Abel Industries®

Trusted quality, service and price!

AbelBonded®
GC Columns

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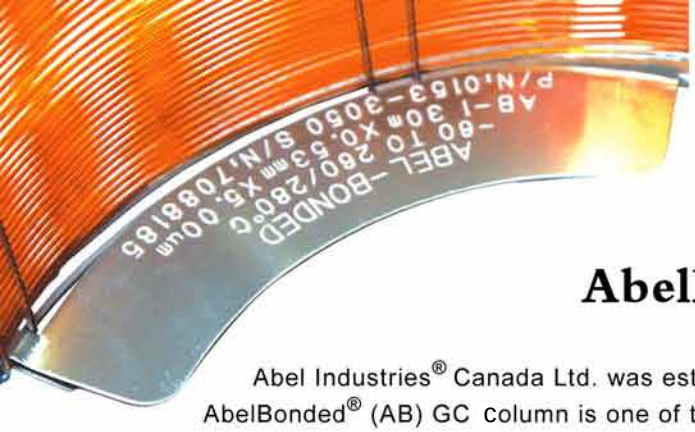


AbelBonded® GC Columns

Abel Industries® Canada Ltd. was established in 1997. It is located in Vancouver BC Canada. AbelBonded® (AB) GC column is one of the proud products of Abel Industries® Canada Ltd (Abel).

AB GC column offers:

- Complete stationary phase selections: Polysiloxane, Polyethylene glycol (PEG) and PLOTs;
- Available in many dimensions (variations in length, internal diameter and film thickness);
- Consistent High performance: lowest bleed, the highest inertness, high efficiency, the most consistent retention time and the greatest repeatability;
- A wide variety of sample matrices, such as food, environmental, clinical toxicology, petrochemical, flavours and fragrances standard mix....
- Competitive price.

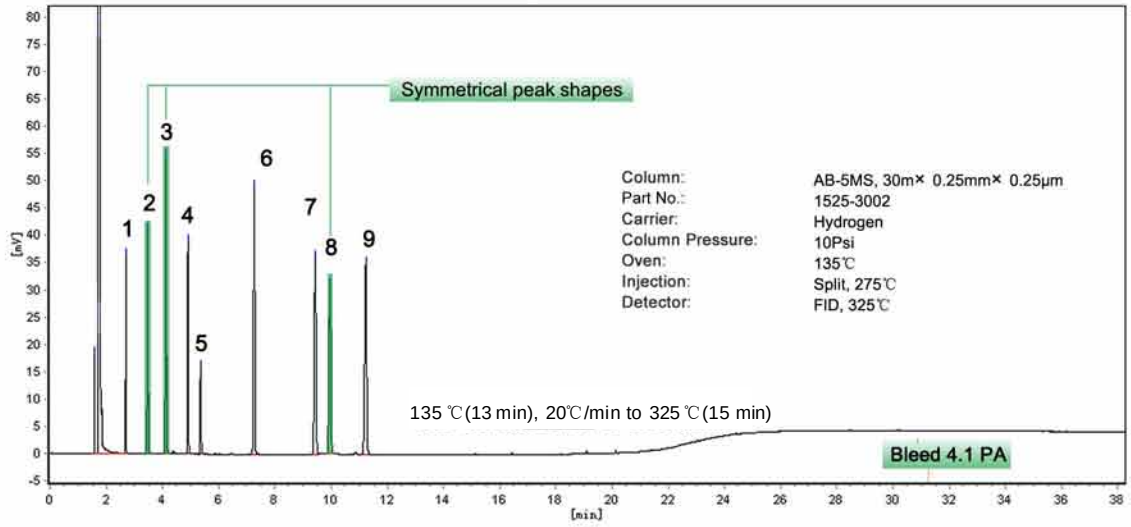
■ Strict Quality Control

Inertness – The inert surface not only significantly reduces the compounds adsorption and peak tailing and also make the peak shapes symmetrical and sharp. Abel's proprietary surface deactivate technology makes AB GC columns the highest inertness.

Bleed – The manufacturing process at Abel (including the strict quality specifications, Abel's unique chemical bonded, and cross-linked technologies) ensures lowest bleed in return giving AB column long lifetime while keeping sensitivity and stability.

Column Efficiency – Abel's strict production requirements and comprehensive evaluation criteria make AB columns gain the highest effective theoretical plates and the best resolution power.

Reproducibility – Every AB GC column is individually tested for coating, efficiency, selectivity, film thickness, inertness and bleed level. Abel controls the capacity factors and the retention index in a narrow window to ensure the column to column's reproducibility and meet the rigorous requirements of various applications.



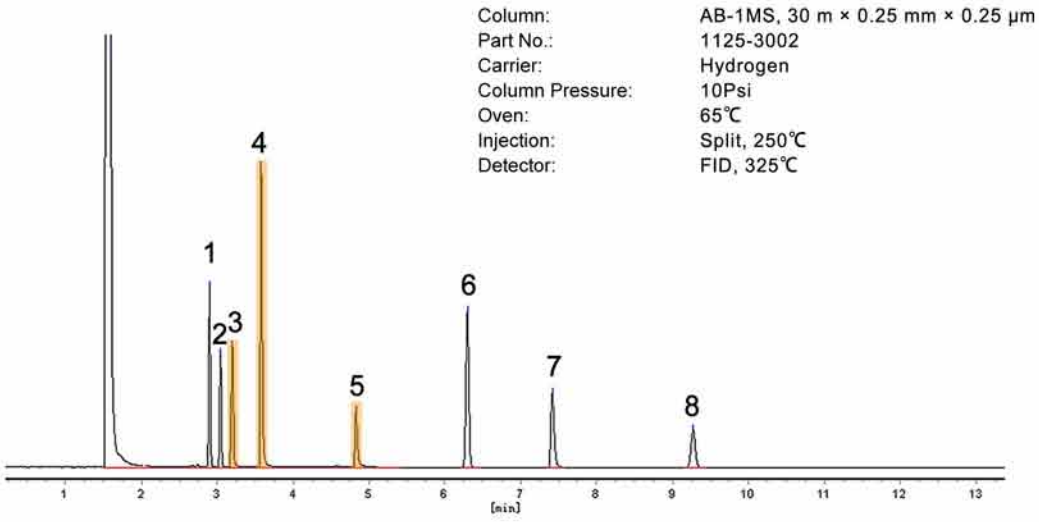
Low Bleed, Excellent Sensitivity ,Thermal Stability and Inertness

1. Undecane
2. 4-Chlorophenol
3. 1-Decylamine
4. Tridecane
5. Methyl decanoate
6. Tetradecane
7. Acenaphthylene
8. 1-Dodecanol
9. Pentadecane

➡ Strict Test Sample ➡

* Testing each column individually;
* Testing and controlling column efficiency, capacity factors, retention index, the peak high ratio of acids and bases to ensure the highest quality and excellent reproducibility.

The Highest Inert



1. 1-Octene
2. n-Octane
3. 1,2-Butanediol
4. 4-Picoline
5. Trimethyl phosphate
6. n-Propylbenzene
7. 3-Octanone
8. n-Decane

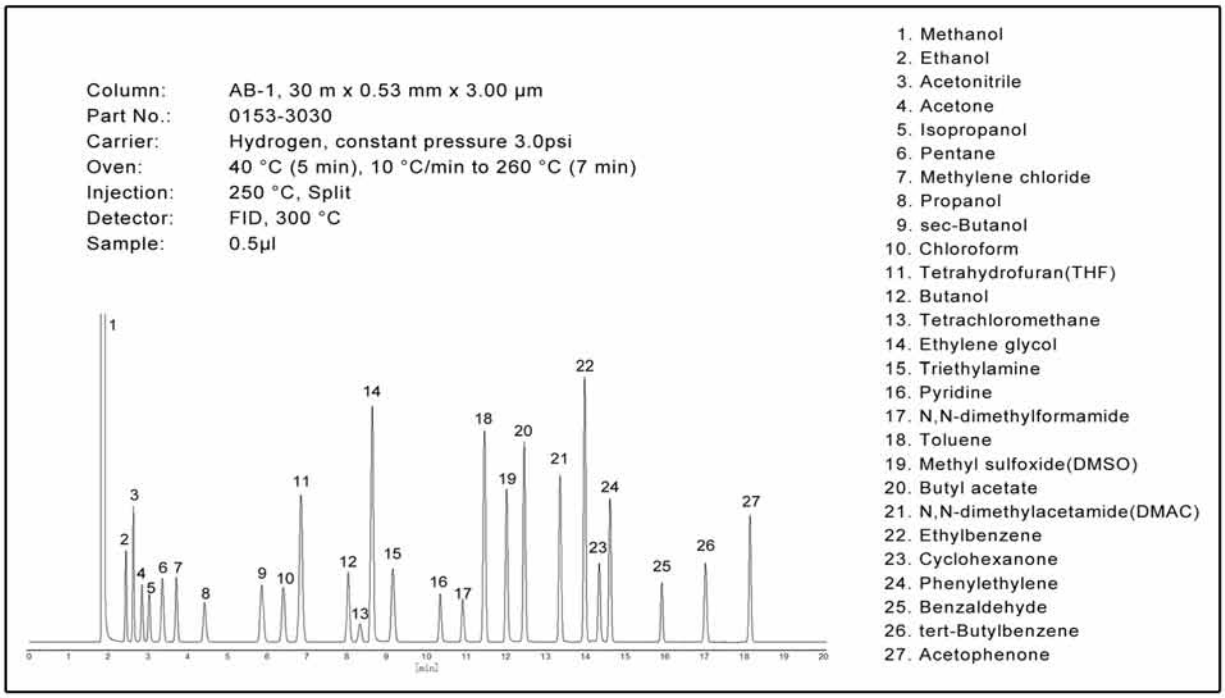
The alcohol uncovers any oxygen damage or exposed silanols. The peak shape is symmetrical. So the AB-1MS column is inert toward to the 1,2-Butanediol.

No steric shielding of the active groups to test column interface strictly. AB-1MS shows excellent peak shapes which further proofs AB-1MS's surface is inert.

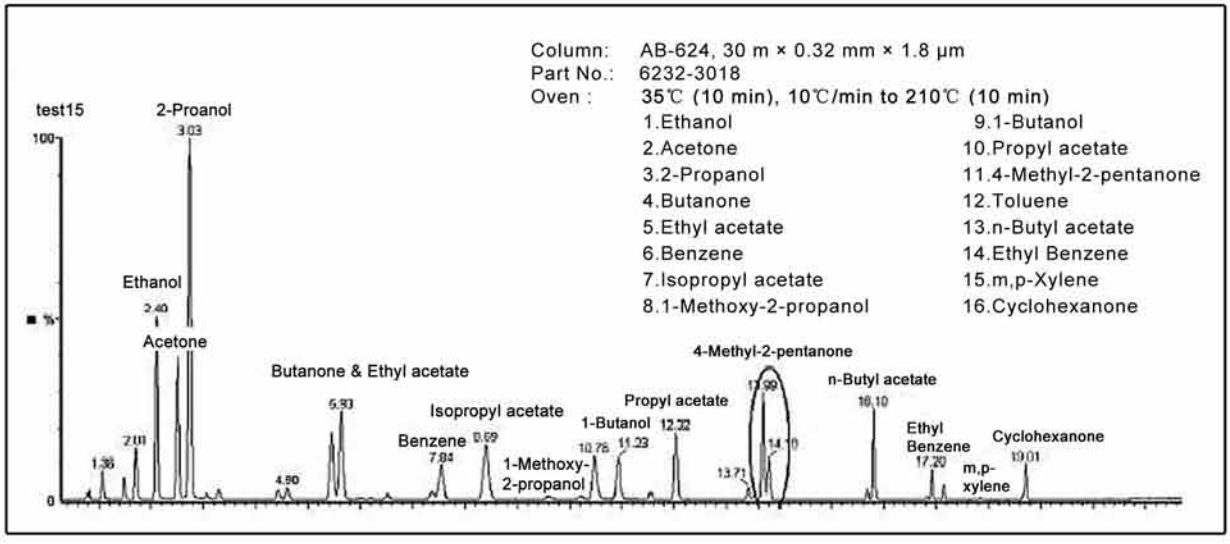
The rigorous test probe mixture can highlight deficiencies in column activity. AB-1MS and AB-5MS are tested by the inert test mixture which has low molecular weights, low boiling points and no steric shielding of their active groups. These characters make the end of each compound active and penetrate to interact with any active portion of the stationary phase and the column surface. AB-1MS and AB-5MS all show ultra Inert performance.

AB GC Column Excellent Performance

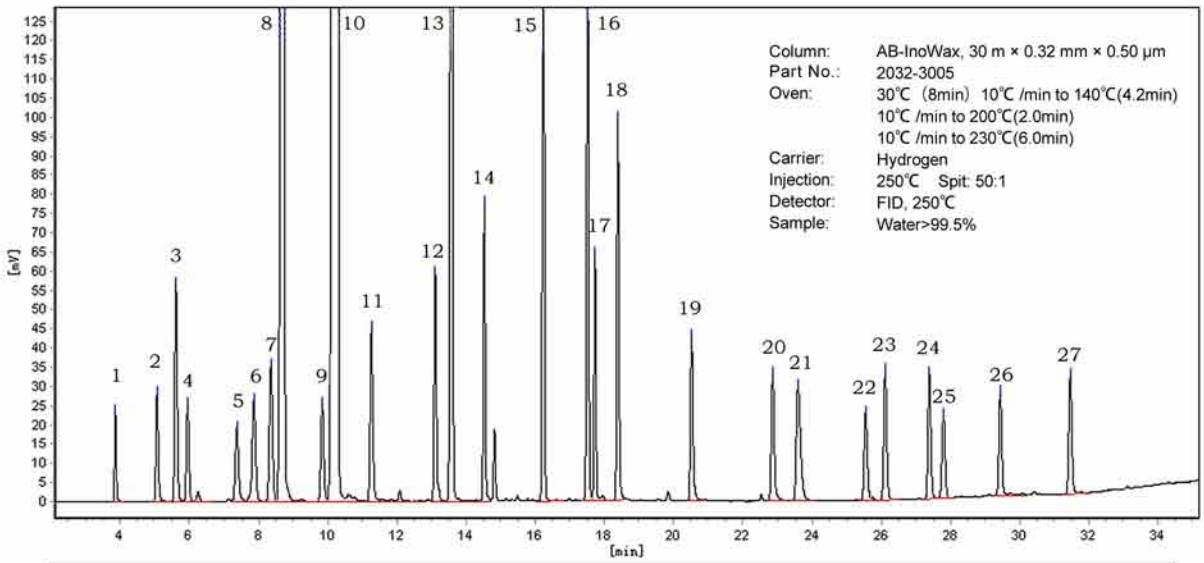
(1) High Efficiency - AB-1 the best selectivity and separation



(2) AB-624



(3) AB-InoWax for analyte with 100% water matrix



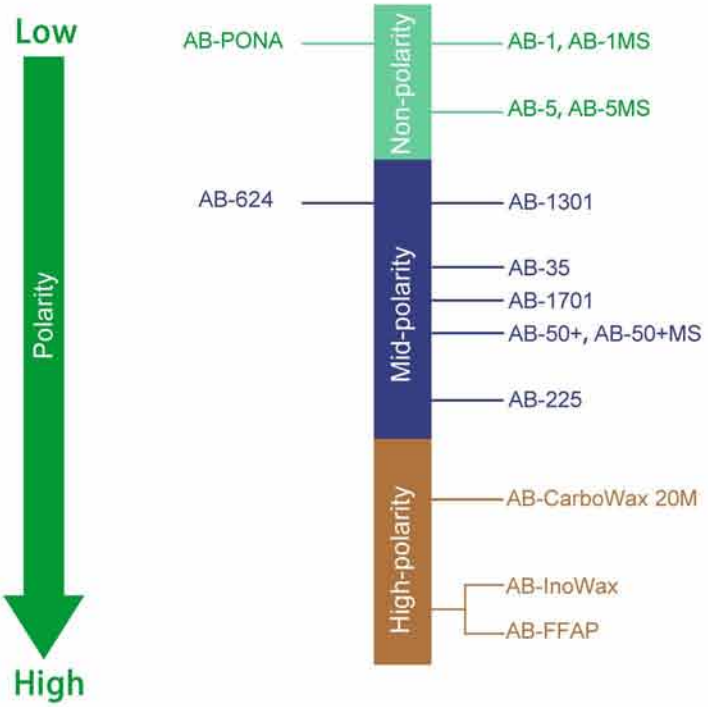
1, Acetaldehyde	10, Ethanol	19, n-Hexanol
2, Propaldehyde	11, Pentanone	20, n-Heptanol
3, Acetone	12, 2-Butyl alcohol	21, Acetic acid
4, Methyl acetate	13, n-Propyl alcohol	22, Propionic acid
5, n-Butylaldehyde	14, Hexanone	23, Isobutyric acid
6, Ethyl acetate	15, n-Butyl alcohol	24, Butyric acid
7, Butanone	16, 3-Methyl-1-butyl alcohol	25, 1,4-Butyrolactone
8, Methanol	17, 2-Hexanol	26, n-Pentanoic acid
9, Isopropanol	18, n-Pentanol	27, Hexanoic acid

AB GC Column's Polarity Reference

Non-polarity
AB-1 AB-1MS
AB-5 AB-5MS

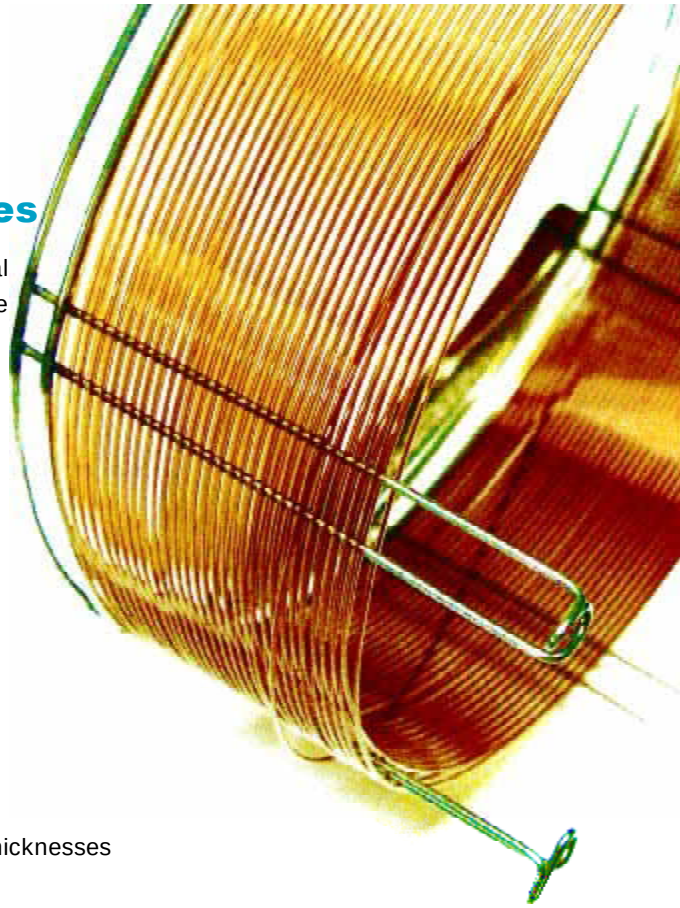
Mid-polarity
AB-1301 AB-624
AB-35 AB-1701
AB-50+ AB-50+MS
AB-225

High-polarity
AB-CarboWax 20M
AB-InoWax
AB-FFAP



AbelBonded®

Polysiloxane Based Stationary Phases



Polysiloxanes are most common stationary phases for general separations. They are relatively stable, robust and versatile to wide range of applications. Different functional groups substitutes replace the methyl group on silicon atom, which characterizes the polarity of polysiloxane. Carefully controlling the polymer synthesis, capillary surface treatment and other manufacturing processes can control the column characteristics, such as polarity, retention, efficiency, inertness and repeatability of column performance to very tight windows.

AB-1

- 100% bonded and crosslinked dimethylpolysiloxane
- Non-polar, equivalent to USP phase G2
- Solvent rinsable and high temperature limit
- Wide range of column dimensions and stationary phase film thicknesses
- Low column bleed, inert surface and high efficiency
- Most popular for general applications

Similar phases: DB-1, HP-1, Ultra-1, SPB-1, Rtx-1, CP-Sil 5CB, BP-1, ZB-1, AT-1, MDN-1, OV-1, OV-101

Order Information:

P/N	Description	Length(m)	ID(mm)	Film (μm)	Temperature Limit (℃)
0118-1001	AB-1, 10m × 0.18mm × 0.18 μm	10	0.18	0.18	-60 to 325/350
0118-1003	AB-1, 10m × 0.18mm × 0.36 μm	10	0.18	0.36	-60 to 325/350
0118-1004	AB-1, 10m × 0.18mm × 0.40 μm	10	0.18	0.40	-60 to 325/350
0118-2001	AB-1, 20m × 0.18mm × 0.18 μm	20	0.18	0.18	-60 to 325/350
0118-2003	AB-1, 20m × 0.18mm × 0.36 μm	20	0.18	0.36	-60 to 325/350
0118-2004	AB-1, 20m × 0.18mm × 0.40 μm	20	0.18	0.40	-60 to 325/350
0118-4004	AB-1, 40m × 0.18mm × 0.40 μm	40	0.18	0.40	-60 to 325/350
0120-1203	AB-1, 12m × 0.20mm × 0.33 μm	12	0.20	0.33	-60 to 325/350
0120-2501	AB-1, 25m × 0.20mm × 0.11 μm	25	0.20	0.11	-60 to 325/350
0120-2503	AB-1, 25m × 0.20mm × 0.33 μm	25	0.20	0.33	-60 to 325/350
0120-2505	AB-1, 25m × 0.20mm × 0.50 μm	25	0.20	0.50	-60 to 325/350
0120-5001	AB-1, 50m × 0.20mm × 0.11 μm	50	0.20	0.11	-60 to 325/350
0120-5003	AB-1, 50m × 0.20mm × 0.33 μm	50	0.20	0.33	-60 to 325/350
0125-1501	AB-1, 15m × 0.25mm × 0.10 μm	15	0.25	0.10	-60 to 325/350
0125-1502	AB-1, 15m × 0.25mm × 0.25 μm	15	0.25	0.25	-60 to 325/350
0125-1510	AB-1, 15m × 0.25mm × 1.00 μm	15	0.25	1.00	-60 to 325/350
0125-3001	AB-1, 30m × 0.25mm × 0.10 μm	30	0.25	0.10	-60 to 325/350
0125-3002	AB-1, 30m × 0.25mm × 0.25 μm	30	0.25	0.25	-60 to 325/350
0125-3005	AB-1, 30m × 0.25mm × 0.50 μm	30	0.25	0.50	-60 to 325/350
0125-3010	AB-1, 30m × 0.25mm × 1.00 μm	30	0.25	1.00	-60 to 325/350
0125-6002	AB-1, 60m × 0.25mm × 0.25 μm	60	0.25	0.25	-60 to 325/350

AB-1

Order Information:

P/N	Description	Length (m)	ID (mm)	Film (μm)	Temperature Limit (℃)
0125-6005	AB-1, 60m × 0.25mm × 0.50 μm	60	0.25	0.50	-60 to 325/350
0125-6010	AB-1, 60m × 0.25mm × 1.00 μm	60	0.25	1.00	-60 to 325/350
0132-1501	AB-1, 15m × 0.32mm × 0.10 μm	15	0.32	0.10	-60 to 325/350
0132-1502	AB-1, 15m × 0.32mm × 0.25 μm	15	0.32	0.25	-60 to 325/350
0132-1510	AB-1, 15m × 0.32mm × 1.00 μm	15	0.32	1.00	-60 to 325/350
0132-2501	AB-1, 25m × 0.32mm × 0.17 μm	25	0.32	0.17	-60 to 325/350
0132-2505	AB-1, 25m × 0.32mm × 0.52 μm	25	0.32	0.52	-60 to 325/350
0132-2510	AB-1, 25m × 0.32mm × 1.05 μm	25	0.32	1.05	-60 to 325/350
0132-3001	AB-1, 30m × 0.32mm × 0.10 μm	30	0.32	0.10	-60 to 325/350
0132-3002	AB-1, 30m × 0.32mm × 0.25 μm	30	0.32	0.25	-60 to 325/350
0132-3005	AB-1, 30m × 0.32mm × 0.50 μm	30	0.32	0.50	-60 to 325/350
0132-3010	AB-1, 30m × 0.32mm × 1.00 μm	30	0.32	1.00	-60 to 325/350
0132-3030	AB-1, 30m × 0.32mm × 3.00 μm	30	0.32	3.00	-60 to 260/280
0132-3040	AB-1, 30m × 0.32mm × 4.00 μm	30	0.32	4.00	-60 to 260/280
0132-3050	AB-1, 30m × 0.32mm × 5.00 μm	30	0.32	5.00	-60 to 260/280
0132-5001	AB-1, 50m × 0.32mm × 0.17 μm	50	0.32	0.17	-60 to 325/350
0132-5005	AB-1, 50m × 0.32mm × 0.52 μm	50	0.32	0.52	-60 to 325/350
0132-5010	AB-1, 50m × 0.32mm × 1.05 μm	50	0.32	1.05	-60 to 325/350
0132-6001	AB-1, 60m × 0.32mm × 0.10 μm	60	0.32	0.10	-60 to 325/350
0132-6002	AB-1, 60m × 0.32mm × 0.25 μm	60	0.32	0.25	-60 to 325/350
0132-6005	AB-1, 60m × 0.32mm × 0.50 μm	60	0.32	0.50	-60 to 325/350
0132-6010	AB-1, 60m × 0.32mm × 1.00 μm	60	0.32	1.00	-60 to 325/350
0132-6030	AB-1, 60m × 0.32mm × 3.00 μm	60	0.32	3.00	-60 to 260/280
0132-6050	AB-1, 60m × 0.32mm × 5.00 μm	60	0.32	5.00	-60 to 260/280
0153-0501	AB-1, 5m × 0.53mm × 0.15 μm	5	0.53	0.15	-60 to 320/350
0153-0508	AB-1, 5m × 0.53mm × 0.88 μm	5	0.53	0.88	-60 to 300/320
0153-0526	AB-1, 5m × 0.53mm × 2.65 μm	5	0.53	2.65	-60 to 260/280
0153-0550	AB-1, 5m × 0.53mm × 5.00 μm	5	0.53	5.00	-60 to 260/280
0153-0715	AB-1, 7.5m × 0.53mm × 1.50 μm	7.5	0.53	1.50	-60 to 280/300
0153-0750	AB-1, 7.5m × 0.53mm × 5.00 μm	7.5	0.53	5.00	-60 to 260/280
0153-1008	AB-1, 10m × 0.53mm × 0.88 μm	10	0.53	0.88	-60 to 300/320
0153-1026	AB-1, 10m × 0.53mm × 2.65 μm	10	0.53	2.65	-60 to 260/280
0153-1050	AB-1, 10m × 0.53mm × 5.00 μm	10	0.53	5.00	-60 to 260/280
0153-1501	AB-1, 15m × 0.53mm × 0.15 μm	15	0.53	0.15	-60 to 325/350
0153-1502	AB-1, 15m × 0.53mm × 0.25 μm	15	0.53	0.25	-60 to 325/350
0153-1505	AB-1, 15m × 0.53mm × 0.50 μm	15	0.53	0.50	-60 to 300/320
0153-1510	AB-1, 15m × 0.53mm × 1.00 μm	15	0.53	1.00	-60 to 300/320
0153-1515	AB-1, 15m × 0.53mm × 1.50 μm	15	0.53	1.50	-60 to 300/320
0153-1530	AB-1, 15m × 0.53mm × 3.00 μm	15	0.53	3.00	-60 to 260/280
0153-1550	AB-1, 15m × 0.53mm × 5.00 μm	15	0.53	5.00	-60 to 260/280
0153-3001	AB-1, 30m × 0.53mm × 0.15 μm	30	0.53	0.15	-60 to 325/320
0153-3002	AB-1, 30m × 0.53mm × 0.25 μm	30	0.53	0.25	-60 to 325/320
0153-3005	AB-1, 30m × 0.53mm × 0.50 μm	30	0.53	0.50	-60 to 300/320
0153-3008	AB-1, 30m × 0.53mm × 0.88 μm	30	0.53	0.88	-60 to 300/320
0153-3010	AB-1, 30m × 0.53mm × 1.00 μm	30	0.53	1.00	-60 to 300/320
0153-3015	AB-1, 30m × 0.53mm × 1.50 μm	30	0.53	1.50	-60 to 300/320
0153-3026	AB-1, 30m × 0.53mm × 2.65 μm	30	0.53	2.65	-60 to 260/280
0153-3030	AB-1, 30m × 0.53mm × 3.00 μm	30	0.53	3.00	-60 to 260/280
0153-3050	AB-1, 30m × 0.53mm × 5.00 μm	30	0.53	5.00	-60 to 260/280
0153-5030	AB-1, 50m × 0.53mm × 3.00 μm	50	0.53	3.00	-60 to 260/280
0153-5050	AB-1, 50m × 0.53mm × 5.00 μm	50	0.53	5.00	-60 to 260/280
0153-6010	AB-1, 60m × 0.53mm × 1.00 μm	60	0.53	1.00	-60 to 300/320
0153-6030	AB-1, 60m × 0.53mm × 3.00 μm	60	0.53	3.00	-60 to 260/280
0153-6050	AB-1, 60m × 0.53mm × 5.00 μm	60	0.53	5.00	-60 to 260/280

AB-1MS

- Identical selectivity to AB-1 but with much lower column bleed
- Ideal for GC-MS analysis and first choice of a new method development

Similar phases: HP-1MS, DB-1MS, BPX-1, AT-1MS, ZB-1, Rtx-1, CP-Sil 5 CB

Order Information:

P/N	Description	Length (m)	ID (mm)	Film (μm)	Temperature Limit (℃)
1118-2001	AB-1MS, 20m × 0.18mm × 0.18 μm	20	0.18	0.18	-60 to 325/350
1118-2003	AB-1MS, 20m × 0.18mm × 0.36 μm	20	0.18	0.36	-60 to 325/350
1118-2004	AB-1MS, 20m × 0.18mm × 0.40 μm	20	0.18	0.40	-60 to 325/350
1118-4004	AB-1MS, 40m × 0.18mm × 0.40 μm	40	0.18	0.40	-60 to 325/350
1120-1503	AB-1MS, 15m × 0.20mm × 0.33 μm	15	0.20	0.33	-60 to 325/350
1120-2503	AB-1MS, 25m × 0.20mm × 0.33 μm	25	0.20	0.33	-60 to 325/350
1125-1502	AB-1MS, 15m × 0.25mm × 0.25 μm	15	0.25	0.25	-60 to 325/350
1125-3001	AB-1MS, 30m × 0.25mm × 0.10 μm	30	0.25	0.10	-60 to 325/350
1125-3002	AB-1MS, 30m × 0.25mm × 0.25 μm	30	0.25	0.25	-60 to 325/350
1125-3005	AB-1MS, 30m × 0.25mm × 0.50 μm	30	0.25	0.50	-60 to 325/350
1125-3010	AB-1MS, 30m × 0.25mm × 1.00 μm	30	0.25	1.00	-60 to 325/350
1125-6002	AB-1MS, 60m × 0.25mm × 0.25 μm	60	0.25	0.25	-60 to 325/350
1132-1502	AB-1MS, 15m × 0.32mm × 0.25 μm	15	0.32	0.25	-60 to 325/350
1132-2505	AB-1MS, 25m × 0.32mm × 0.52 μm	25	0.32	0.52	-60 to 325/350
1132-3001	AB-1MS, 30m × 0.32mm × 0.10 μm	30	0.32	0.10	-60 to 325/350
1132-3002	AB-1MS, 30m × 0.32mm × 0.25 μm	30	0.32	0.25	-60 to 325/350
1132-3010	AB-1MS, 30m × 0.32mm × 1.00 μm	30	0.32	1.00	-60 to 325/350
1132-6002	AB-1MS, 60m × 0.32mm × 0.25 μm	60	0.32	0.25	-60 to 325/350

AB-5

- 5% phenyl, 95% dimethylpolysiloxane, bonded and crosslinked
- Non-polar, equivalent to USP phase G27
- Solvent rinsable and high temperature limit
- Wide range of column dimensions and stationary phase film thicknesses
- Low column bleed, inert surface with neutral surface and high efficiency
- Most popular for general applications

Similar phases: DB-5, HP-5, Ultra-5, SPB-5, Rtx-5, CP-Sil 8CB, BP-5, ZB-5, AT-5, MDN-5, OV-5, SE-52, SE-54

Order Information:

P/N	Description	Length (m)	ID (mm)	Film (μm)	Temperature Limit (℃)
0518-1001	AB-5, 10m × 0.18mm × 0.18 μm	10	0.18	0.18	-60 to 325/350
0518-1003	AB-5, 10m × 0.18mm × 0.36 μm	10	0.18	0.36	-60 to 325/350
0518-1004	AB-5, 10m × 0.18mm × 0.40 μm	10	0.18	0.40	-60 to 325/350
0518-2001	AB-5, 20m × 0.18mm × 0.18 μm	20	0.18	0.18	-60 to 325/350
0518-2003	AB-5, 20m × 0.18mm × 0.36 μm	20	0.18	0.36	-60 to 325/350
0518-2004	AB-5, 20m × 0.18mm × 0.40 μm	20	0.18	0.40	-60 to 325/350
0518-4001	AB-5, 40m × 0.18mm × 0.18 μm	40	0.18	0.18	-60 to 325/350
0520-1203	AB-5, 12m × 0.20mm × 0.33 μm	12	0.20	0.33	-60 to 325/350
0520-1703	AB-5, 17m × 0.20mm × 0.33 μm	17	0.20	0.33	-60 to 325/350
0520-2501	AB-5, 25m × 0.20mm × 0.11 μm	25	0.20	0.11	-60 to 325/350

Order Information:

P/N	Description	Length (m)	ID (mm)	Film (μm)	Temperature Limit (℃)
0520-2503	AB-5, 25m × 0.20mm × 0.33 μm	25	0.20	0.33	-60 to 325/350
0520-2505	AB-5, 25m × 0.20mm × 0.50 μm	25	0.20	0.50	-60 to 325/350
0520-5001	AB-5, 50m × 0.20mm × 0.11 μm	50	0.20	0.11	-60 to 325/350
0520-5003	AB-5, 50m × 0.20mm × 0.33 μm	50	0.20	0.33	-60 to 325/350
0520-5005	AB-5, 50m × 0.20mm × 0.50 μm	50	0.20	0.50	-60 to 325/350
0525-1501	AB-5, 15m × 0.25mm × 0.10 μm	15	0.25	0.10	-60 to 325/350
0525-1502	AB-5, 15m × 0.25mm × 0.25 μm	15	0.25	0.25	-60 to 325/350
0525-1505	AB-5, 15m × 0.25mm × 0.50 μm	15	0.25	0.50	-60 to 325/350
0525-1510	AB-5, 15m × 0.25mm × 1.00 μm	15	0.25	1.00	-60 to 325/350
0525-3001	AB-5, 30m × 0.25mm × 0.11 μm	30	0.25	0.11	-60 to 325/350
0525-3002	AB-5, 30m × 0.25mm × 0.25 μm	30	0.25	0.25	-60 to 325/350
0525-3005	AB-5, 30m × 0.25mm × 0.50 μm	30	0.25	0.50	-60 to 325/350
0525-3010	AB-5, 30m × 0.25mm × 1.00 μm	30	0.25	1.00	-60 to 325/350
0525-6001	AB-5, 60m × 0.25mm × 0.10 μm	60	0.25	0.10	-60 to 325/350
0525-6002	AB-5, 60m × 0.25mm × 0.25 μm	60	0.25	0.25	-60 to 325/350
0525-6005	AB-5, 60m × 0.25mm × 0.50 μm	60	0.25	0.50	-60 to 325/350
0525-6010	AB-5, 60m × 0.25mm × 1.00 μm	60	0.25	1.00	-60 to 325/350
0532-1501	AB-5, 15m × 0.32mm × 0.10 μm	15	0.32	0.10	-60 to 325/350
0532-1502	AB-5, 15m × 0.32mm × 0.25 μm	15	0.32	0.25	-60 to 325/350
0532-1505	AB-5, 15m × 0.32mm × 0.50 μm	15	0.32	0.50	-60 to 325/350
0532-1510	AB-5, 15m × 0.32mm × 1.00 μm	15	0.32	1.00	-60 to 325/350
0532-2501	AB-5, 25m × 0.32mm × 0.17 μm	25	0.32	0.17	-60 to 325/350
0532-2505	AB-5, 25m × 0.32mm × 0.52 μm	25	0.32	0.52	-60 to 325/350
0532-2510	AB-5, 25m × 0.32mm × 1.05 μm	25	0.32	1.05	-60 to 300/320
0532-3001	AB-5, 30m × 0.32mm × 0.10 μm	30	0.32	0.10	-60 to 325/350
0532-3002	AB-5, 30m × 0.32mm × 0.25 μm	30	0.32	0.25	-60 to 325/350
0532-3005	AB-5, 30m × 0.32mm × 0.50 μm	30	0.32	0.50	-60 to 325/350
0532-3010	AB-5, 30m × 0.32mm × 1.00 μm	30	0.32	1.00	-60 to 300/320
0532-5001	AB-5, 50m × 0.32mm × 0.17 μm	50	0.32	0.17	-60 to 325/350
0532-5005	AB-5, 50m × 0.32mm × 0.52 μm	50	0.32	0.52	-60 to 325/350
0532-5010	AB-5, 50m × 0.32mm × 1.05 μm	50	0.32	1.05	-60 to 300/320
0532-6001	AB-5, 60m × 0.32mm × 0.10 μm	60	0.32	0.10	-60 to 325/350
0532-6002	AB-5, 60m × 0.32mm × 0.25 μm	60	0.32	0.25	-60 to 325/350
0532-6010	AB-5, 60m × 0.32mm × 1.00 μm	60	0.32	1.00	-60 to 325/350
0553-1026	AB-5, 10m × 0.53mm × 2.65 μm	10	0.53	2.65	-60 to 260/280
0553-1050	AB-5, 10m × 0.53mm × 5.00 μm	10	0.53	5.00	-60 to 260/280
0553-1515	AB-5, 15m × 0.53mm × 1.50 μm	15	0.53	1.50	-60 to 300/320
0553-1530	AB-5, 15m × 0.53mm × 3.00 μm	15	0.53	3.00	-60 to 260/280
0553-1550	AB-5, 15m × 0.53mm × 5.00 μm	15	0.53	5.00	-60 to 260/280
0553-3002	AB-5, 30m × 0.53mm × 0.25 μm	30	0.53	0.25	-60 to 300/320
0553-3008	AB-5, 30m × 0.53mm × 0.88 μm	30	0.53	0.88	-60 to 300/320
0553-3015	AB-5, 30m × 0.53mm × 1.50 μm	30	0.53	1.50	-60 to 300/320
0553-3026	AB-5, 30m × 0.53mm × 2.65 μm	30	0.53	2.65	-60 to 260/280
0553-3030	AB-5, 30m × 0.53mm × 3.00 μm	30	0.53	3.00	-60 to 260/280
0553-3050	AB-5, 30m × 0.53mm × 5.00 μm	30	0.53	5.00	-60 to 260/280
0553-6030	AB-5, 60m × 0.53mm × 3.00 μm	60	0.53	3.00	-60 to 260/280
0553-6050	AB-5, 60m × 0.53mm × 5.00 μm	60	0.53	5.00	-60 to 260/280

AB-5MS

- Identical selectivity to AB-5 but with much lower column bleed
- Best surface inertness for wide range of compounds
- Ideal for a GC-MS analysis or a new method development

Similar phases: HP-5MS, DB-5MS, BPX-5MS, AT-5MS, Rtx-5MS, CP-Sil 8 CB

Order Information:

P/N	Description	Length (m)	ID (mm)	Film (μm)	Temperature Limit (℃)
1518-1001	AB-5MS, 10m × 0.18mm × 0.18 μm	10	0.18	0.18	-60 to 325/350
1518-1003	AB-5MS, 10m × 0.18mm × 0.36 μm	10	0.18	0.36	-60 to 325/350
1518-2001	AB-5MS, 20m × 0.18mm × 0.18 μm	20	0.18	0.18	-60 to 325/350
1518-2003	AB-5MS, 20m × 0.18mm × 0.36 μm	20	0.18	0.36	-60 to 325/350
1518-4001	AB-5MS, 40m × 0.18mm × 0.18 μm	40	0.18	0.18	-60 to 325/350
1520-1203	AB-5MS, 12m × 0.20mm × 0.33 μm	12	0.20	0.33	-60 to 325/350
1520-1703	AB-5MS, 17m × 0.20mm × 0.33 μm	17	0.20	0.33	-60 to 325/350
1520-2503	AB-5MS, 25m × 0.20mm × 0.33 μm	25	0.20	0.33	-60 to 325/350
1520-5003	AB-5MS, 50m × 0.20mm × 0.33 μm	50	0.20	0.33	-60 to 325/350
1525-1501	AB-5MS, 15m × 0.25mm × 0.10 μm	15	0.25	0.10	-60 to 325/350
1525-1502	AB-5MS, 15m × 0.25mm × 0.25 μm	15	0.25	0.25	-60 to 325/350
1525-1505	AB-5MS, 15m × 0.25mm × 0.50 μm	15	0.25	0.50	-60 to 325/350
1525-1510	AB-5MS, 15m × 0.25mm × 1.00 μm	15	0.25	1.00	-60 to 325/350
1525-3001	AB-5MS, 30m × 0.25mm × 0.10 μm	30	0.25	0.10	-60 to 325/350
1525-3002	AB-5MS, 30m × 0.25mm × 0.25 μm	30	0.25	0.25	-60 to 325/350
1525-3005	AB-5MS, 30m × 0.25mm × 0.50 μm	30	0.25	0.50	-60 to 325/350
1525-3010	AB-5MS, 30m × 0.25mm × 1.00 μm	30	0.25	1.00	-60 to 325/350
1525-6001	AB-5MS, 60m × 0.25mm × 0.10 μm	60	0.25	0.10	-60 to 325/350
1525-6002	AB-5MS, 60m × 0.25mm × 0.25 μm	60	0.25	0.25	-60 to 325/350
1525-6005	AB-5MS, 60m × 0.25mm × 0.50 μm	60	0.25	0.50	-60 to 325/350
1525-6010	AB-5MS, 60m × 0.25mm × 1.00 μm	60	0.25	1.00	-60 to 325/350
1532-1501	AB-5MS, 15m × 0.32mm × 0.10 μm	15	0.32	0.10	-60 to 325/350
1532-1502	AB-5MS, 15m × 0.32mm × 0.25 μm	15	0.32	0.25	-60 to 325/350
1532-1505	AB-5MS, 15m × 0.32mm × 0.50 μm	15	0.32	0.50	-60 to 325/350
1532-1510	AB-5MS, 15m × 0.32mm × 1.00 μm	15	0.32	1.00	-60 to 325/350
1532-2505	AB-5MS, 25m × 0.32mm × 0.52 μm	25	0.32	0.52	-60 to 325/350
1532-3001	AB-5MS, 30m × 0.32mm × 0.10 μm	30	0.32	0.10	-60 to 325/350
1532-3002	AB-5MS, 30m × 0.32mm × 0.25 μm	30	0.32	0.25	-60 to 325/350
1532-3005	AB-5MS, 30m × 0.32mm × 0.50 μm	30	0.32	0.50	-60 to 325/350
1532-3010	AB-5MS, 30m × 0.32mm × 1.00 μm	30	0.32	1.00	-60 to 325/350
1532-6001	AB-5MS, 60m × 0.32mm × 0.10 μm	60	0.32	0.10	-60 to 325/350
1532-6002	AB-5MS, 60m × 0.32mm × 0.25 μm	60	0.32	0.25	-60 to 325/350
1532-6005	AB-5MS, 60m × 0.32mm × 0.50 μm	60	0.32	0.50	-60 to 325/350
1532-6010	AB-5MS, 60m × 0.32mm × 1.00 μm	60	0.32	1.00	-60 to 325/350
1553-3005	AB-5MS, 30m × 0.53mm × 0.50 μm	30	0.53	0.50	-60 to 300/320
1553-3008	AB-5MS, 30m × 0.53mm × 0.88 μm	30	0.53	0.88	-60 to 300/320
1553-3015	AB-5MS, 30m × 0.53mm × 1.50 μm	30	0.53	1.50	-60 to 300/320

AB-35

- Bonded and crosslinked, 35% phenyl backbone, 65% dimethylpolysiloxane
- Equivalent to USP phase G42
- Inert for active compounds
- Idea for confirmation analyses
- Low column bleed to improve detection sensitivity and quantitation
- Applications: Arochlors, PCBs, amines, pesticides, pharmaceutical molecules

Similar Phases: HP-35MS, DB-35, BPX-35, AT-35, Rtx-35, SPB-35

Order Information:

P/N	Description	Length (m)	ID (mm)	Film (μm)	Temperature Limit (℃)
3525-3001	AB-35, 30m × 0.25mm × 0.15 μm	30	0.25	0.15	40 to 300/320
3525-3002	AB-35, 30m × 0.25mm × 0.25 μm	30	0.25	0.25	40 to 300/320
3525-3005	AB-35, 30m × 0.25mm × 0.50 μm	30	0.25	0.50	40 to 300/320
3525-6002	AB-35, 60m × 0.25mm × 0.25 μm	60	0.25	0.25	40 to 300/320
3525-6005	AB-35, 60m × 0.25mm × 0.50 μm	60	0.25	0.50	40 to 300/320
3532-1502	AB-35, 15m × 0.32mm × 0.25 μm	15	0.32	0.25	40 to 300/320
3532-3002	AB-35, 30m × 0.32mm × 0.25 μm	30	0.32	0.25	40 to 300/320
3532-3005	AB-35, 30m × 0.32mm × 0.50 μm	30	0.32	0.50	40 to 300/320
3532-6002	AB-35, 60m × 0.32mm × 0.25 μm	60	0.32	0.25	40 to 300/320
3532-6005	AB-35, 60m × 0.32mm × 0.50 μm	60	0.32	0.50	40 to 300/320
3553-3005	AB-35, 30m × 0.53mm × 0.50 μm	30	0.53	0.50	40 to 280/300
3553-3010	AB-35, 30m × 0.53mm × 1.00 μm	30	0.53	1.00	40 to 280/300
3553-3015	AB-35, 30m × 0.53mm × 1.50 μm	30	0.53	1.50	40 to 260/280
3553-6005	AB-35, 60m × 0.53mm × 0.50 μm	60	0.53	0.50	40 to 280/300

AB-50+

- 50% phenyl, 50% dimethylpolysiloxane
- Mid polar, most popular to general applications
- Bonded and Crosslinked, Solvent Rinsable
- Equivalent to USP G3 Phase

Similar phases: DB-17, DB-17MS, HP-50+, Rtx-50, ZB-50, CP-Sil 24CB, 007-17, AT-50, SPB-50, SP-2250

Order Information:

P/N	Description	Length (m)	ID (mm)	Film (μm)	Temperature Limit (℃)
5018-2001	AB-50+, 20m × 0.18mm × 0.18 μm	20	0.18	0.18	40 to 300/320
5018-2003	AB-50+, 20m × 0.18mm × 0.30 μm	20	0.18	0.30	40 to 300/320
5025-1501	AB-50+, 15m × 0.25mm × 0.15 μm	15	0.25	0.15	40 to 300/320
5025-1502	AB-50+, 15m × 0.25mm × 0.25 μm	15	0.25	0.25	40 to 300/320
5025-1505	AB-50+, 15m × 0.25mm × 0.50 μm	15	0.25	0.50	40 to 290/310
5025-3001	AB-50+, 30m × 0.25mm × 0.15 μm	30	0.25	0.15	40 to 300/320
5025-3002	AB-50+, 30m × 0.25mm × 0.25 μm	30	0.25	0.25	40 to 300/320
5025-3005	AB-50+, 30m × 0.25mm × 0.50 μm	30	0.25	0.50	40 to 290/310
5025-6002	AB-50+, 60m × 0.25mm × 0.25 μm	60	0.25	0.25	40 to 300/320
5032-1501	AB-50+, 15m × 0.32mm × 0.15 μm	15	0.32	0.15	40 to 300/320
5032-1502	AB-50+, 15m × 0.32mm × 0.25 μm	15	0.32	0.25	40 to 300/320
5032-1505	AB-50+, 15m × 0.32mm × 0.50 μm	15	0.32	0.50	40 to 290/310
5032-3001	AB-50+, 30m × 0.32mm × 0.15 μm	30	0.32	0.15	40 to 300/320
5032-3002	AB-50+, 30m × 0.32mm × 0.25 μm	30	0.32	0.25	40 to 300/320
5032-3005	AB-50+, 30m × 0.32mm × 0.50 μm	30	0.32	0.50	40 to 290/310
5032-3010	AB-50+, 30m × 0.32mm × 1.00 μm	30	0.32	1.00	40 to 280/300
5032-6002	AB-50+, 60m × 0.32mm × 0.25 μm	60	0.32	0.25	40 to 300/320
5053-1502	AB-50+, 15m × 0.53mm × 0.25 μm	15	0.53	0.25	40 to 260/280
5053-1505	AB-50+, 15m × 0.53mm × 0.50 μm	15	0.53	0.50	40 to 260/280
5053-1510	AB-50+, 15m × 0.53mm × 1.00 μm	15	0.53	1.00	40 to 260/280
5053-1515	AB-50+, 15m × 0.53mm × 1.50 μm	15	0.53	1.50	40 to 260/280
5053-3002	AB-50+, 30m × 0.53mm × 0.25 μm	30	0.53	0.25	40 to 260/280
5053-3005	AB-50+, 30m × 0.53mm × 0.50 μm	30	0.53	0.50	40 to 260/280
5053-3010	AB-50+, 30m × 0.53mm × 1.00 μm	30	0.53	1.00	40 to 260/280
5053-3015	AB-50+, 30m × 0.53mm × 1.50 μm	30	0.53	1.50	40 to 260/280
5053-6010	AB-50+, 60m × 0.53mm × 1.00 μm	60	0.53	1.00	40 to 260/280

AB-50+MS

- 50% phenyl, 50% dimethylpolysiloxane
- Excellent inertness for active compounds
- High temperature limit
- Low column bleed to improve detection sensitivity
- Mid polar, most popular to general applications
- Bonded and crosslinked, Solvent Rinsable
- Equivalent to USP Phase G3

Similar phases: DB-17, DB-17MS, HP-50+, Rtx-50, ZB-50, CP-Sil 24CB, 007-17, AT-50, SPB-50, SP-2250

Order Information:

P/N	Description	Length (m)	ID (mm)	Film (μm)	Temperature Limit (℃)
5118-2001	AB-50+MS, 20m × 0.18mm × 0.18 μm	20	0.18	0.18	40 to 320/340
5125-1501	AB-50+MS, 15m × 0.25mm × 0.15 μm	15	0.25	0.15	40 to 320/340
5125-1502	AB-50+MS, 15m × 0.25mm × 0.25 μm	15	0.25	0.25	40 to 320/340
5125-3001	AB-50+MS, 30m × 0.25mm × 0.15 μm	30	0.25	0.15	40 to 320/340
5125-3002	AB-50+MS, 30m × 0.25mm × 0.25 μm	30	0.25	0.25	40 to 320/340
5125-6002	AB-50+MS, 60m × 0.25mm × 0.25 μm	60	0.25	0.25	40 to 320/340
5132-1502	AB-50+MS, 15m × 0.32mm × 0.25 μm	15	0.32	0.25	40 to 320/340
5132-3002	AB-50+MS, 30m × 0.32mm × 0.25 μm	30	0.32	0.25	40 to 320/340

■ AB-1301

- Bonded and crosslinked, 6% cyanopropyl-phenyl, 94% dimethylsiloxane
- Equivalent to USP phase G43, low to mid polarity
- Inert for many active compounds
- Applications: pesticides, herbicides, halogenates.

Similar Phases: HP-1301, DB-1301, BP-10, Rtx-1301

Order Information:

P/N	Description	Length (m)	ID (mm)	Film (μm)	Temperature Limit (℃)
6025-1502	AB-1301, 15m × 0.25mm × 0.25 μm	15	0.25	0.25	-20 to 280/300
6025-3002	AB-1301, 30m × 0.25mm × 0.25 μm	30	0.25	0.25	-20 to 280/300
6025-3005	AB-1301, 30m × 0.25mm × 0.50 μm	30	0.25	0.50	-20 to 280/300
6025-3010	AB-1301, 30m × 0.25mm × 1.00 μm	30	0.25	1.00	-20 to 280/300
6025-6002	AB-1301, 60m × 0.25mm × 0.25 μm	60	0.25	0.25	-20 to 280/300
6032-1502	AB-1301, 15m × 0.32mm × 0.25 μm	15	0.32	0.25	-20 to 280/300
6032-1505	AB-1301, 15m × 0.32mm × 0.50 μm	15	0.32	0.50	-20 to 280/300
6032-3002	AB-1301, 30m × 0.32mm × 0.25 μm	30	0.32	0.25	-20 to 280/300
6032-3005	AB-1301, 30m × 0.32mm × 0.50 μm	30	0.32	0.50	-20 to 280/300
6032-3010	AB-1301, 30m × 0.32mm × 1.00 μm	30	0.32	1.00	-20 to 280/300
6032-6002	AB-1301, 60m × 0.32mm × 0.25 μm	60	0.32	0.25	-20 to 280/300
6032-6005	AB-1301, 60m × 0.32mm × 0.50 μm	60	0.32	0.50	-20 to 280/300
6053-3005	AB-1301, 30m × 0.53mm × 0.50 μm	30	0.53	0.50	-20 to 260/280
6053-3010	AB-1301, 30m × 0.53mm × 1.00 μm	30	0.53	1.00	-20 to 260/280
6053-3015	AB-1301, 30m × 0.53mm × 1.50 μm	30	0.53	1.50	-20 to 260/280
6053-6005	AB-1301, 60m × 0.53mm × 0.50 μm	60	0.53	0.50	-20 to 260/280

■ AB-1701

- Bonded and crosslinked, 14% cyanopropyl-phenyl, 86% dimethylpolysiloxane
- Low to mid polarity
- Excellent inertness to active compounds
- Applications: pesticides, herbicides, halogenates.

Similar phases: DB 1701, ZB 1701, BP-10, Rtx-1701, CP-Sil 19 CB

Order Information:

P/N	Description	Length (m)	ID (mm)	Film (μm)	Temperature Limit (℃)
6118-1004	AB-1701, 10m × 0.18mm × 0.40 μm	10	0.18	0.40	-20 to 280/300
6118-2001	AB-1701, 20m × 0.18mm × 0.18 μm	20	0.18	0.18	-20 to 280/300
6125-1502	AB-1701, 15m × 0.25mm × 0.25 μm	15	0.25	0.25	-20 to 280/300
6125-3002	AB-1701, 30m × 0.25mm × 0.25 μm	30	0.25	0.25	-20 to 280/300
6125-3005	AB-1701, 30m × 0.25mm × 0.50 μm	30	0.25	0.50	-20 to 280/300
6125-3010	AB-1701, 30m × 0.25mm × 1.00 μm	30	0.25	1.00	-20 to 280/300
6125-6002	AB-1701, 60m × 0.25mm × 0.25 μm	60	0.25	0.25	-20 to 280/300
6125-6005	AB-1701, 60m × 0.25mm × 0.50 μm	60	0.25	0.50	-20 to 280/300
6132-1502	AB-1701, 15m × 0.32mm × 0.25 μm	15	0.32	0.25	-20 to 280/300
6132-1505	AB-1701, 15m × 0.32mm × 0.50 μm	15	0.32	0.50	-20 to 280/300
6132-3002	AB-1701, 30m × 0.32mm × 0.25 μm	30	0.32	0.25	-20 to 280/300
6132-3005	AB-1701, 30m × 0.32mm × 0.50 μm	30	0.32	0.50	-20 to 280/300
6132-3010	AB-1701, 30m × 0.32mm × 1.00 μm	30	0.32	1.00	-20 to 260/280
6132-6002	AB-1701, 60m × 0.32mm × 0.25 μm	60	0.32	0.25	-20 to 280/300
6132-6005	AB-1701, 60m × 0.32mm × 0.50 μm	60	0.32	0.50	-20 to 280/300
6132-6010	AB-1701, 60m × 0.32mm × 1.00 μm	60	0.32	1.00	-20 to 280/300

Order Information:

P/N	Description	Length (m)	ID (mm)	Film (μm)	Temperature Limit (℃)
6153-1505	AB-1701, 15m × 0.53mm × 0.50 μm	15	0.53	0.50	-20 to 260/280
6153-1510	AB-1701, 15m × 0.53mm × 1.00 μm	15	0.53	1.00	-20 to 260/280
6153-3002	AB-1701, 30m × 0.53mm × 0.25 μm	30	0.53	0.25	-20 to 260/280
6153-3005	AB-1701, 30m × 0.53mm × 0.50 μm	30	0.53	0.50	-20 to 260/280
6153-3010	AB-1701, 30m × 0.53mm × 1.00 μm	30	0.53	1.00	-20 to 260/280
6153-3015	AB-1701, 30m × 0.53mm × 1.50 μm	30	0.53	1.50	-20 to 260/280
6153-6005	AB-1701, 60m × 0.53mm × 0.50 μm	60	0.53	0.50	-20 to 260/280
6153-6010	AB-1701, 60m × 0.53mm × 1.00 μm	60	0.53	1.00	-20 to 260/280

■ AB-624

- Bonded and crosslinked, specially designed stationary phase for EPA methods
- Low to mid polarity
- Excellent inertness for active compounds
- Equivalent to USP Phase G43
  Applications: EPA methods: 501.3, 502.2, 503.1, 524.2, 601, 602, 8010, 8015, 8020, 8240,8260

Similar phases: DB-624, ZB-624, AT-624, Rtx-624, CP-624

Order Information:

P/N	Description	Length (m)	ID (mm)	Film (μm)	Temperature Limit (℃)
6225-3014	AB-624, 30m × 0.25mm × 1.40 μm	30	0.25	1.40	-20 to 260
6225-6014	AB-624, 60m × 0.25mm × 1.40 μm	60	0.25	1.40	-20 to 260
6232-3018	AB-624, 30m × 0.32mm × 1.80 μm	30	0.32	1.80	-20 to 260
6232-6018	AB-624, 60m × 0.32mm × 1.80 μm	60	0.32	1.80	-20 to 260
6253-3030	AB-624, 30m × 0.53mm × 3.00 μm	30	0.53	3.00	-20 to 260

■ AB-225

- Mid to high polarity
- 50% cyanopropyl-methyl, 50% dimethylpolysiloxane
- Bonded and crosslinked
- Solvent rinsable
- Wide range of applications including: fatty acid methyl esters (FAME), PUFA, alditol, and neutral sterols
- Temperature range from 40℃ to 220℃ / 240℃
- Equivalent to USP phase G7

Similar phases:DB-225, SP-2330, CP-Sil 43 CB, Rtx-225, BP-225, OV-225, 007-225, AT-225

Order Information:

P/N	Description	Length (m)	ID (mm)	Film (μm)	Temperature Limit (℃)
2525-1502	AB-225, 15m × 0.25mm × 0.25 μm	15	0.25	0.25	40 to 220/240
2525-1505	AB-225, 15m × 0.25mm × 0.50 μm	15	0.25	0.50	40 to 220/240
2525-3001	AB-225, 30m × 0.25mm × 0.15 μm	30	0.25	0.15	40 to 220/240
2525-3002	AB-225, 30m × 0.25mm × 0.25 μm	30	0.25	0.25	40 to 220/240
2532-3002	AB-225, 30m × 0.32mm × 0.25 μm	30	0.32	0.25	40 to 220/240
2532-3005	AB-225, 30m × 0.32mm × 0.50 μm	30	0.32	0.50	40 to 220/240
2553-1505	AB-225, 15m × 0.53mm × 0.50 μm	15	0.53	0.50	40 to 200/220
2553-1510	AB-225, 15m × 0.53mm × 1.00 μm	15	0.53	1.00	40 to 200/220
2553-3002	AB-225, 30m × 0.53mm × 0.25 μm	30	0.53	0.25	40 to 200/220
2553-3005	AB-225, 30m × 0.53mm × 0.50 μm	30	0.53	0.50	40 to 200/220
2553-3010	AB-225, 30m × 0.53mm × 1.00 μm	30	0.53	1.00	40 to 200/220

■ AB-PONA

- 100% dimethylpolysiloxane
- For analyzing petroleum process products
- Tested to ensure the resolution of m-xylene and p-xylene, and of cyclopentane from 2,3-dimethylbutane
- High resolution
- Bonded and crosslinked
- Solvent rinsable

Similar Phases: HP PONA, Petrocol DH, SPB-1, 007-1, Rtx-1, MXT-1

Order Information:

P/N	Description	Length (m)	ID (mm)	Film (μm)	Temperature Limit (℃)
9002-PONA	AB-PONA 50m × 0.20mm × 0.50 μm	50	0.20	0.50	-60 to 325/350
9006-PONA	AB-PONA 100m × 0.25mm × 0.50 μm	100	0.25	0.50	-60 to 325/350

■ AB Builtin-Guard Column

AB Builtin-Guard column is combination of a AbelBonded® column with a built-in Abel-made guard column. The first 5-meter or 10-meter is part of the AB Builtin-Guard column. The guard column is just deactivated with no coated stationary phase. The single continuous piece avoids the problems of installation hassles, peak shape problems, and leaks associated with unions. Difficult samples, such as pesticides or drugs, can be analyzed without any undesirable contributions from the unions.

Similar Phases: Dura_Guard Column, EZ-Guard Column

Order Information:

P/N	Description	Guard Column Length	Temperature Limit (℃)
1118-2001-G5	AB-1MS Builtin-Guard 20m × 0.18mm × 0.18 μm	5m	-60 to 325/350
1125-3002-G5	AB-1MS Builtin-Guard 30m × 0.25mm × 0.25 μm	5m	-60 to 325/350
1125-3002-G10	AB-1MS Builtin-Guard 30m × 0.25mm × 0.25 μm	10m	-60 to 325/350
1125-3005-G5	AB-1MS Builtin-Guard 30m × 0.25mm × 0.50 μm	5m	-60 to 325/350
1125-6002-G5	AB-1MS Builtin-Guard 60m × 0.25mm × 0.25 μm	5m	-60 to 325/350
1132-3002-G5	AB-1MS Builtin-Guard 30m × 0.32mm × 0.25 μm	5m	-60 to 325/350
1132-3005-G5	AB-1MS Builtin-Guard 30m × 0.32mm × 0.50 μm	5m	-60 to 325/350
1518-2001-G5	AB-5MS Builtin-Guard 20m × 0.18mm × 0.18 μm	5m	-60 to 325/350
1525-3002-G5	AB-5MS Builtin-Guard 30m × 0.25mm × 0.25 μm	5m	-60 to 325/350
1525-3002-G10	AB-5MS Builtin-Guard 30m × 0.25mm × 0.25 μm	10m	-60 to 325/350
1525-3005-G5	AB-5MS Builtin-Guard 30m × 0.25mm × 0.50 μm	5m	-60 to 325/350
1525-6002-G5	AB-5MS Builtin-Guard 60m × 0.25mm × 0.25 μm	5m	-60 to 325/350
1532-3002-G5	AB-5MS Builtin-Guard 30m × 0.32mm × 0.25 μm	5m	-60 to 325/350
1532-3005-G5	AB-5MS Builtin-Guard 30m × 0.32mm × 0.50 μm	5m	-60 to 325/350

Polyethylene Glycol (PEG) Phases

Abel offers three types of PEG columns: AB-InoWax, AB-FFAP and AB-CarboWax 20M. These three types of columns have various applications based on the characteristics of the PEG stationary phases.

■ AB-InoWax

- Bonded and crosslinked, Polyethylene glycol (PEG)
- Solvent rinsable
- Highest temperature limits of bonded PEG phases
- Polar phase, equivalent to USP phase G16
- Wide applications of polar solvent analysis in food, pharmaco, cosmetics, petrochemical industries

Similar Phases: HP-INNOWax, DB-WAX, DB-WAXetr, SupelcoWAX 10, CP-WAX 52 CB, CB-WAX, Stablilwax, BP-20, 007-CW, AT-Wax, Rtx-Wax, ZB-Wax, HP-20M

Order Information:

P/N	Description	Length (m)	ID (mm)	Film (µm)	Temperature Limit (℃)
2018-1001	AB-InoWax, 10m × 0.18mm × 0.18 µm	10	0.18	0.18	40 to 260/280
2018-2001	AB-InoWax, 20m × 0.18mm × 0.18 µm	20	0.18	0.18	40 to 260/280
2018-4001	AB-InoWax, 40m × 0.18mm × 0.18 µm	40	0.18	0.18	40 to 260/280
2018-4003	AB-InoWax, 40m × 0.18mm × 0.36 µm	40	0.18	0.36	40 to 260/280
2020-2502	AB-InoWax, 25m × 0.20mm × 0.20 µm	25	0.20	0.20	40 to 260/280
2020-2504	AB-InoWax, 25m × 0.20mm × 0.40 µm	25	0.20	0.40	40 to 260/280
2020-5002	AB-InoWax, 50m × 0.20mm × 0.20 µm	50	0.20	0.20	40 to 260/280
2020-5004	AB-InoWax, 50m × 0.20mm × 0.40 µm	50	0.20	0.40	40 to 260/280
2025-1502	AB-InoWax, 15m × 0.25mm × 0.25 µm	15	0.25	0.25	40 to 260/280
2025-1505	AB-InoWax, 15m × 0.25mm × 0.50 µm	15	0.25	0.50	40 to 260/280
2025-3001	AB-InoWax, 30m × 0.25mm × 0.15 µm	30	0.25	0.15	40 to 260/280
2025-3002	AB-InoWax, 30m × 0.25mm × 0.25 µm	30	0.25	0.25	40 to 260/280
2025-3005	AB-InoWax, 30m × 0.25mm × 0.50 µm	30	0.25	0.50	40 to 260/280
2025-6001	AB-InoWax, 60m × 0.25mm × 0.15 µm	60	0.25	0.15	40 to 260/280
2025-6002	AB-InoWax, 60m × 0.25mm × 0.25 µm	60	0.25	0.25	40 to 260/280
2025-6005	AB-InoWax, 60m × 0.25mm × 0.50 µm	60	0.25	0.50	40 to 260/280
2032-1502	AB-InoWax, 15m × 0.32mm × 0.25 µm	15	0.32	0.25	40 to 260/280
2032-1505	AB-InoWax, 15m × 0.32mm × 0.50 µm	15	0.32	0.50	40 to 260/280
2032-3001	AB-InoWax, 30m × 0.32mm × 0.15 µm	30	0.32	0.15	40 to 260/280
2032-3002	AB-InoWax, 30m × 0.32mm × 0.25 µm	30	0.32	0.25	40 to 260/280
2032-3005	AB-InoWax, 30m × 0.32mm × 0.50 µm	30	0.32	0.50	40 to 260/280
2032-6001	AB-InoWax, 60m × 0.32mm × 0.15 µm	60	0.32	0.15	40 to 260/280
2032-6002	AB-InoWax, 60m × 0.32mm × 0.25 µm	60	0.32	0.25	40 to 260/280
2032-6005	AB-InoWax, 60m × 0.32mm × 0.50 µm	60	0.32	0.50	40 to 260/280
2053-1510	AB-InoWax, 15m × 0.53mm × 1.00 µm	15	0.53	1.00	40 to 240/250
2053-3010	AB-InoWax, 30m × 0.53mm × 1.00 µm	30	0.53	1.00	40 to 240/250
2053-6010	AB-InoWax, 60m × 0.53mm × 1.00 µm	60	0.53	1.00	40 to 240/250

■ AB-FFAP

- Nitroterephthalic acid modified Polyethylene glycol (PEG)
- Bonded and crosslinked
- Solvent rinsable
- High temperature limit
- Polar phase, equivalent to USP phase G35
- Designed for the analysis of volatile fatty acids and phenols

Similar Phases: HP-FFAP, DB-FFAP, CB-WAX 58 (FFAP) CB, Stabilwax-DA, BP-21, 007-CW, AT-100

Order Information:

P/N	Description	Length (m)	ID (mm)	Film (μm)	Temperature Limit (℃)
2118-2001	AB-FFAP, 20m × 0.18mm × 0.18 μm	20	0.18	0.18	50 to 260
2120-2503	AB-FFAP, 25m × 0.20mm × 0.30 μm	25	0.20	0.30	50 to 260
2120-5003	AB-FFAP, 50m × 0.20mm × 0.30 μm	50	0.20	0.30	50 to 260
2125-1502	AB-FFAP, 15m × 0.25mm × 0.25 μm	15	0.25	0.25	50 to 260
2125-3002	AB-FFAP, 30m × 0.25mm × 0.25 μm	30	0.25	0.25	50 to 260
2132-1502	AB-FFAP, 15m × 0.32mm × 0.25 μm	15	0.32	0.25	50 to 260
2132-2505	AB-FFAP, 25m × 0.32mm × 0.50 μm	25	0.32	0.50	50 to 260
2132-3002	AB-FFAP, 30m × 0.32mm × 0.25 μm	30	0.32	0.25	50 to 260
2132-3005	AB-FFAP, 30m × 0.32mm × 0.50 μm	30	0.32	0.50	50 to 260
2132-5005	AB-FFAP, 50m × 0.32mm × 0.50 μm	50	0.32	0.50	50 to 260
2153-1010	AB-FFAP, 10m × 0.53mm × 1.00 μm	10	0.53	1.00	50 to 250
2153-1510	AB-FFAP, 15m × 0.53mm × 1.00 μm	15	0.53	1.00	50 to 250
2153-3010	AB-FFAP, 30m × 0.53mm × 1.00 μm	30	0.53	1.00	50 to 250

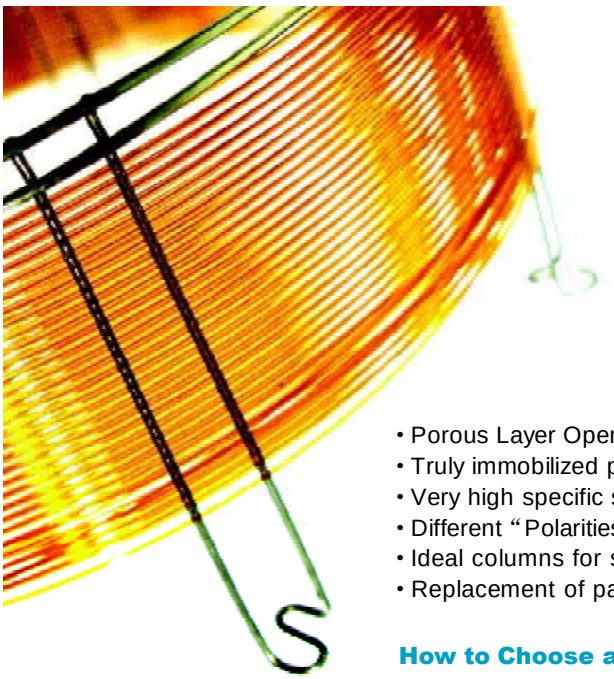
■ AB-CarboWax 20M

- Polyethylene glycol (PEG), MW 20,000
- Non-bonded non-crosslinked phase
- Polar phase, equivalent to USP phase G16
- Replacement of packed columns with Carbowax 20M modified

Similar Phases: HP-20M,Carbowax 20M

Order Information:

P/N	Description	Length (m)	ID (mm)	Film (μm)	Temperature Limit (℃)
2220-2501	AB-CarboWax 20M, 25m × 0.20mm × 0.10 μm	25	0.20	0.10	60 to 220
2220-5001	AB-CarboWax 20M, 50m × 0.20mm × 0.10 μm	50	0.20	0.10	60 to 220
2225-3002	AB-CarboWax 20M, 30m × 0.25mm × 0.25 μm	30	0.25	0.25	60 to 220
2232-2503	AB-CarboWax 20M, 25m × 0.32mm × 0.30 μm	25	0.32	0.30	60 to 220
2232-3002	AB-CarboWax 20M, 30m × 0.32mm × 0.25 μm	30	0.32	0.25	60 to 220
2232-5003	AB-CarboWax 20M, 50m × 0.32mm × 0.30 μm	50	0.32	0.30	60 to 220
2253-1013	AB-CarboWax 20M, 10m × 0.53mm × 1.33 μm	10	0.53	1.33	60 to 210
2253-3013	AB-CarboWax 20M, 30m × 0.53mm × 1.33 μm	30	0.53	1.33	60 to 210



AB-PLOT Columns

Abel offers three types of PLOT columns, AB-PLOT Al_2O_3, AB-PLOT Molesieve, and AB-PLOT Q for various applications in petrochemical, environment, and pharmaceutical industries.

- Porous Layer Open Tubular (PLOT) formed by various particle absorbents
- Truly immobilized particle coating onto capillary tubing wall, no need of using trap column
- Very high specific surface areas to provide high capacities needed for separations
- Different "Polarities" (column selectivity) to tail specific separations
- Ideal columns for separating volatile and gaseous compounds
- Replacement of packed columns

How to Choose an AB-PLOT Column

General property	AB-PLOT Al_2O_3/ " KCl ", "S", "M"	AB-PLOT MoleSieves 5Å	AB-PLOT Q
Stationary phase	Aluminum oxide, modified with KCl, Na_2SO_4 or Na_2MoO_4	Molecular Sieve, zeolite, 5Å	Crosslinked Divinylbenzene polymer
Withstand water	No	No	Good to excellent
Withstand acid/base	No	No/Yes	Excellent
Withstand non-aqueous liquid	Yes	No	Yes
Thermal stability	200℃	300℃	280℃
Rinsable w/ solvent	No	Yes, w/ water	Yes
Fix gas separation at ambient temperature	No	Yes	Air/CO, CO_2, water, sulfur gases, ammonia
C1 to C5 separation	Excellent baseline	No (C1 and C2)	Most, poor isomer baseline separation
Hydrocarbons	C1 to C6 (C10 for short columns)	C1, C2	C1 to C12
Separation of polar / oxygenated compound	Minimal	No	Good to excellent
Known surface adsorption	Oxygenates, acid/ base, CO_2, Water	CO_2, Water, Acid/ base, hydrocarbons and halocarbons	Modest sulfur gases adsorption
Elution order	Air, C1, Mostly carbon No. and aromatics	He/H_2 /Ne/Ar/ O_2 /N_2 /C1/CO	Air, C1, C2, CO_2, water Mostly carbon No. or polarity and aromatics
Known Applications	Hydrocarbons, halocarbons, some chemical weapon gases (cynaous gases), BTEX	Fixed gases and fixed gases from hydrocarbon stream, hydrogen isotopes at －80C	Hydrocarbon stream, oxygenated compounds, inorganic gases, halocarbons
Similar Phases	HP-PLOT Al_2O_3 "KCl", "S", "M", CP-Al_2O_3 PLOT KCl, NA_2SO_4, GS-Alumina, Rt-Alumina ZB-Alumina	HP-PLOT Molesieve, CP-Molsieve PLOT, Rt-Molesieve, ZB-Molesieve	HP-PLOT Q, GS-Q, CP PoraPLOT Q, CP PoraPLOT Q HT, Rt-Q, Supel Q PLOT ZB-PLOT Q

■ Common Practices of Using PLOT Columns:

- Avoid using a column at over temperature limit, as it changes column selectivity
- Avoid direct aqueous sample introduction to Alumina, Molesieve PLOT columns
- Avoid direct dirty sample introduction to PLOT columns, as performance regeneration takes long time. Use backflushing as much as possible
- Avoid rinsing a column to regenerate the column performance. Instead, using temperature condition a column as much as possible
- Seal column ends with new septum when it is stored outside a GC oven
- Cut a column gently and neatly to avoid particle dislodging
- Do not tap or vibrate a column, avoid too much tubing bending, as these will destroy coating binding and generate particulates to cause detector blockage or baseline spike
- Use helium as carrier gas if possible. When hydrogen gas is used as carrier gas, avoid too much high temperature instrumentation
- Keep a column at 100-150℃ when idling inside a GC oven, maintain column gas flow
- For a GC equipped with EPC, use slow pressure ramping for constant flow mode. Avoid pressure pulse injection
- A PLOT column can be very fragile as it is prepared under great stresses. Use it with great care.
- A PLOT column can be used in a GC-MS with great care to avoid particle dislodging. In case the particle invade into the ion source, clean the ion source as soon as possible to avoid particle moving into detector or turbo pump
- Use a shorter length column first. Use a 50/60m column if retention needs to be increased
- Use a 0.53mm ID column for large sample loading capacity. Use a 0.32mm ID column for improving baseline separations or GC-MS applications
- Elution order of working compounds has not been known completely. Try common sense, your own knowledge, literature, expert consultation, and other resources to identify peaks. Use internal standards or GC-MS as aid for peak identification
- There is no totally "inert" PLOT column. Quantify your analysis result with care. Calibrate the result time by time as a column performance may be decreased over time
- Bare spots over column length are normal for PLOT columns. It does NOT affect column efficiency, retention time and coating immobilization

■ AB-PLOT Al_2O_3 "KCl"

- Least "polar" aluminum oxide phase
- Deactivated with KCl
- Minimum surface adsorption of dienes and halocarbons
- ASTM recommended phase
- Preferred choices of light hydrocarbon separation

Similar phase : HP-PLOT Al_2O_3/KCl, GS-Alumina/KCl, CP-Al_2O_3/KCl PLOT

Order Information:

P/N	Description	Length (m)	ID (mm)	Film (μm)	Temperature Limit (℃)
8125-3005	AB-PLOT Al_2O_3 "KCl", 30m ×0.25mm ×5.00 μm	30	0.25	5	-60 to 200/250
8132-5008	AB-PLOT Al_2O_3 "KCl", 50m ×0.32mm ×8.00 μm	50	0.32	8	-60 to 200
8153-3015	AB-PLOT Al_2O_3 "KCl", 30m ×0.53mm ×15.00 μm	30	0.53	15	-60 to 200
8153-5015	AB-PLOT Al_2O_3 "KCl", 50m ×0.53mm ×15.00 μm	50	0.53	15	-60 to 200

Advice 250℃ for duration < 30min each time.

■ AB-PLOT Al_2O_3 "S"

- Good selective Olefins (mid "polar") aluminum oxide phase
- Deactivated with Na_2SO_4 salt
- Excellent baseline separation of C1 to C10 hydrocarbons, excellent of C2 to C5 isomer baseline separations
- Less accurate quantitations of dienes and halocarbons
- ASTM recommended phase
- Preferred choices of hydrocarbon separation

Similar phase : HP-PLOT Al_2O_3/ "S", GS-Alumina, CP-Al_2O_3/Na_2SO_4 PLOT, RT-Alumina

Order Information:

P/N	Description	Length (m)	ID (mm)	Film (μm)	Temperature Limit (℃)
8225-3005	AB-PLOT Al_2O_3 "S", 30m × 0.25mm × 5.00 μm	30	0.25	5	-60 to 200/250
8232-3008	AB-PLOT Al_2O_3 "S", 30m × 0.32mm × 8.00 μm	30	0.32	8	-60 to 200
8232-5008	AB-PLOT Al_2O_3 "S", 50m × 0.32mm × 8.00 μm	50	0.32	8	-60 to 200
8253-3015	AB-PLOT Al_2O_3 "S", 30m × 0.53mm × 15.00 μm	30	0.53	15	-60 to 200

Advice 250℃ for duration < 30min each time.

■ AB-PLOT Al_2O_3 "M"

- Strong selective Olefins (most "polar") aluminum oxide phase
- Deactivated with Na_2MoO_4 salt
- Mostly baseline separation of C1 to C10 hydrocarbons, good baseline separation of cyclopropane from propylene
- Accurate quantitations of dienes and halocarbons
- ASTM recommended phase
- Preferred choices of hydrocarbon separation

Similar phase: HP-PLOT Al_2O_3/ "M", GS-Alumina

Order Information:

P/N	Description	Length (m)	ID (mm)	Film (μm)	Temperature Limit (℃)
8332-5008	AB-PLOT Al_2O_3 "M", 50m × 0.32mm × 8.00 μm	50	0.32	8	-60 to 200
8353-3015	AB-PLOT Al_2O_3 "M", 30m × 0.53mm × 15.0 μm	30	0.53	15	-60 to 200
8353-5015	AB-PLOT Al_2O_3 "M", 50m × 0.53mm × 15.0 μm	50	0.53	15	-60 to 200

AB-PLOT MoleSieve

- Molecular Sieve, Zeolite, 5Å
- Thin and thick coatings for push limit separations, e.g. Ar/O_2 separation at 35℃, O_2/N_2 with 15 seconds
- Truly immobilized coating and smooth baseline workable for valve switching
- Preferred columns to analyze fixed gases from hydrocarbon streams
- Regeneration of performance from water/CO_2 adsorptions at 250℃ for 3 hours
- ASTM recommended phase
- Noble gas, air from methane, fuel cell and etc.
- Often used with other PLOT columns for fixed gas separation from sample matrix

Similar phase : HP-PLOT Molesieve, CP-PLOT MolSieve.

Order Information:

P/N	Description	Length (m)	ID (mm)	Film (μm)	Temperature Limit (℃)
8432-3012	AB-PLOT MoleSieve, 30m × 0.32mm × 12.0 μm	30	0.32	12	-80 to 300
8432-1525	AB-PLOT MoleSieve, 15m × 0.32mm × 25.0 μm	15	0.32	25	-80 to 300
8432-3025	AB-PLOT MoleSieve, 30m × 0.32mm × 25.0 μm	30	0.32	25	-80 to 300
8453-1525	AB-PLOT MoleSieve, 15m × 0.53mm × 25.0 μm	15	0.53	25	-80 to 300
8453-3025	AB-PLOT MoleSieve, 30m × 0.53mm × 25.0 μm	30	0.53	25	-80 to 300
8453-1550	AB-PLOT MoleSieve, 15m × 0.53mm × 50.0 μm	15	0.53	50	-80 to 300
8453-3050	AB-PLOT MoleSieve, 30m × 0.53mm × 50.0 μm	30	0.53	50	-80 to 300

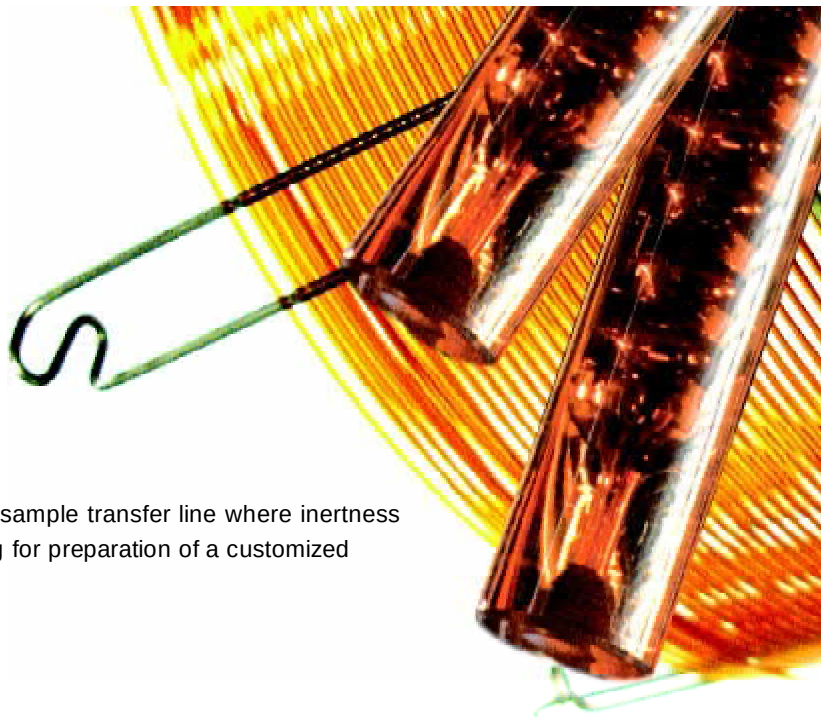
AB-PLOT Q

- Divinylbenzene polymer particle, nonpolar, close to traditional PoraPak Q
- Truly immobilized coating and smooth baseline workable for valve switching and liquid sample introduction at low temperatures
- Excellent separation of C1 to C3 isomers, good separations of C3 to C12, halocarbons
- Excellent inertness and stability of water/alcohol sample, a good secondary choice of wax column for alcohol analysis
- Excellent tolerance to strong acid/base sample without affecting retention time
- Good anti-oxidation at 280℃ and fast regeneration of performance
- Good choices for analyzing low level solvent residues from wide samples, such as headspace, aqueous, or organic solutions
- Preferred columns for residue analysis in petroleum industry, pharmaceutical, environmental, chemical weapon detection

Similar phase: HP-PLOT Q, GS-Q, CP-PoraPLOT Q HT, Supel PLOT Q, Rt-Q

Order Information:

P/N	Description	Length (m)	ID (mm)	Film (μm)	Temperature Limit (℃)
8632-1515	AB-PLOT Q, 15m × 0.32mm × 15.0 μm	15	0.32	15	-80 to 280/290
8632-3015	AB-PLOT Q, 30m × 0.32mm × 15.0 μm	30	0.32	15	-80 to 280/290
8653-1530	AB-PLOT Q, 15m × 0.53mm × 30.0 μm	15	0.53	30	-80 to 280/290
8653-3030	AB-PLOT Q, 30m × 0.53mm × 30.0 μm	30	0.53	30	-80 to 280/290



Fused Silica Tubing

Undeactivated Tubing

Bare fused silica tubing are commonly used as sample transfer line where inertness is not required. It can also be used as raw tubing for preparation of a customized column.

Order Information:

P/N	Description	Length(m)	ID(mm)	OD (mm)
9020-0500	Undeactivated Tubing, 5m, ID 0.2mm, OD 0.34mm	5	0.20	0.34
9020-1000	Undeactivated Tubing, 10m, ID 0.2mm, OD 0.34mm	10	0.20	0.34
9020-1500	Undeactivated Tubing, 15m, ID 0.2mm, OD 0.34mm	15	0.20	0.34
9025-0500	Undeactivated Tubing, 5m, ID 0.25mm, OD 0.35mm	5	0.25	0.35
9025-1000	Undeactivated Tubing, 10m, ID 0.25mm, OD 0.35mm	10	0.25	0.35
9025-1500	Undeactivated Tubing, 15m, ID 0.25mm, OD 0.35mm	15	0.25	0.35
9032-0500	Undeactivated Tubing, 5m, ID 0.32mm, OD 0.43mm	5	0.32	0.43
9032-1000	Undeactivated Tubing, 10m, ID 0.32mm, OD 0.43mm	10	0.32	0.43
9032-1500	Undeactivated Tubing, 15m, ID 0.32mm, OD 0.43mm	15	0.32	0.43
9053-0500	Undeactivated Tubing, 5m, ID 0.53mm, OD 0.67mm	5	0.53	0.67
9053-1000	Undeactivated Tubing, 10m, ID 0.53mm, OD 0.67mm	10	0.53	0.67
9053-1500	Undeactivated Tubing, 15m, ID 0.53mm, OD 0.67mm	15	0.53	0.67

Deactivated Tubing

Deactivated fused silica tubing is commonly used as retention gap and guard column or sample transfer line. It can prolong analytical column life, as it traps most "dirty" or undesired compounds. Our standard deactivation method is methyl siloxane deactivation. Abel also can offer other deactivation methods upon requesting.

Order Information:

P/N	Description	Length(m)	ID(mm)	OD (mm)
9120-0100	Deactivated Tubing, 1m, ID 0.2mm, OD 0.34mm	1	0.20	0.34
9120-0500	Deactivated Tubing, 5m, ID 0.2mm, OD 0.34mm	5	0.20	0.34
9120-1000	Deactivated Tubing, 10m, ID 0.2mm, OD 0.34mm	10	0.20	0.34
9125-0100	Deactivated Tubing, 1m, ID 0.25mm, OD 0.35mm	1	0.25	0.35
9125-0500	Deactivated Tubing, 5m, ID 0.25mm, OD 0.35mm	5	0.25	0.35
9125-1000	Deactivated Tubing, 10m, ID 0.25mm, OD 0.35mm	10	0.25	0.35
9132-0100	Deactivated Tubing, 1m, ID 0.32mm, OD 0.43mm	1	0.32	0.43
9132-0500	Deactivated Tubing, 5m, ID 0.32mm, OD 0.43mm	5	0.32	0.43
9132-1000	Deactivated Tubing, 10m, ID 0.32mm, OD 0.43mm	10	0.32	0.43
9153-0100	Deactivated Tubing, 1m, ID 0.53mm, OD 0.67mm	1	0.53	0.67
9153-0500	Deactivated Tubing, 5m, ID 0.53mm, OD 0.67mm	5	0.53	0.67
9153-1000	Deactivated Tubing, 10m, ID 0.53mm, OD 0.67mm	10	0.53	0.67

Catalog Number Guide

Contents of a Catalog Number

Internal Diameter — Film Thickness

2032-3002

Type of the Phase — Column Length

Example

Column Description:	AB-InoWax 30m × 0.32mm × 0.25μm	AB-5MS 30m × 0.25mm × 0.25μm
Type of Phase:	20	15
Internal Diameter(mm):	0.32	0.25
Column Length(m):	30	30
Film Thickness(μm):	0.25	0.25
Catalog No.:	2032-3002	1525-3002

Type of Phase	Catalog No.Code
AB-1	01
AB-1MS	11
AB-5	05
AB-5MS	15
AB-35	35
AB-1301	60
AB-50+	50
AB-50+MS	51
AB-1701	61
AB-624	62
AB-225	25
AB-InoWax	20
AB-FFAP	21
AB-CarboWax 20M	22
AB-Plot Al_2O_3, "KCl"	81
AB-Plot Al_2O_3, "S"	82
AB-Plot Al_2O_3, "M"	83
AB-Plot Molesieve	84
AB-Plot Q	86
Undeactivated Tubing	90
Deactivated Tubing	91
Customized column	99

Column Length(m)	Catalog No.Code
15	15
25	25
30	30
50	50
60	60

Internal Diameter(mm)	Catalog No.Code
0.18	18
0.20	20
0.25	25
0.32	32
0.53	53

Film Thickness(μm)	Catalog No.Code(WCOT)
0.1,0.11,0.17	01
0.25	02
0.3,0.33	03
0.5,0.52	05
0.88	08
1.00	10
1.50	15
2.65	26
5.00	50

AB-PONA

P/N	Description
9002-PONA	AB-PONA 50m×0.20mm×0.5μm
9006-PONA	AB-PONA 100m×0.25mm×0.5μm

Film Thickness(μm)	Catalog No.Code(PLOT Columns)
3	03
5	05
10	10
25	25
50	50

AbelBonded® Column Offers

AB Phase	Composition	Polarity	Approximate temperaure limits℃	Similar Phases for Replacement
AB-1, AB-1MS	100% Dimethylpolysiloxane	non-polar	-60 to 325/350	DB-1, HP-1, DB-1MS, HP-1MS, Ultra-1, Rtx-1, ZB-1, BP-1, SPB-1,CP-Sil 5CB
AB-5, AB-5MS	5% Diphenyl 95% Dimethylpolysiloxane	non-polar	-60 to 325/350	DB-5, HP-5, DB-5MS, HP-5MS, Ultra-2, Rtx-5, ZB-5, BP-5, SPB-5,CP-Sil 8CB
AB-35	35% Phenyl backbone 65% Dimethylpolysiloxane	mid-polar	40 to 300/320	HP-35MS, DB-35MS, ZB-35, BPX-35, AT-35, Rtx-35, SPB-35
AB-50, AB-50+MS	50% Phenyl backbone 50% Dimethylpolysiloxane	mid-polar	40 to 320/340	HP-50+, DB-17, DB-17MS, Rtx-50, ZB-50, SPB-50, 007-17, SP-2250, CP-Sil 24CB
AB-1301	6% Cyanopropyl-phenyl 94% Dimethylpolysiloxane	mid-polar	-20 to 280/300	HP-1301, DB-1301, ZB-1301, BP-10, Rtx-1301
AB-1701	14% Cyanopropyl-phenyl 86% Dimethylpolysiloxane	mid-polar	-20 to 280/300	DB-1701, ZB-1701, BP-10, Rtx-1701, CP-Sil 19CB
AB-624	6% Cyanopropyl-phenyl 94% Dimethylpolysiloxane	mid-polar	-20 to 260	DB-624, ZB-624, AT-624, Rtx-624, CP-624
AB-225	50% Cyanopropylphenyl 50% Dimethylpolysiloxane	mid-polar	40 to 220/240	DB-225, SP-2330, CP-Sil 43 CB, Rtx-225, BP-225, OV-225, 007-225, AT-225
AB InoWax	Polyethylene glycol	polar	40 to 260/280	HP-INNOWax DB-WAX DB-WAXetr, Supelco WAX10, CB-WAX, AT-Wax,HP-20M
AB-Carbowax 20M	Polyethylene glycol	polar	60 to 220	HP-20M, DB-CAM
AB-FFAP	Polyethylene glycol, acid modified	polar	50 to 260	HP-FFAP, DB-FFAP, CP-WAX58(FFAP)CB, BP-21, AT-100
AB-PLOT Molesieves	Molecular sieves, zeolite, 5Å		-80 to 300	HP-PLOT Molesieve, CP-PLOT MolSieve
AB-PLOT Al_2O_3 "KCl"	KCl modified Alumina		-60 to 200	HP-PLOT Al_2O_3/KCl, GS-Alumina/KCL, CP-Al $_2O_3$/KCL PLOT
AB-PLOT Al_2O_3 "S"	Na_2SO_4 modified Alumina		-60 to 200	HP-PLOT Al $_2O_3$/"S", GS-Alumina, CP-Al $_20_3$/Na_2SO_4 PLOT, RT-Alumina
AB-PLOT Al_2O_3 "M"	Na_2MoO_4 modifed Alumina		-60 to 200	HP-PLOT Al $_2O_3$/"M", GS-Alumina
AB-PLOT Q	Divinylbenzen polymer		-80 to 280/300	HP-PLOT Q, GS-Q, CP-PoraPLOT Q HT, Rt-Q

Method/Column Selection Guides

■ AB GC Columns stationary phase applications guide

AB Phase	Composition	Polarity	Approximate temperature limits℃	General separations
AB-1, AB-1MS	100% Dimethylpolysiloxane	non-polar	-60 to 325/350	Amines, hydrocarbons, pesticides, PCBs, phenols, sulfurs, flavors and fragances
AB-5, AB-5MS	5% Diphenyl 95% Dimethylpolysiloxane	non-polar	-60 to 325/350	Semivolatiles, alkaloids, drugs, FAMEs, Halogenated compounds, pesticides, herbicides
AB-35	35% Phenyl backbone 65% Dimethylpolysiloxane	mid-polar	40 to 300/320	Pesticides, aroclors, drugs of abuse, pharmaceutical molecules
AB-50+, AB-50+MS	50% Phenyl backbone 50% Dimethylpolysiloxane	mid-polar	40 to 320/340	Pesticides, drugs, steroids, glycols
AB-1301	6% Cyanopropyl-phenyl 94% Dimethylpolysiloxane	mid-polar	-20 to 280/300	Aroclors, alcohols, pesticides, VOCs
AB-1701	14% Cyanopropyl-phenyl 86% Dimethylpolysiloxane	mid-polar	-20 to 280/300	Aroclors, pesticides, herbicides, TMS sugars
AB-624	6% Cyanopropyl-phenyl 94% Dimethylpolysiloxane	mid-polar	-20 to 260	Volatiles in environmental samples
AB-225	50% Cyanopropyl-phenyl 50% Dimethylpolysiloxane	mid-polar	40 to 220/240	FAMEs, neutral sterols, alditol acetates
AB-InoWax	Polyethylene glycol	polar	40 to 260/280	Alcohols, solvents, essential oils, flavors and fragrances
AB-CarboWAX 20M	Polyethylene glycol	polar	60 to 220	Alcohols, free acids, ether, glycol, solvents
AB-FFAP	Polyethylene glycol, acid modified	polar	50 to 260	Alcohols, organic acids, aldehydes, ketones, acrylates
AB-PLOT Molesieves	Molecular sieves, zeolite, 5Å		-80 to 300	Fixed gases, noble gases, argon/oxygen
AB-PLOT Al_2O_3 "KCl"	KCl modified Alumina		-60 to 200	Hydrocarbons, C1 to C6, extend to C10s, halocarbons
AB-PLOT Al_2O_3 "S"	Na_2SO_4 modified Alumina		-60 to 200	Hydrocarbons, C1 to C6, extend to C10s, halocarbons
AB-PLOT Al_2O_3 "M"	Na_2MoO_4 modifed Alumina		-60 to 200	Hydrocarbons, C1 to C6, extend to C10s, halocarbons
AB-PLOT "Q"	Divinylbenzen polymer		-80 to 280/300	Hydrocarbons, C1 to C10, from air/CO, CO_2, water, sulfurs, amines, acids, oxygenated solvents,halocarbons

USP GC Phases

- United States Pharmacopoeia (USP GC Phases)

USP	Composition	Equivalent or approximate AB Phase
G1	Dimethylpolysiloxane, oil	AB-1, AB-1MS
G2	Dimethylpolysiloxane gum	AB-1, AB-1MS
G3	50% phenyl 50% methylpolysiloxane	AB-50+, AB-50+MS
G14	Polyethylene glycol, average MW 950--1,050	AB-InoWax
G15	Polyethylene glycol, average MW 3,000--3,700	AB-InoWax, AB-CarboWax20M
G16	Polyethylene glycol, average MW 15,000	AB-InoWax, AB-CarboWax20M
G17	75% phenyl 25% methylpolysiloxane	AB-50+, AB-50+MS
G19	25% phenyl 25% cyanopropyl 50% methylsilicone	AB-225
G20	Polyethylene glycol, average MW 380-420	AB-InoWax
G25	Polyethylene glycol, TPA (Carbowax 20M, Terephthalic acid)	AB-FFAP
G27	5% phenyl 95% methylpolysiloxane	AB-5, AB-5MS
G28	25% phenyl 75% methylpolysiloxane	AB-35
G32	20% phenylmethyl 80% Dimethylpolysiloxane	AB-35
G35	Polyethylene glycol & diepoxide esterified with nitroterepthalic acid	AB-FFAP
G36	1% vinyle 5% phenylmethylpolysiloxane	AB-5, AB-5MS
G38	Phase G1 plus tailing inhibitor	AB-1, AB-1MS
G39	Polyethylene glycol average MW 1500	AB-InoWax
G41	Phenylmethyldimethylsilicone (10% phenyl substituted)	AB-5, AB-5MS
G42	35% diphenyl 65% Dimethylvinylsiloxane	AB-35
G43	6% Cyanopropylphenyl-94% dimethylpolysiloxane	AB-624, AB-1301
G46	14% Cyanopropylphenyl-86% methylpolysiloxane	AB-1701

Method and recommendations

■ Environmental/EPA Methods

Analyte Type	EPA Method Reference	Common Sample Preparation	Detector Types	Sample Matrix	Abel Recommendations (Part No.)
Volatiles					
Trihalomethanes	501	Purge and trap,direct injection,headspace	ELCD,ECD	Drinking water	AB-624, 30m x0.53mm x 3µm(6253-3030)
Volatile Organic Compounds(VOCs)	502.2,8021 CLP-Volatiles	Purge and trap,direct injection,headspace	PID,ELCD	Drinking water Waste water Solid wastes	AB-624, 75m x 0.53mm x 3µm (6253-7530)
Purgeable Halogenated Organics	601 8010	Purge and trap headspace for screening	PID,ELCD	Waste water Solid wastes	AB-624, 75m x 0.53mm x 3µm (6253-7530)
Purgeable Aromatic Organics	503 .1 ,602 8020	Purge and headspace for screening	PID,	Drinking water Trap,waste water Solid wastes	AB-624, 30m x 0.53mm x 3µm(6253-3030)
Volatile Organic Compounds(VOCs) Using MSD	524.2, 624 82,408,260 CLP-VOCs	Purge and trap,direct injection,headspace	MSD	Drinking water waste water Solid wastes	AB-624, 60m x 0.32mm x 1.8µm (6232-6018)
Volatile Organic Compounds(VOCs) Using 5973 MSD	524.2, 624 82,408,260 CLP-VOCs	Purge and trap,direct injection,headspace	MSD (5973)	Drinking water Waste water Solid wastes	AB-624, 25m x 0.20mm x 1.12µm (6220-2510)
EDB and DBCP	504.1,8011	Microextraction with Hexane	ECD	Drinking water Solid wastes	AB-624, 30m x 0.53mm x 3µm(6253-3030) AB-624, 30m x 0.53mm x 3µm(6253-3030)
Acrylonitrile and Acrolein	603, 8015 8031	Purge and trap,liquid extraction,sonication	FID,NPD	Waste water Solid wastes	AB-624, 30m x 0.53mm x 3µm(6253-3030)
Semivolatiles					
Semivolatile Organic Compounds	525 ,625 8270	Lisquid extraction sonication,soxhlet extraction,SPE	MSD	Drinking water Waste water Solid wastes	AB-5MS, 30m x 0.25mm x0.5µm (1525-3005)
Phenols	528 ,604 8040 ,8041	Liquid extraction sonication,soxhlet extraction derivatization	ECD,FID	Waste water Solid wastes	AB-5MS, 30m x 0.25mm x 0.25µm (1525-3002) AB-5, 30m x 0.53mm x 1.5µm (0553-3015)
Phthalate Esters	506 ,606 8060, 8061	Liquid extraction sonication,soxhlet extraction,SPE	ECD,FID	Drinking water Waste water Solid wastes	AB-5MS, 30m x 0.25mm x 0.25µm (1525-3002) AB-5, 30m x 0.53mm x 1.5µm (0553-3015)
Benzidines	605	Liquid extraction	ECD	Waste water	AB-5MS, 30m x 0.25mm x 0.25µm (1525-3002) AB-5, 30m x 0.53mm x 1.5µm (0553-3015)
Nitrosamines	607 ,8070	Liquid extraction sonication,soxhlet extraction,SPE	NPD	Waste water Solid wastes	AB-5MS, 30m x 0.25mm x 0.25µm (1525-3002) AB-5, 30m x 0.53mm x 1.5µm (0553-3015)
Nitroaromatics and Isophorone	609, 8090	Liquid extraction sonication,soxhlet extraction,SPE	ECD,FID	Waste water Solid wastes	AB-5MS, 30m x 0.25mm x0.25µm (1525-3002) AB-5, 30m x 0.53mm x 1.5µm (0553-3015)
Polynuclear Aromatic Hydrocarbons(PAHs)	610 ,8100	Liquid extraction sonication,soxhlet extraction,SPE	FID	Waste water Solid wastes	AB-5MS, 30m x 0.25mm x 0.25µm (1525-3002) AB-5MS, 30m x 0.32mm x 0.25µm (1532-3002) AB-1MS, 30m x 0.25mm x 0.25µm(1125-3002)
Chlorinated Hydrocarbons	612 8120 8121	Liquid extraction sonication,soxhlet extraction,SPE	ECD	Waste water Solid wastes	AB-5MS, 30m x 0.32mm x 0.5µm(1532-3005) AB-1MS, 30m x 0.32mm x 0.5µm(1132-3005)
Chlorinated Disinfection Byproducts	551 .551. 1A	Liquid extraction derivatization	ECD	Drinking water	AB-5MS, 30m x 0.25mm x 1.0µm(1525-3010) AB-1MS, 30m x 0.25mm x 1.0µm(1125-3010)
Halogenated Axetic Acids	552 ,552.1 552.2	Liquid extraction derivatization	ECD	Drinking water	AB-35MS, 30m x 0.32mm x 0.25µm (3532-3002)
Pesticides,Herbicides and PCBs					
Organochlorine Pesticides and PCBs	508.0, 608 8081A,8082 CLP-Pesticides	Liquid extraction sonication,soxhlet extraction,SPE	ECD	Drinking water Waste water Solid wastes	AB-35, 30m x 0.32mm x 0.25µm (3532-3002)
Phenoxy Acid Herbicides	515,615 8150 ,8151	Liquid extraction sonication,soxhlet extraction,SPE	ECD	Drinking water Waste water Solid wastes	AB-35, 30m x 0.32mm x 0.25µm (3532-3002)
N-and P-Containing Pesticides and Herbicides	507 ,614 619 ,622 8140 ,8141A	Liquid extraction sonication,soxhlet extraction,SPE	NPD,ELCD FPD	Drinking water Waste water Solid wastes	AB-35, 30m x 0.25mm x 0.25µm (3525-3002) AB-5, 30m x 0.25mm x 0.25µm(1525-3002)

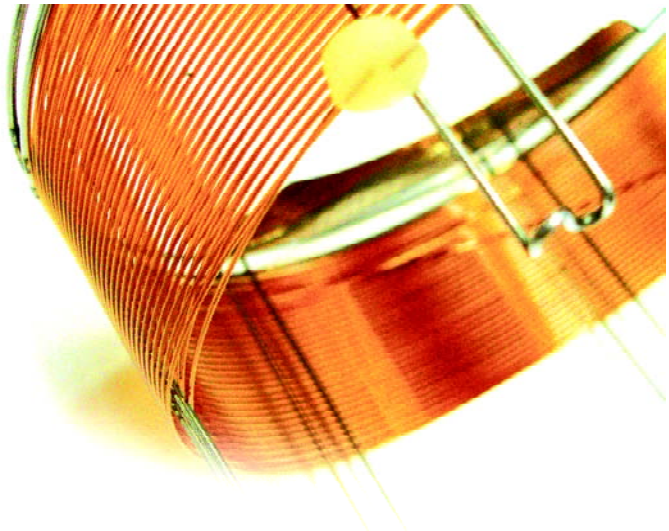
■ ASTM Methods

Method Designation	Method Title	Abel recommended columns	Part No
D 1945	Standard test method for the analysis of natural gas by GC	AB-PLOT Molesieve 15m x 0.53mm id, 50µm film AB-PLOT Q, 15m x 0.53mm id, 30µm film	8453-1550 8653-1530
D 1946	Standard test method for the analysis of reformed gas by GC	AB-PLOT Molesieve 15m x 0.53mm id, 50µm film AB-PLOT Q, 15m x 0.53mm id, 30µm film	8453-1550 8653-1530
D 1983	Standard test method for the analysis of fatty acid compositions by GC of methyl ester	AB InoWax, 30m x 0.25mm id, 0.25µm film	2025-3002
D 2163	Standard test method for the analysis of liquified petroleum gases and propene concentration by GC	AB-PLOT Al_2O_3 "KCl" 30m x 0.53mm id AB-PLOT Al_2O_3 "S" 30m x 0.53mm id	8153-3015 8253-3015
D 2268	Standard test method for the analysis of high purity n-Heptane and iso-Octane by capillary GC	AB-1, 60mx0.25mm id, 0.50µm film	0125-6005
D 2306	Standard test method for C8 aromatic hydrocarbons by GC	AB-InoWax, 60m x 0.25mm id, 0.25µm film	2025-6002
D 2426	Standard test method for Butadiene dimer, styrene in butadiene concentration by GC	AB-1, 30m x 0.53mm id, 5µm film	0153-3050
D 2427	Standard test method for determination of C2 through C5 hydrocarbons in gasoline by GC	AB-1, 30m x 0.53mm id, 5µm film AB-PLOT Al_2O_3 "M", 30m x 0.53mm id	0153-3050 8353-3015
D2504	Standard Test Method for Noncondensable Gases in C2 and Lighter Hydrocarbon Products by GC	AB-PLOT Molesieve,30m x 0.53mm id, 50µm film	8453-3050
D2593	Standard Test Method for Butadiene Purity and Hydrocarbon Impurities by GC	AB-PLOT Al_2O_3 "M", 30m x 0.53mm id	8353-3015
D2712	Standard Test Method for Hydrocarbon Traces in Propylene Concentrates by GC	AB-PLOT Al_2O_3 "M", 50m x 0.53mm id	8353-5015
D2804	Standard Test Method for Purity of Methyl Ethyl Ketone by GC	AB-InoWax, 30m x 0.53mm id, 1.0µm film	2053-3010
Extended D 2887	Standard Test Method for Boiling Range Distribution of Petrolerm fractions by GC, to C60	AB-1, 10m x 0.53mm id, 0.88µm film AB-1, 5m x 0.53mm id,0.88µm film	0153-1008 0153-0508
D3054	Standard Test Method for Analysis of Cyclohexane by GC	AB-1, 60m x 0.32mm id, 0.50µm film	0132-6005
D3257	Standard Test Method for Aromatics in Mineral Spirits by GC	AB-624, 30m x 0.53mm id, 3.0µm film	6253-3030
D3329	Standard Test Method for Purity of Methyl isobutyl Ketone by GC	AB-InoWax, 30m x 0.53mm id, 1.0µm film AB-624, 30m x 0.53mm id, 3.0µm film	2053-3010 6253-3030
D3432	Standard Test Method for Unreacted Toluene Diisocyanates in Urethane Prepolymers and Coating Solutions by GC	AB-1MS, 30m x 0.32mm id, 1.00µm film	1132-3010
D3447	Standard Test Method for Purity of Halogentated Organic Solvents	AB-624, 30m x 0.53mm id, 3.0µm film	6253-3030
D3534	Standard Test Method for PCBs in Water	AB-1MS, 30m x 0.32mm id,1.00µm film	1132-3010
D3545	Standard Test Method for Alcohol Content and Purity of Acetate Esters by GC	AB-624, 30m x 0.53mm id ,3.0µm film	6253-3030
D3687	Standard Practice for Analyses of Organic Vapors Collected by the Activated Charcoal Tube Adsorption Method	AB-InoWax, 30m x 0.53mm id, 1.0µm film	2053-3010
D3695	Standard Test Method for Volatile Alcohols in Water by Direct Aqueous injection GC	AB-InoWax, 30m x 0.53mm id, 1.0µm film	2053-3010
D3760	Standard Test Method for Analysis of Isopropylbenzene(Cumene)by GC	AB-InoWax, 60m x 0.32mm id, 0.25µm film(Column A) AB-1, 50m x 0.32mm id, 0.52µm film(ColumnB)	2032-6002 0132-5005
D3797	Standard Test Method for Analysis of O-Xylene by GC	AB-InoWax, 60m x 0.32mm id,0.50µm film	2032-6005
D3798	Standard Test Method for Analysis of P-Xylene by GC	AB-InoWax, 60m x 0.32mm id,0.50µm film	2032-6005

Method Designation	Method Title	Abel recommended columns	Part No
D3893	Standard Test Method for Purity of Methyl Amyl Ketone and Methyl Isoamyl Ketone by GC	AB-624, 30m x 0.53mm id, 3.0µm film	6253-3030
D3973	Standard Test Method for Low-Molecular Weight Halogenated Hydrocarbons in Water	AB-1, 30m x 0.53mm id, 2.65µm film	0153-3026
D4415	Standard Test Method for Determination of Dimer in Acrylic Acid	AB-FFAP, 30m x 0.32mm id, 0.25µm film	2132-3002
D4424	Standard Test Method for Butylene Analyses by GC	AB-PLOT Al_2O_3 "S", 50m x 0.53mm id	8253-5015
D4443	Standard Test Method for Residual Vinyl Chloride Monomer Content in PPB Range in Vinyl Chloride Homo-and Co -Polymers by Headspace GC	AB-1, 30m x 0.53mm id, 2.65µm film	0153-3026
D4864	Standard Test Method for Determination of Traces of Methanol in Propylene Concentrates by GC	AB-InoWax, 30m x 0.53mm id, 1.0µm film AB-PLOT Q, 30m x 0,53mm id, 30µm film	2053-3010 8653-3030
D4947	Standard Test Method for Chordane and Heptachlor Residues in Indoor Air	AB-5, 30m x 0.53mm id, 1.5µm film	0553-3015
D4961	Standard Test Methid for GC Analysis of Major Organic Impurities in Phenol Produced by the Cumene Process	AB-PLOT Q, 15m x 0.53mm id, (Method B)	8653-1530
D4983	Standard Test Methid for Cyclohexylanine,Morpholine and Diethylaminoethanol in Water and Condensed Steam by Direct Aqueous Injection GC	AB-5MS, 30m x 0.32mm id, 1.00um film	1532-3010
D5008	Standard Test Methid for Ethyl Methyl Pentonal Content and Purity Value of 2-Ethylhexanol by GC	AB-1, 15m x0.53mm id, 5.0µm film AB-INOWax, 30m x 0.32mm id, 0.25µm film	0153-1550 2032-3002
D5060	Standard Test Methid for Determining Impurities in High-Purity Ethylbenzene by GC	AB-INOWax, 60m x 0.32mm id, 0.5µm film	2032-6005
D5075	Standard Test Methid for Nicotine in Indoor Air	AB-5, 30m x 0.53mm id, 1.5µm film AB-5, 30m x 0.32mm id, 1.0µm film	0553-3015 0532-3010
D5135	Standard Test Methid for Analysis of Sryreme by Capollary GC	AB-INOWax, 60m x 0.32mm id, 0.5µm film	2032-6005
D5307	Standard Test Method Determination of Boiling Range Distribution of Crude Petroleum by GC	AB-1, 7.5m x 0.53mm id, 5.0µm film	0153-0750
D5310	Standard Test Method for Tar Acid Composition by Capillary GC	AB-5MS, 30m x 0.25mm id, 0.25µm film	1525-3002
D5316	Standard Test Method for 1, 2-Dibromoethane and 1,2-Dibromo-3-Chloropropane in Water by Microextraction and GC	AB-1MS, 30m x 0.32mm id, 1.00µm film AB-PLOT Q, 30m x 0.53mm id, 30µm	1132-3010 8653-3030
D5317	Standard Test Method for Determination of Chlorinated Organic Acid Coumpounds in Water by GC with Electron Capture Detector	AB-5MS, 30m x 0.25mm id, 0.25µm film AB-1701, 30m x 0.25mm id, 0.25µm film AB-35 ,30m x 0.25mm id, 0.25µm film	1525-3002 6125-3002 3525-3002
D5320	Standard Test Method Determination of 1,1-Trochloroethane and Methylene Chloride in Stabilized Trichloroethylene and Tetrachloroethylene	AB-1, 30m x 0.53mm id, 3.0µm film AB-624, 30m x 0.32mm id, 1.8µm film	0153-3030 6232-3018
D5441	Standard Test Method for Analysis of Methyl Tert-Butyl Ether(MTBE)by GC	AB-PLOT Q, 30m x 0.53mm id	8653-3030
D5442	Standard Test Method for Analysis of Petroleum Waxes by GC	AB-5, 15m x 0.25mm id, 0.25µm film	0525-1502
D5475	Standard Test Method for Nitrogen and Phosphorus-Containing Pesticides in Water by GC With a Nitrogen Phosphorus Detector	AB-5MS, 30m x 0.25 id, 0.25µm film AB-35, 30m x 0.25mm id, 0.25µm film AB-1701, 30m x 0.25mm id, 0.25µm film	1525-3002 3525-3002 6125-3002
D5501	Standard Test Method Determination of Ethanol Content of Denatured Fuel Ethanol by GC	AB-1, 100m x 0.25mm id, 0.50µm film	0125-1005

Method Designation	Method Title	Abel recommended columns	Part No
D5507	Standard Test Method Determination Column/Multi-dimensional GC	AB-PLOT Q, 15m x 0.53mm id	8653-1530
D5508	Standard Test Method Determination of Residual Acrylonitirle Monomer in Styrene-Acrylonitirle Co-poplymer Resins andNitrile-Butadiene Rubber by Headspace-Capillary GC	AB-PLOT Q, 30m x 0.53mm id	8653-3030
D5580	Standard Test Method Determination of Benzene ,Toluene,Ethylbenzene, P/m-Xylene ,C9 and Heavier Aromatics, and Total Aromatics in Finished Gasoline by GC	AB-1, 30m x 0.53 mm id, 5.0µm film	0153-3050
D5599	Standard Test Method Determination of Oxygenates in Gasoline by GC Oxygen Selective Flame Ionization Detection	AB-1, 60m x 0.25mm id, 1.0µm film	0125-6010
D5623	Standard Test Method Sulfur Compounds in Light Petroleum Liquids by GC and Sulfur Selective Detection	AB-1,30m x 0.32mm id, 4.0µm film	0132-3040
D5739	Standard Practice for Oil Spill Source Identification by GC and Positive Ion Electron Impact Low Resolution Mass Spectrometry	AB-5, 30m x 0.25mm id, 0.25µm film	0525-3002
D5769	Standard Test Method Determination of Benzene ,Toluene ,and Total Aromatics in Finished Gasolone by GC/MS	AB-1, 60m x 0.25mm id, 1.0µm film	0125-6010
D5812	Standard Test Method Determination of Organochlotine Pesticides in Water by Capillart Column GC	AB-5MS, 30m x 0.25mm id, 0.25µm film AB-35, 30m x 0.25mm id, 0.25µm film AB-1701, 30m x 0.25mm id, 0.25µm film	1525-3002 3525-3002 6125-3002
D5917	Standard Test Method for Trace Impurities in Monocyclic Aromatic Hydrocarbons by GC and External Calibration	AB-INOWax, 60m x 0.32mm id, 0.25µm film	2032-6002
D5986	Standard Test Method for Determination of Oxygenates Benzene, Toluene,C8-C12 Aromatics and Total Aromatics in Finished Gasoline by GC/FTIR	AB-1, 60m x 0.53mm id, 5.0µm film	0153-6050
D6144	Standard Test Method for Trace Impurities in Alpha-Methylstyrene by Capillary GC	AB-1, 60m x 0.25mm id, 1.0µm film	0125-6010
D6159	Standard Test Method for Determination Hydrocarbon Impurities in Ethylene by GC	AB-PLOT Al_2O_3 "KCl", 50m x 0.53mm id AB-PLOT Al_2O_3 "M", 50m x 0.53mm id AB-1, 30m x 0.53 mm id, 5.0µm film	8153-5015 8353-5015 0153-3050
D6160	Standard Test Method for Determination of PCBs in Waste Materials by GC	AB-5MS, 30m x 0.32mm id, 0.25µm film	1532-3002
D2360	Standard Test Method for Trace Impurities in Monocylic Aromatic Hydrocarbons by GC	AB-INOWax, 60m x 0.32mm id, 0.25µm film	2032-6002
E1616	Standard Test Method for Analysis of Acetic Anhydride Using GC	AB-1, 50m x 0.32mm id, 0.52µm film	0132-5005
E1863	Standard Test Method for Analysis of Acrylonitrile by GC	AB-INOWax, 30m x 0.32mm id, 1.0µm film AB-PLOT Q, 30m x 0.32mm id, 15µm film	2032-3010 8632-3015
E202	Standard Test Method for Analysis of Ethylene Glycols and Propylene Glycols	AB-624, 30m x 0.53mm id, 3.0µm film	6253-3030
E475	Standard Test Method for Assay of Di-tert-Butyl Peroxide Using GC	AB-5, 30m x 0.53mm id, 5.0µm film	0553-3050

Column Care



Proper column care and use such as installing,storing and regenerating can enhance the lifetime of a column and it's application success.

Column installation

- Pre-installation

1.Know your GC

Since most problems of GC analysis are not due to column itself instead the improper instrument or instrumentation, it is never over emphasized to know about your GC and its history prior usage.
Below is a list of our recommended checklist for your GC:

- GC condition: new or used
- Recent change of the GC location
- GC idling duration
- Recent maintenance of the GC system and gas line change
- Abnormal GC column degradation
- Previous GC column performance record/logbook
- Carrier gas quality

When a system is restarted, all these offer clues about the instrument system performance. Particularly, if previous GC column behaved abnormally, such as shortened lifetime, high bleed, ghost peak, peaking tailing, no signal or too high baseline signal, most likely, it pinpoints leaking problem, dirty inlet, gas flow or blockage of detector jet.

2.Have a good GC ready

If your GC displays one or more of the above mentioned symptoms, you can fix the problems by following the manufacturer's recommendations or refer below for some common fixes:

- Use high purity gases including the column carrier gas and makeup gas
- Setup proper gas flows for both inlet and the detector
- Change seals (o-rings, inlet seals, ferrules, etc.), septum and the inlet liner
- Change the jet
- Condition the GC inlet and the detector at high temperature for hours

After checking out these practices, you will have a good GC ready for new instrumentation with your new GC column.

3.Know your GC column

- A new column or a used column
- Column shelf time in lab
- Any column breakage
- A test chromatogram from the column manufacturer
- Previous analysis chromatograms of the column to be used

- Installation

1.Carefully uncoil the column one half coils on both ends
2.Loosely hang the column inside the GC oven
3.Use known good and correct ferrules and column nuts
4.Install the column nuts and ferrules to each end of the column
5.Cut each column end neatly for 3 - 5cm with a good column cutter. Do not hand break the column end tip
6.Thoroughly examine the cuts. Re-cut the column ends, if the cuts are not neat
7.Attach the column end to the inlet. Follow instrument manual on column end tip length to install the column, such as 2-3cm for split/split inlet, 1-2mm gap length from the end of the FID jet, etc. Make sure the

column end not touch metal wall more than 3 times, as multiple touching may damage the column tips that affect sample introduction into the column

8. Finger-tighten the column nut with another hand holding the column end position for proper insert length, then use proper size wrench to tighten the nuts completely. Do not over tighten the nut, as it may smash the column. Make sure the column tip insert length is in the range of the GC manufacturer's recommendation or specification
9. Stepwise setup the column pressure to establish the column flow or set up the proper column flow
10. Repeat the above steps to connect the detector
11. Securely hang the column inside the GC oven. Do not over uncoil the GC column at each end as it may become broken after thermal cycling. Coil the extra loosed column back to the column cage for securing
12. Adjust the column flow to the manufacturer's specification. A general flow setting would be:

Column id (mm)	Column flow range (ml/min)
0.53	5—8
0.32	1.0—2.5
0.25	0.8—1.5
0.20	0.4—1.0

13. Check for any leak sign with Snoop technique or other proper leak detection technique
14. Set properly the inlet and the detector temperatures
15. Set the oven temperature around 50—100℃
16. Turn on the detector after both the temperature and the flows have been established
17. Check for the stabilized signal level. If the signal is too low or too high, it may indicate a leaking column connection or a broken column at connection ends. Redo the column installation as needed
18. Condition a column at a temperature which is 10—20℃ lower than the column's upper temperature limit for minimum 30 minutes. Overnight condition is preferred.
19. Check for the detector signal. If it is too high, there may be a leaking problem, a dirty inlet/detector, or a bad column. Find leaking place and redo column installation, or clean the inlet/detector, or change another column
20. Adjust the column flow to analysis condition if necessary

Good column installation will help obtaining good and successful analysis results.

Column Storage

- Idling inside a GC oven

  Maintain proper oven temperature, e.g., 100—150℃ under proper column carrier flow.

- Out side a GC oven

  Septum-seal both ends of a column, store the column in its original box. Avoid moisture or chemical vapor.

Causes of performance degradation

Many root causes can result in column performance degradation. The most causes are oxygen present in carrier gas stream (oxidation), thermal damage, and sample contamination. Check for instrumentation obvious before time-consuming troubleshooting. The following table lists general troubleshooting processes and some remedies.

Degradation Symptoms	Root cause	From	Remedy
-High column bleed -Column selectivity change/shift -Retention time shift -Chopping baseline profile -Peak tailing -Blockage of a detector jet and abnormal signal level	-Oxygen in carrier gas flow path -A bad column	- Low grade carrier gas used - Leak in the gas line connection - Instrument leaking places: inlet, pressure regulator, valve - Home gas plumb connection with dead or void volume in the flow path	-Change carrier gas grade -Use traps -Properly re-plumbing -Fix instrument leaks -Purge the column for longer time at low temperature -Avoid high temperature chromatography -Change the column
-Peak tailing -Unstable or noisy detector signal -Retention time shift	-Moisture present in gas stream line -Sample contamination -Thermal damage at temperature over column upper limit	-System off for long time -Low grade carrier gas -Large dirty Sample introduction	-Use trap in carrier gas line -Bake instrument -Do not turn off instrument unless necessary -Good sample preparation -Trim contaminated column ends by 0.1-0.5m
-Accelerated column bleed -Significant column selectivity change -Severely peak tailing -Peak broadening	-Thermal damage	-Oven temperature exceeding the column upper temperature limit -The inlet or detector temperature is too high -Combination of oxidation, duration time and column temperature	-Almost irreversible degradation -Trim column each end by 0.5-1m -Reduce used temperatures -Switch the high grade carrier gas
-Column breakage	-Human errors -Instrumentation errors -A bad column	-A bad column -Gas pressure pulse -Fast temperature ramping up/down -Column nut tightened Too much	-Slowly setup carrier gas pressure with EPC -Reduce temperature ramping -Butt-connect the broken column -Redo the column installation

Column regeneration

■ Conditioning

Condition or bake a column at isothermal temperature close to the column upper temperature limit with two times of the column working carrier flow for 2-24 hours.This regeneration can be effective for sample contamination. Please make sure the carrier gas is purity enough, especially no oxygen could be presented. Otherwise, conditioning can result in accelerated degradation, the column surface will become active for many polar compounds.

■ Multiple solvent injections

Injecting solvent multiple times into a column at 50—100℃ oven temperature may regenerate the column performance. Avoid using oven temperature below solvent boiling point as solvent condensation will wash out too much stationary phase at the inlet end. The column surface may become less inert or more active after multiple injections.

■ Trim both ends of the column

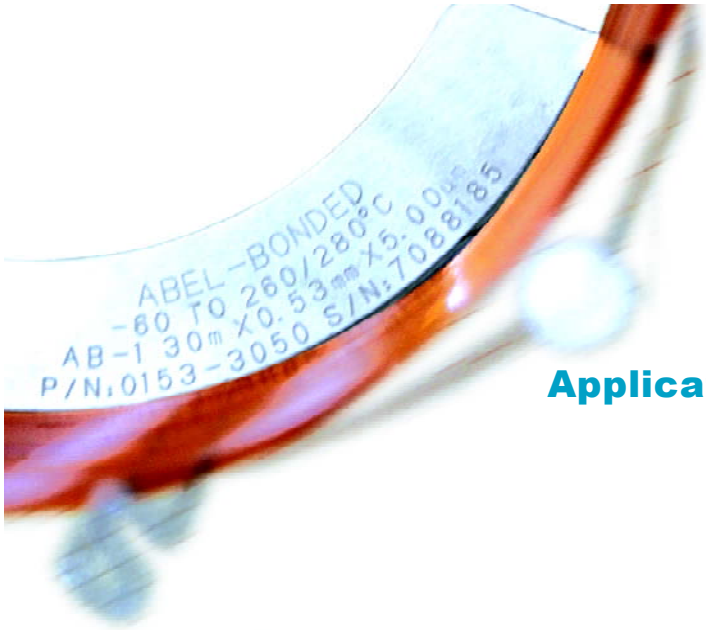
Trim both ends of column by 0.1—1m could be an easy and effective way to regenerate the column performance. Trim longer length at detector end than at the inlet end. Adjust instrument condition (e.g., column flow) according to maintain retention time locking. After trimming, condition the column for 30 minutes to 2 hours.
Trimming column leads to shorter column length, and it may eventually make the column unusable.

■ Solvent rinse

In extreme case of offline solvent rinse:

- Use high grad (HPLC or GC grade) solvent compatible to stationary phase, such as non-aqueous olvent for wax columns, hexane/toluene for polysiloxane columns.
- A column should only be rinsed with 2-3 column volume solvent at low pressure.
- Gas purge dry a column for 30minutes to one hour
- Properly condition the column at its upper temperature limit for 2-10hours.

Note: Avoid rapidly pressure change, since it often causes the column breakage.



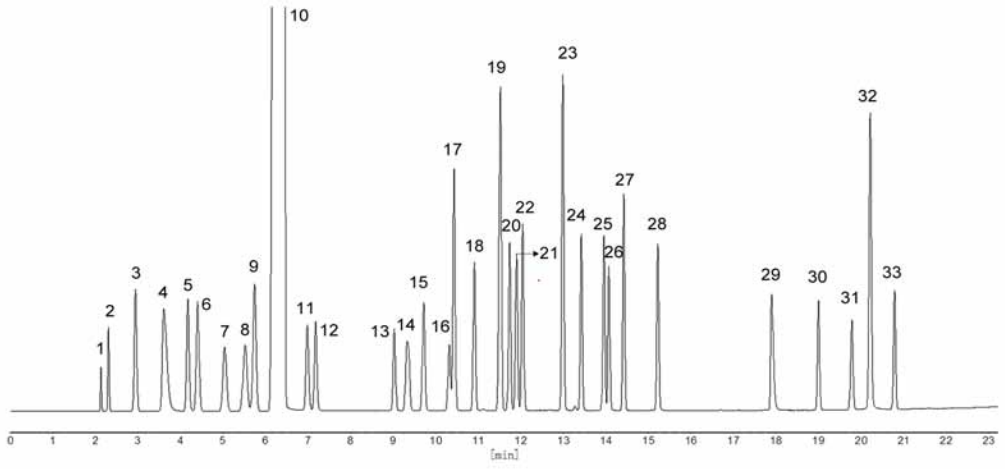
Applications

Industrial Chemical Applications

Solvents I

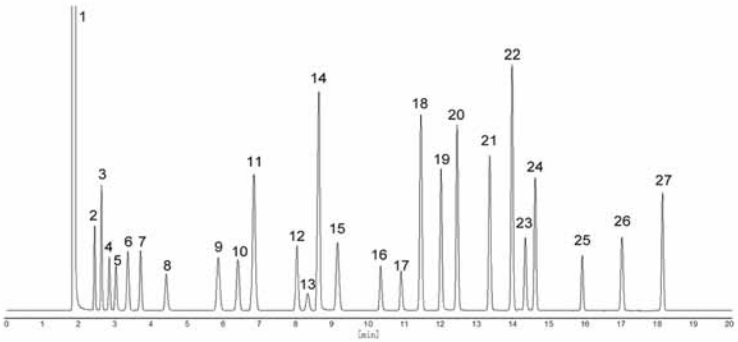
Column:	AB-InoWax, 30 m x 0.53 mm x 1.00 µm
Part No.:	2053-3010
Carrier:	Hydrogen, constant pressure 2.5psi
Oven:	40 °C (5 min), 10 °C/min to 260 °C(7 min)
Injection:	250 °C, Split
Detector:	FID, 300 °C
Sample:	0.5µl

1. Pentane
2. Hexane
3. Cyclohexane
4. Triethylamine
5. Acetone
6. Methyl acetate
7. Tetrahydrofuran(THF)
8. Tetrachloromethane
9. Ethyl acetate
10. Methanol
11. Methylene chloride
12. Ethanol
13. Acetonitrile
14. Chloroform
15. Toluene
16. 1,4-Dioxane
17. Butyl acetate
18. iso-Butanol
19. iso-Amyl acetate
20. Ethylbenzene
21. p-Xylene
22. m-Xylene
23. o-Xylene
24. Propylbenzene
25. tert-Butylbenzene
26. Pentanol
27. Phenylethylene
28. Cyclohexanone
29. Acetic acid
30. Benzaldehyde
31. Methyl sulfoxide (DMSO)
32. Ethylene glycol
33. Acetophenone



Solvents II

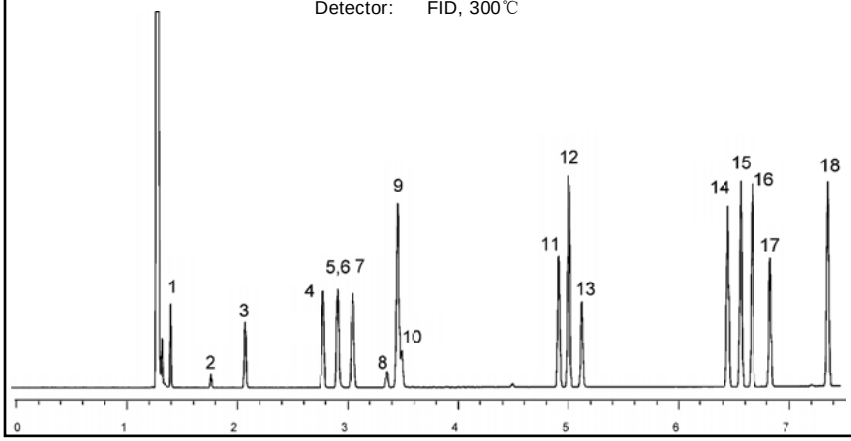
Column: AB-1, 30 m x 0.53 mm x 3.00 µm
Part No.: 0153-3030
Carrier: Hydrogen, constant pressure 3.0psi
Oven: 40 °C (5 min), 10 °C/min to 260 °C (7 min)
Injection: 250 °C, Split
Detector: FID, 300 °C
Sample: 0.5µl



1. Methanol
2. Ethanol
3. Acetonitrile
4. Acetone
5. Isopropanol
6. Pentane
7. Methylene chloride
8. Propanol
9. sec-Butanol
10. Chloroform
11. Tetrahydrofuran(THF)
12. Butanol
13. Tetrachloromethane
14. Ethylene glycol
15. Triethylamine
16. Pyridine
17. N,N-dimethylformamide
18. Toluene
19. Methyl sulfoxide(DMSO)
20. Butyl acetate
21. N,N-dimethylacetamide(DMAC)
22. Ethylbenzene
23. Cyclohexanone
24. Phenylethylene
25. Benzaldehyde
26. tert-Butylbenzene
27. Acetophenone

Solvents III

Column: AB-InoWax, 30m x 0.25 mm x 0.25 µm
Part No.: 2025-3002
Oven: 35℃(2.5 min), 10℃/min to 85℃
Detector: FID, 300℃

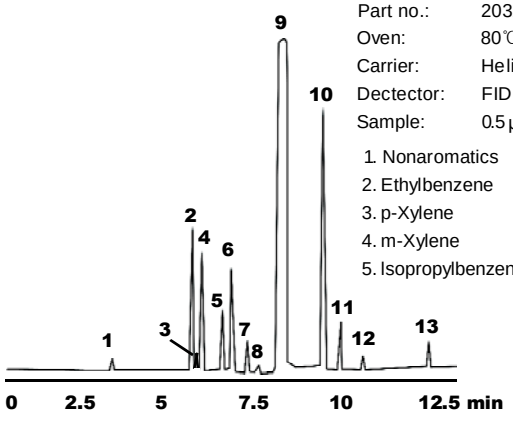


Peak identification:

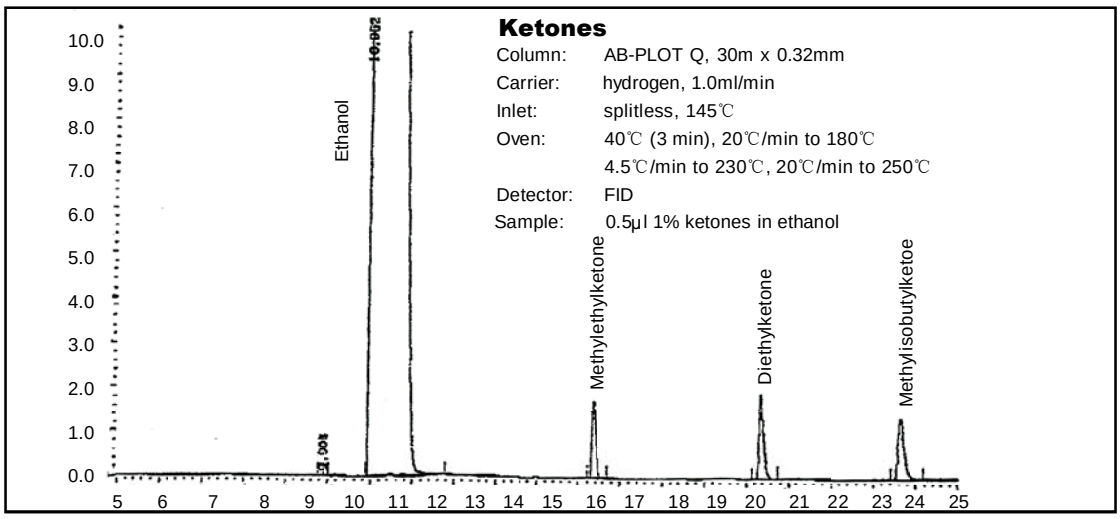
1. Pentane
2. Methyl formate
3. Acetone
4. Ethyl acetate.
5. Methyl ethyl acetate
6. Methanol
7. 2-methyl-2-Propanol
8. Dichloromethane
9. Benzene
10. Ethanol
11. 2-Butanol
12. Toluene
13. n-Propanol
14. ethyl Benzene
15. p-Xylene
16. m-Xylene
17. 1-Butanol
18. o-Xylene

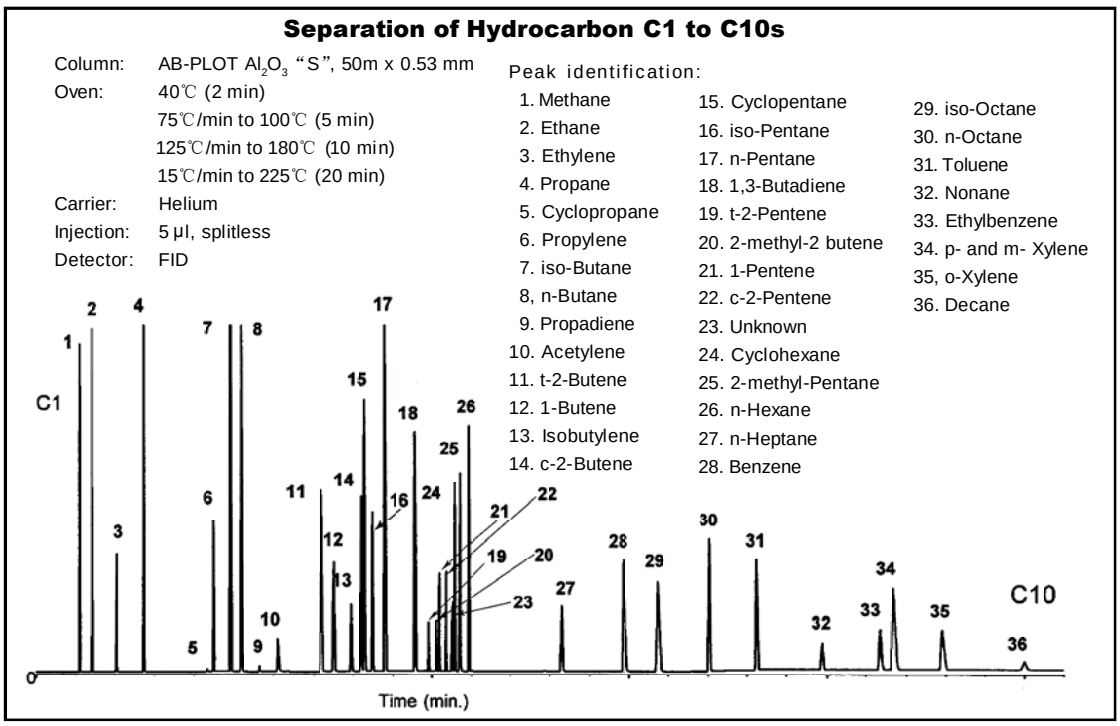
Impurities in styrene

Column: AB-InoWax, 30m x 0.32mm x 0.5µm
Part no.: 2032-3005
Oven: 80℃(5 min), 10℃/min to 150℃(2 min)
Carrier: Helium, 1.5ml/min
Dectector: FID, 240℃
Sample: 0.5µl



1. Nonaromatics
2. Ethylbenzene
3. p-Xylene
4. m-Xylene
5. Isopropylbenzene
6. o-Xylene
7. n-propylbenzene
8. p/m - Ethyltoluene
9. Styrene
10. α-Methylstyrene(366ppm)
11. Phenylacetylene(58ppm)
12. β-Methylstyrene
13. Benzaldehyde

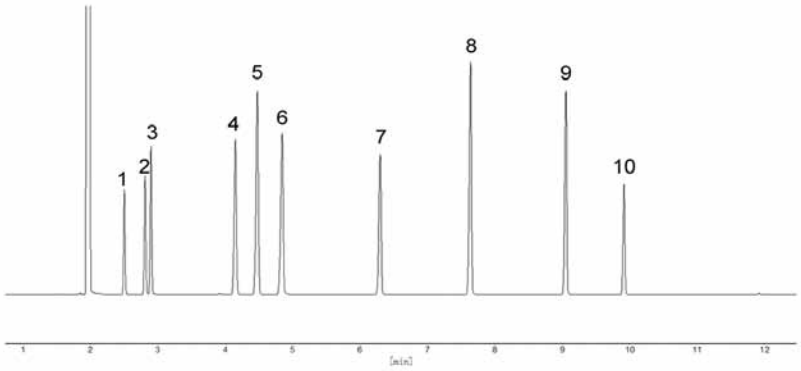

Ketones
Column: AB-PLOT Q, 30m x 0.32mm
Carrier: hydrogen, 1.0ml/min
Inlet: splitless, 145℃
Oven: 40℃ (3 min), 20℃/min to 180℃
4.5℃/min to 230℃, 20℃/min to 250℃
Detector: FID
Sample: 0.5µl 1% ketones in ethanol
Ethanol
Methylethylketone
Diethylketone
Methylisobutylketoe
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25


Separation of Hydrocarbon C1 to C10s
Column: AB-PLOT Al_2O_3 "S", 50m x 0.53 mm
Oven: 40℃ (2 min)
75℃/min to 100℃ (5 min)
125℃/min to 180℃ (10 min)
15℃/min to 225℃ (20 min)
Carrier: Helium
Injection: 5 µl, splitless
Detector: FID
Peak identification:
1. Methane
2. Ethane
3. Ethylene
4. Propane
5. Cyclopropane
6. Propylene
7. iso-Butane
8, n-Butane
9. Propadiene
10. Acetylene
11. t-2-Butene
12. 1-Butene
13. Isobutylene
14. c-2-Butene
15. Cyclopentane
16. iso-Pentane
17. n-Pentane
18. 1,3-Butadiene
19. t-2-Pentene
20. 2-methyl-2 butene
21. 1-Pentene
22. c-2-Pentene
23. Unknown
24. Cyclohexane
25. 2-methyl-Pentane
26. n-Hexane
27. n-Heptane
28. Benzene
29. iso-Octane
30. n-Octane
31. Toluene
32. Nonane
33. Ethylbenzene
34. p- and m- Xylene
35, o-Xylene
36. Decane
C1
C10
Time (min.)

Alcohols

Column:	AB-InoWax, 30 m x 0.32 mm x 0.25 µm
Part No.:	2032-3002
Carrier:	Hydrogen, constant pressure 7.0psi
Oven:	40 °C (5 min), 10 °C/min to 250 °C
Injection:	240 °C, Split
Detector:	FID, 260 °C
Sample:	0.5µl

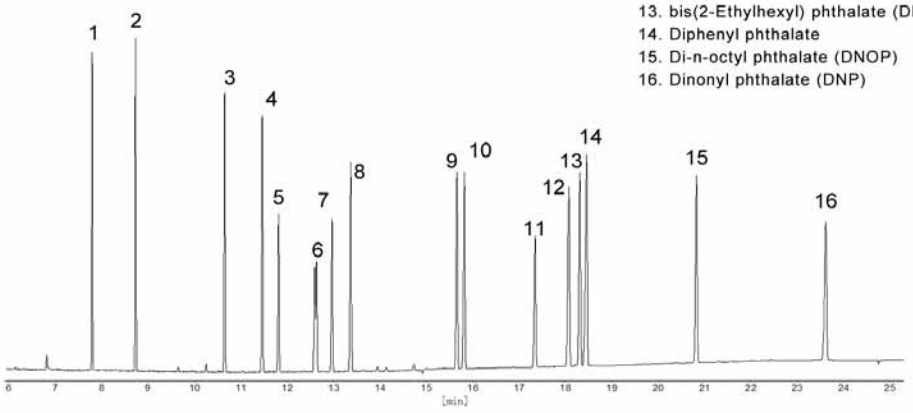
1. Methanol
2. Isopropanol
3. Ethanol
4. 2-Methyl-2-butanol(tert-amyl alcohol)
5. 2-Butanol(sec-Butanol)
6. Propanol
7. Isobutol
8. Butanol
9. Isopentanol
10. Pentanol



Esters

Column:	AB-5MS, 30 m x 0.25 mm x 0.25 µm
Part No.:	1525-3002
Carrier:	Hydrogen, constant pressure 12psi
Oven:	60 °C (1 min), 20 °C/min to 220 °C (1 min) 5 °C/min to 280°C (5 min)
Injection:	250 °C, Split
Detector:	FID, 300 °C
Sample:	100 µg/ml, 0.6µl

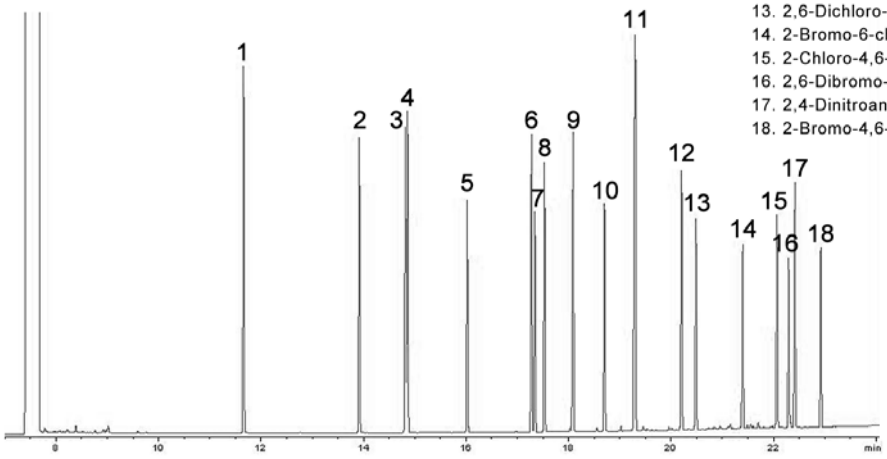
1. Dimethyl phthalate (DMP)
2. Diethyl phthalate (DEP)
3. Disobutyl phthalate(DIBP)
4. Dibutyl phthalate (DBP)
5. bis (2-Methoxyethyl) phthalate (DMEP)
6. bis (4-Methyl-2-pentyl) phthalate(BMPP)
7. bis(2-Ethoxyethyl) phthalate (DEEP)
8. Dipentyl phthalate (DPP)
9. Dihexyl phthalate (DHXP)
10. Benzyl butyl phthalate (BBP)
11. bis(2-n-Butoxyethyl) phthalate (DBEP)
12. Dicyclohexyl phthalate (DCHP)
13. bis(2-Ethylhexyl) phthalate (DEHP)
14. Diphenyl phthalate
15. Di-n-octyl phthalate (DNOP)
16. Dinonyl phthalate (DNP)



Substituted Anilines

Column:	AB-5MS, 30 m x 0.25 mm x 0.50 µm
Part No.:	1525-3005
Carrier:	Hydrogen, 33 cm/sec, Measured at 150 °C
Oven:	40 °C (5 min), 12 °C/min to 300 °C (10 min)
Injection:	250 °C, Split
Detector:	FID, 325 °C
Sample:	0.5µl

1. Aniline
2. 2-Chloroaniline
3. 3-Chloroaniline
4. 4-Chloroaniline
5. 4- Bromoaniline
6. 2-Nitroaniline
7. 2,4,6-Trichloroaniline
8. 3,4-Dichloroaniline
9. 3-Nitroaniline
10. 2,4,5-Trichloroaniline
11. 4-Nitroaniline
12. 2-Chloro-4-nitroaniline
13. 2,6-Dichloro-4-nitroaniline
14. 2-Bromo-6-chloro-4-nitroaniline
15. 2-Chloro-4,6-dinitroaniline
16. 2,6-Dibromo-4-nitroaniline
17. 2,4-Dinitroaniline
18. 2-Bromo-4,6-dinitroaniline

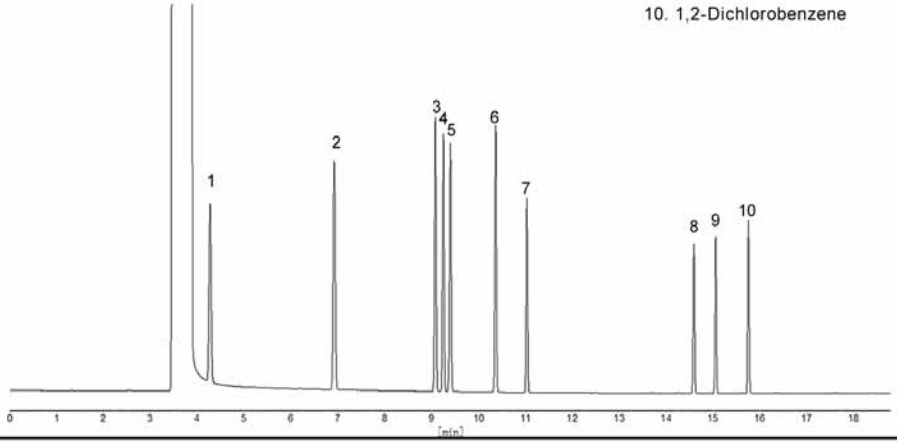


■ Environmental Applications

Aromatic Volatile Organics Mix (EPA Method 507)

Column:	AB-InoWax, 30 m x 0.32 mm x 0.50 µm
Part No.:	2032-3005
Carrier:	Hydrogen, constant pressure 7psi
Oven:	40 °C (5 min), 10 °C/min to 230 °C (2 min)
Injection:	Split, 250 °C
Detector:	FID, 300 °C
Sample:	1µl Standard

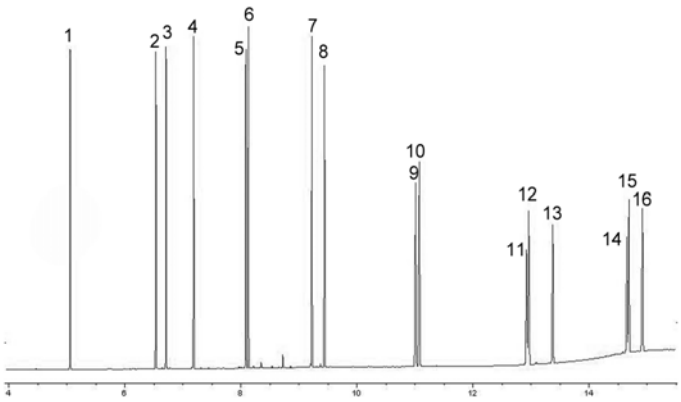
1. Benzene
2. Toluene
3. Ethylbenzene
4. p-Xylene
5. m-Xylene
6. o-Xylene
7. Chlorobenzene
8. 1,3-Dichlorobenzene
9. 1,4-Dichlorobenzene
10. 1,2-Dichlorobenzene



PAHS

Column:	AB-5MS, 30 m x 0.25 mm x 0.25 µm
Part No.:	1525-3002
Carrier:	Hydrogen, 60 cm/sec
Oven:	45 °C (1 min), 25 °C/min to 250 °C 5 °C/min to 265°C, 25°C/min to 325 °C
Injection:	300 °C, Split
Detector:	FID, 320 °C
Sample:	100 µg/ml, 0.6µl

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

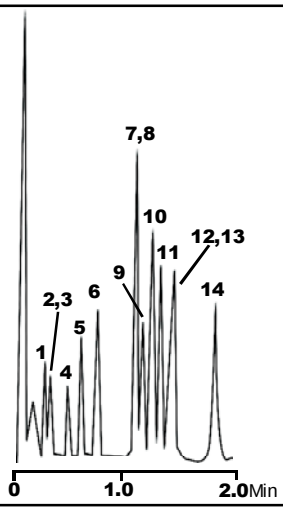


Pesticides

Column: AB-5MS, 12 m x 0.20 mm x 0.33 µm
Part No.: 1520-1203
Carrier: Helium, 2.5ml/min
Inlet: split ratio: 60:1, 250℃
Oven: 20℃
Detector: ECD, 275℃
Sample: 0.5µl

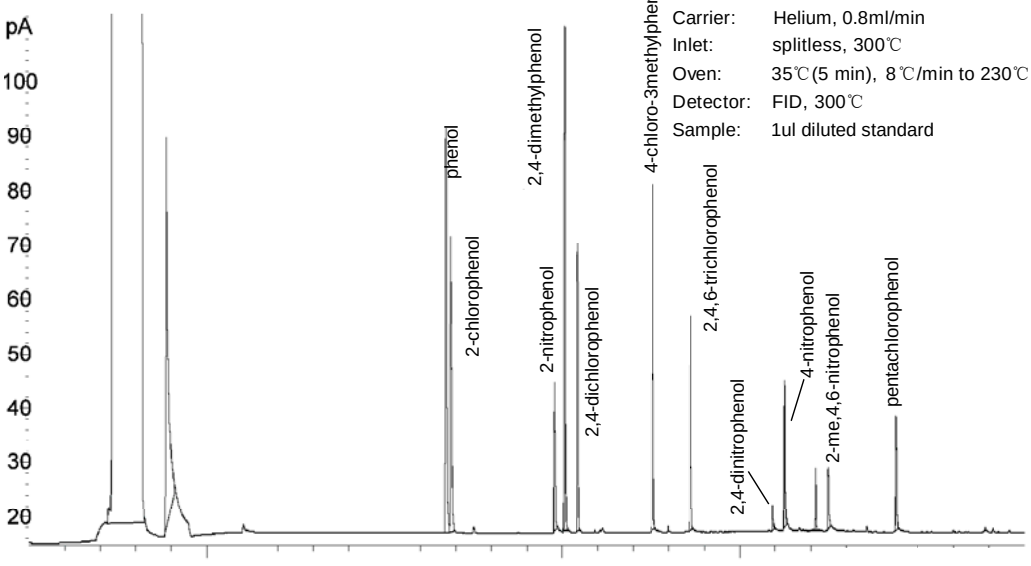
Peak identification:

1. a-BHC
2. Lindane
3. β -BHC
4. Heplachlor
5. Aldrin
6. Heptachlor apoxide
7. p-DDE
8. Dieldrin
9. o,p'-DDD
10. Endrin
11. o,p' -DDT
12. p,p'-DDD
13. b-Endosulfan
14. p,p' -DDT



Phenol Mix (EPA Method 604)

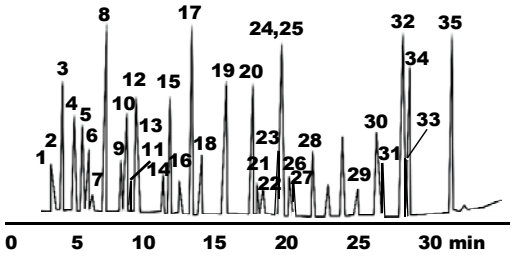
Column: AB-5MS, 30 m x 0.25 mm x 0.25 µm
Part No.: 1525-3002
Carrier: Helium, 0.8ml/min
Inlet: splitless, 300℃
Oven: 35℃(5 min), 8℃/min to 230℃
Detector: FID, 300℃
Sample: 1ul diluted standard



■ Foods and flavors Applications

Flavors and Fragtance standard mix

1. 1-limonene
2. cis-3-Hexenal
3. prenyl acetate
4. cis-3-Hexenyl acetate
5. Rose oxide
6. hexenol
7. Nonanal
8. p-Methyl cresol
9. Decanal
10. Camphor
11. Benzyl aldehyde
12. Linalool
13. Octanol
14. Menthol
15. Citronellyl acetate
16. Alpha-terpineol
17. Benzyl acetate
18. Citronellol
19. Geraniol
20. phenyl propyl acetate
21. Maltol
22. Cyclamen aldehyde
23. Cinnamic aldehyde
24. Isopropyl myristate
25. Unknown
26. Dimethyl anthranilate
27. p-Cresol
28. Eugenol
29. Heliotropine
30. Helional
31. Indole
32. Methyl naphthyl ketone
33. Musk xylol
34. Vanillin
35. Ethylene brassylate(Musk T)

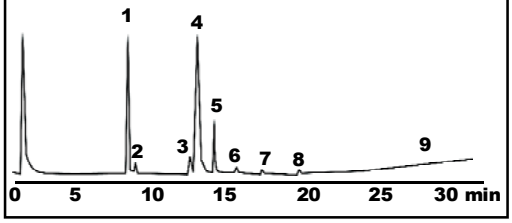


Column: AB-InoWax, 30m x 0.25mm x 0.25µm
Part No.: 2025-3002
Carrier : Helium, 30cm/sec, 0.9ml/min, Constant Flow
Oven: 80 ℃(1 min), 5 ℃/min to 250 ℃(2 min)
Injection: 0.2µl, on-column
Detector: MSD, 280 ℃
Sample: 500 ppm in Ethanol

Derivatized Olive Oil (FAMEs)

Column: AB-FFAP, 25 m x 0.32 mm x 0.5 µm
Part No.: 2132-2505
Carrier: Helium, constant pressure 25.7 psi
Oven : 150 ℃(1 min), 2.5 ℃/min to 230 ℃(1 min)

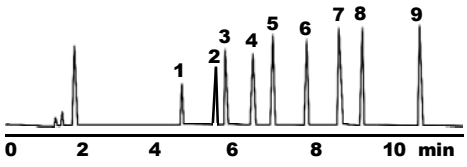
1. C16:0
2. C16:1
3. C18:0
4. C18:1
5. C18:2
6. C18:3
7. C20:0
8. C22:0
9. C24:0



Free fatty acids (C2-C7)

Injection: 0.5ul, split 20:1, 260℃
Column: AB FFAP, 25 m x 0.32 mm x 0.5µm
Part No.: 2132 - 2505
Carrier: Helium, constant pressure 10.8 psi
Oven: 80℃(1 min), 20℃/min to 120℃(0 min)
6.13℃/min to 205℃(2 min)
Detector: FID, 260℃

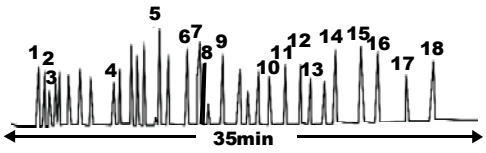
1. Acetic acid
2. Propionic acid
3. Isobutyric acid
4. Butyric acid
5. Isovaleric acid
6. Valeric acid
7. Isocaproic acid
8. Caproic acid
9. Heptanoic acid

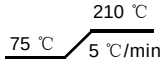


Perfume Calibration Mix

1. a-Pinene
2. β -Pinene
3. &-Limonene
4. Citronellal
5. Menthol
6. Benzyl acetate
7. Citronellyl acetate
8. geraniol
9. Hydroxy citrinellal
10. Anisaldehyde
11. Methyl Cinnamate
12. Ethyl cinnamate
13. Eugenol
14. Jasmonal
15. Diethyl phthalate
16. Coumarin
17. Vanillin
18. Benzyl benzoate

Column: AB-CarboWax 20M, 50m x 0.32mm x 0.3µm
Part No.: 2232-5003
Carrier: Hydrogen, 64cm/sec, measured at 75℃
Oven: Temperature program listed
Injection: split, 210 ℃
Detector: FID, 230 ℃

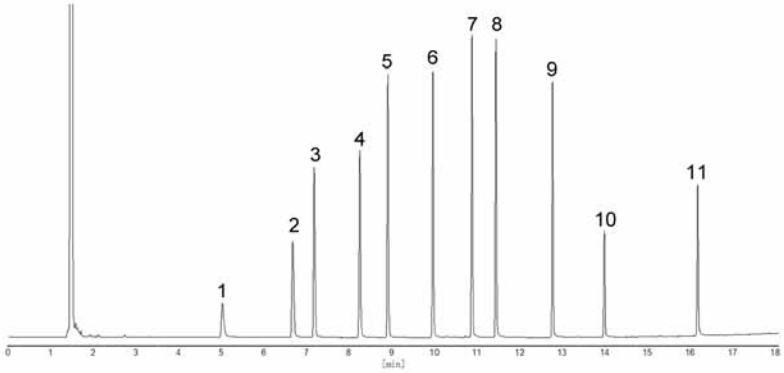




Organics Acids

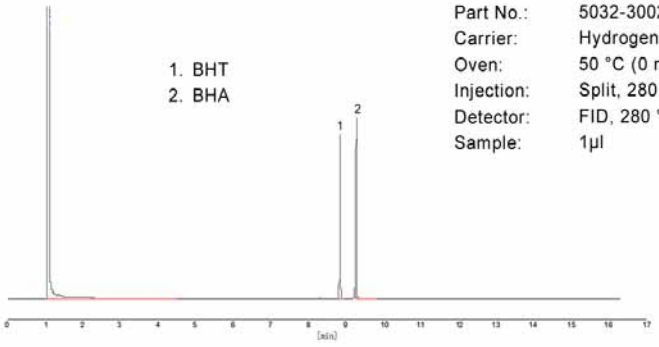
Column:	AB-FFAP, 30 m x 0.25 mm x 0.25 µm
Part No.:	2125-3002
Carrier:	Hydrogen, constant pressure 10.0psi
Oven:	100 °C (5 min), 10 °C/min to 250 °C
Injection:	Split, 250 °C
Detector:	FID, 300 °C
Sample:	0.5µl

1. Acetic acid
2. Propionic acid
3. Isobutyric acid
4. Butyric acid
5. Isovaleric acid
6. Valeric acid
7. Isocaproic acid
8. Caproic acid
9. Heptanoic acid
10. Octanoic acid
11. Decanoic acid



BHA and BHT

1. BHT
2. BHA



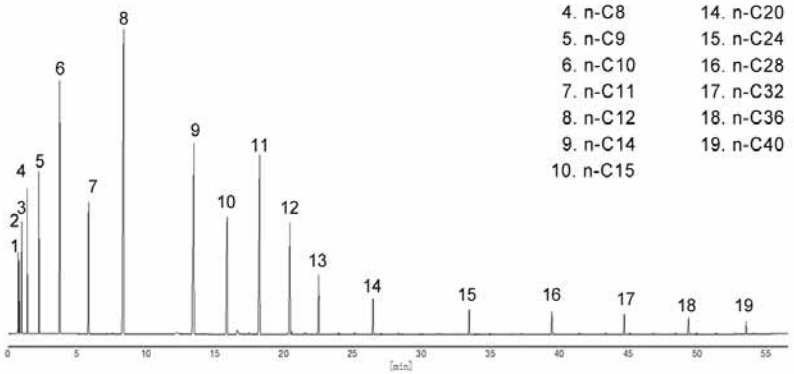
Column:	AB-50+, 30 m x 0.32 mm x 0.25 µm
Part No.:	5032-3002
Carrier:	Hydrogen, constant pressure 7psi
Oven:	50 °C (0 min), 5 °C/min to 240 °C
Injection:	Split, 280 °C
Detector:	FID, 280 °C
Sample:	1µl

■ Petrochemical Applications

C5-C40

Column: AB-1, 30 m x 0.32 mm x 0.10 µm
Part No.: 0132-3001
Carrier: Hydrogen, constant pressure 10psi
Oven: 40 °C (5 min), 5 °C/min to 340 °C
Injection: Split, 340 °C
Detector: FID, 340 °C
Sample: 1µl

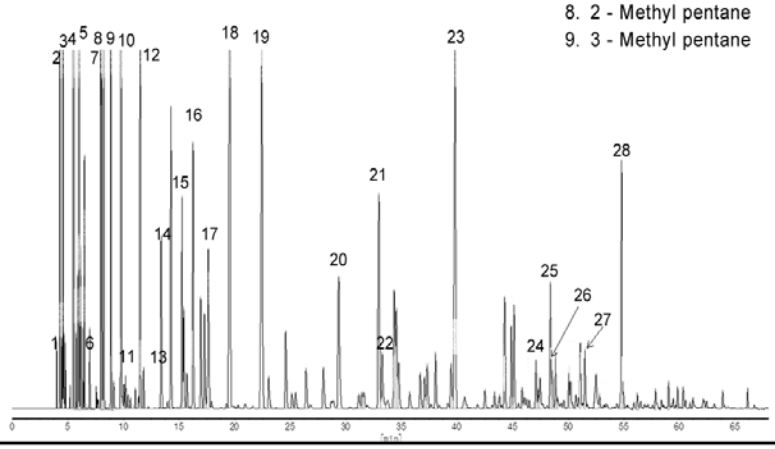
1. n-C5
2. n-C6
3. n-C7
4. n-C8
5. n-C9
6. n-C10
7. n-C11
8. n-C12
9. n-C14
10. n-C15
11. n-C16
12. n-C17
13. n-C18
14. n-C20
15. n-C24
16. n-C28
17. n-C32
18. n-C36
19. n-C40



Naphthas

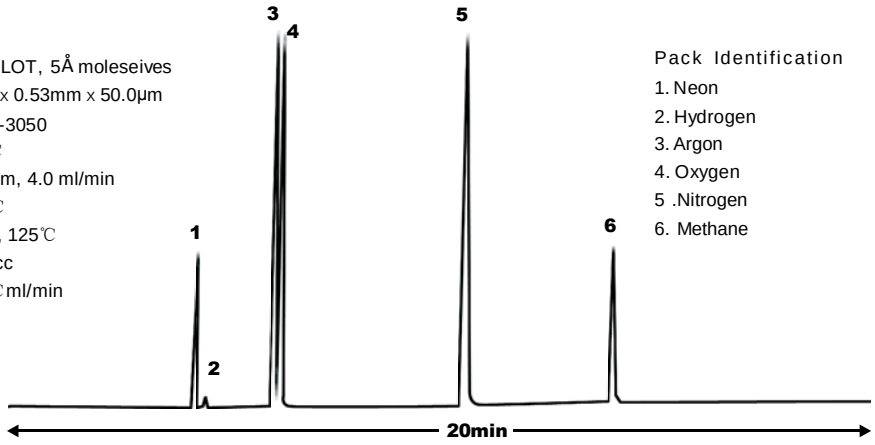
Column: AB-PONA, 50 m x 0.20 mm x 0.50 µm
Part No.: 9002- PONA
Carrier: Hydrogen, constant pressure 13psi
Oven: 35 °C(30 min), 2 °C/min to 200 °C
Injection: Split, 200 °C
Detector: FID, 250 °C
Sample: Naphthas, 0.5µl

1. Propane
2. Isobutane
3. Butane
4. Isopentane
5. Pentane
6. 2,2-Dimethyl butane
7. Cyclopentane
8. 2 - Methyl pentane
9. 3 - Methyl pentane
10. Hexane
11. 2,2-Dimethyl pentane
12. Methylcyclopentane
13. 2,4- Dimethylpentane
14. Benzene
15. 2-Methylhexane
16. 2,3-Dimethylpentane
17. 3-Methylhexane
18. Heptane
19. Methylcyclohexane
20. Toluene
21. 2-Methylheptane
22. 4-Methylheptane
23. Octane
24. Ethylbenzene
25. m-Xylene
26. p-Xylene
27. o-Xylene
28. Nonane



Permanent Gases

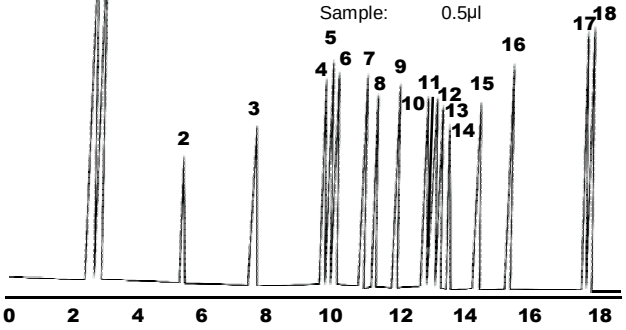
Column:	AB-PLOT, 5Å moleseives
	30m x 0.53mm x 50.0µm
Part No.:	8453-3050
Oven:	40 ℃
Carrier:	Helium, 4.0 ml/min
Iniet:	125℃
Detector:	TCD, 125℃
Sample:	0.25cc
Split flow:	150℃ml/min



Pack Identification
1. Neon
2. Hydrogen
3. Argon
4. Oxygen
5 .Nitrogen
6. Methane

Substituted Aromatics AB-InoWax Column

Column:	AB-InoWax, 60 m x 0.32 mm x 0.5 µm
Part No.:	2032 - 6005
Injection:	Split, 250:1, 250℃
	Concentration of analytes: 500ug/ml in hexane
Carrier:	Hydrogen, 40cm/sec, constant pressure
Oven:	50℃(1 min), 4℃/min to 75℃ (0 min)
	10℃/min to 100℃ (4 min)
	10℃/min to 150℃
Detector:	FID, 300℃
Sample:	0.5µl

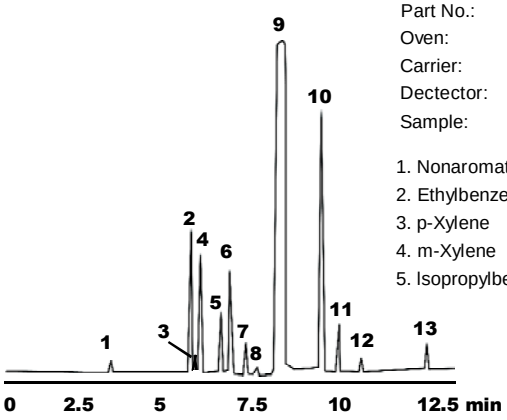


1. Hexane
2. Benzene
3. Toluene
4. Ethylbenzene
5. p-Xylene
6. m-Xylene
7. Isopropylbenzene
8. o-Xylene
9. Propylbenzene
10. tert-Butylbenzene
11. Isobutylbenzene
12.1,3,5-Triethylbenzene
13. sec-Butylbenzene
14. Styrene
15. 1,2,4-Trimethylbenzene
16. Butylbenzene
17. 1, 4-Diisopropylbenzene
18. trans-β-Methylstyrene

Impurities in styrene

Impurities in Styrene:
ASTM D5135

Column:	AB-InoWax, 30 m x 0.32 mm x 0.5 µm
Part No.:	2032-3005
Oven:	80℃ (5 min), 10℃/min to 150℃ (2 min)
Carrier:	Helium, 1.5ml/min
Dectector:	FID, 240℃
Sample:	0.5µl

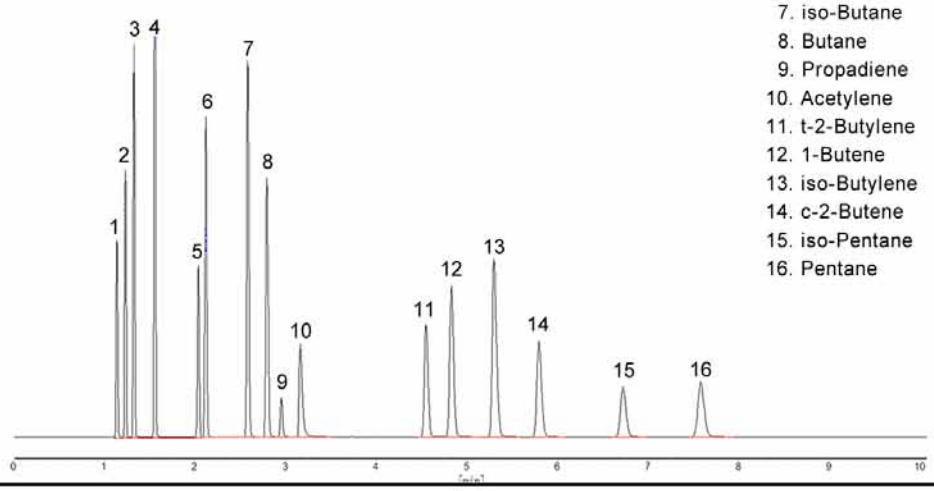


1. Nonaromatics
2. Ethylbenzene
3. p-Xylene
4. m-Xylene
5. Isopropylbenzene
6. o-Xylene
7. n-Propylbenzene
8. p/m- Ethyltoluene
9. Styrene
10. α-methylstyrene
11. Phenylacetylene(58ppm)
12. β-Methylstyrene
13. Benzaldehyde

C1-C5

Column: AB-PLOT Al_2O_3 "S", 30 m x 0.53 mm x 15.00 µm
Part No.: 8253-3015
Carrier: Hydrogen, constant pressure 2.5psi
Oven: 100 °C
Injection: Split, 250 °C
Detector: FID, 220 °C

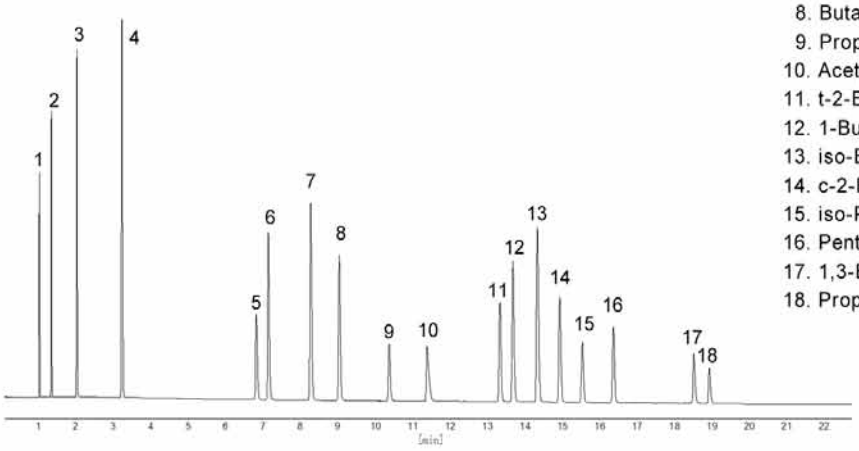
1. Methane
2. Ethane
3. Ethylene
4. Propane
5. Cyclopropane
6. Propylene
7. iso-Butane
8. Butane
9. Propadiene
10. Acetylene
11. t-2-Butylene
12. 1-Butene
13. iso-Butylene
14. c-2-Butene
15. iso-Pentane
16. Pentane

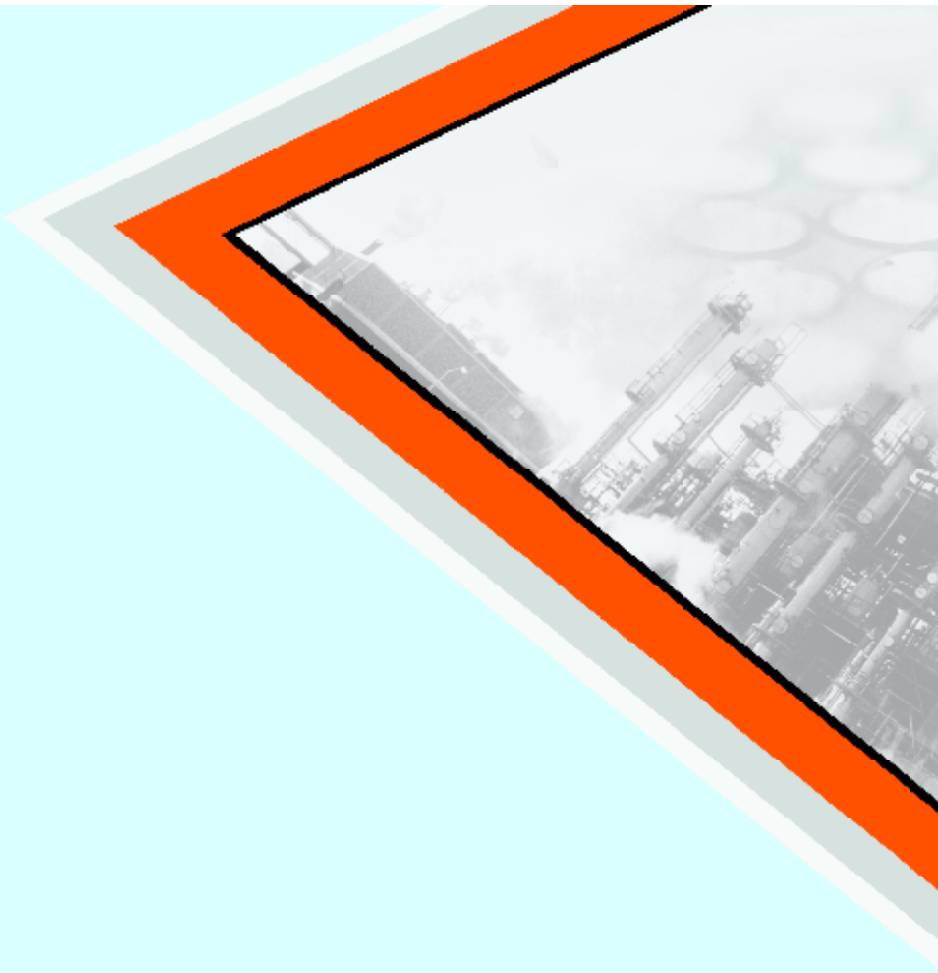


Refinery Gas

Column: AB-PLOT Al_2O_3 "S", 30 m x 0.53 mm x 15.00 µm
Part No.: 8253-3015
Carrier: Hydrogen, constant pressure 2.5psi
Oven: 35 °C (2 min), 5 °C/min to 150 °C
Injection: Split, 250 °C
Detector: FID, 220 °C

1. Methane
2. Ethane
3. Ethylene
4. Propane
5. Cyclopropane
6. Propylene
7. iso-Butane
8. Butane
9. Propadiene
10. Acetylene
11. t-2-Butylene
12. 1-Butene
13. iso-Butylene
14. c-2-Butene
15. iso-Pentane
16. Pentane
17. 1,3-Butadiene
18. Propyne





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