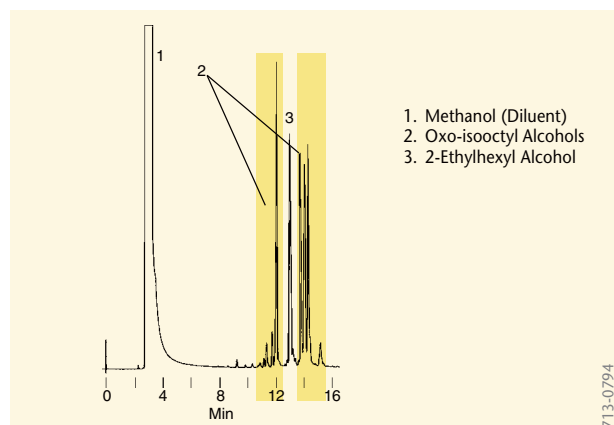
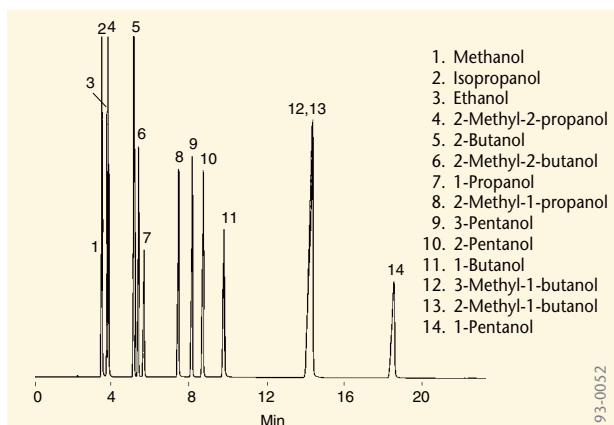


GC Applications

Alcohols

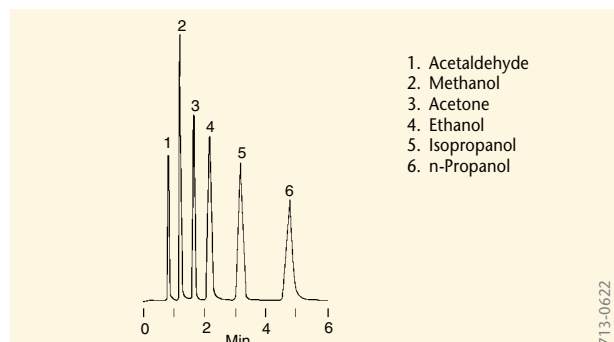
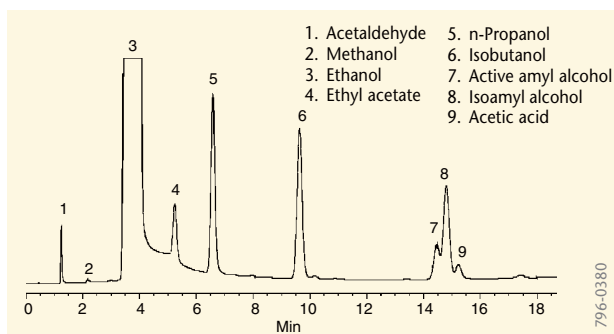


Alcohols (GC)

Column: **PAG, 30m x 0.25mm ID, 0.25µm film**
Cat. No.: **24223**
Oven: 60°C
Carrier: helium, 20cm/sec (set at 60°C), splitter vent flow 65-70cc/min
Det.: FID, 260°C
Inj.: 1µL alcohols in water (0.5-17mM each component), split 100:1, 250°C

Alcohols (GC)

Column: **Nukol, 30m x 0.53mm ID, 0.5µm film**
Cat. No.: **25327**
Oven: 90°C to 160°C at 4°C/min, hold 5 min
Carrier: helium, 20cm/sec
Det.: FID, 200°C
Inj.: 0.2µL methanol, 2% isoctyl alcohols, 200°C

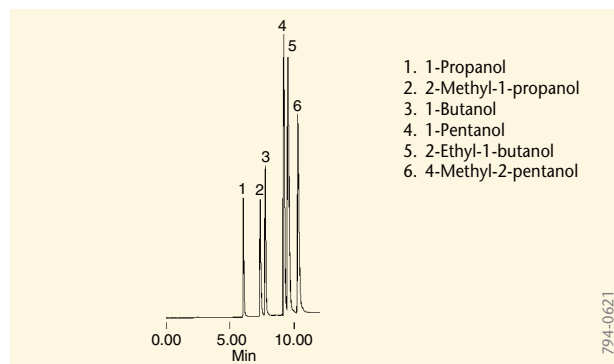
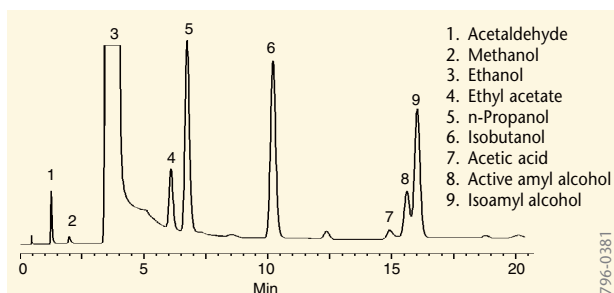


Alcohols (GC)

Packing: **80/120 Carbowax B AW /6.6% Carbowax PEG 20M**
Cat. No.: **11814** (15g/bottle)
Column: 2m x 2mm glass
Oven: 70°C to 150°C at 4°C
Carrier: nitrogen, 20mL/min
Det.: FID
Inj.: 1µL Scotch whiskey

Alcohols, Blood (GC)

Packing: **60/80 Carbowax B/5% Carbowax 20M**
Cat. No.: **11766** (15g/bottle)
Column: 6m x 2mm ID glass stock columns available
Oven: 85°C
Carrier: helium, 20mL/min
Det.: FID
Inj.: 1µL water, 0.05-0.10% each analyte

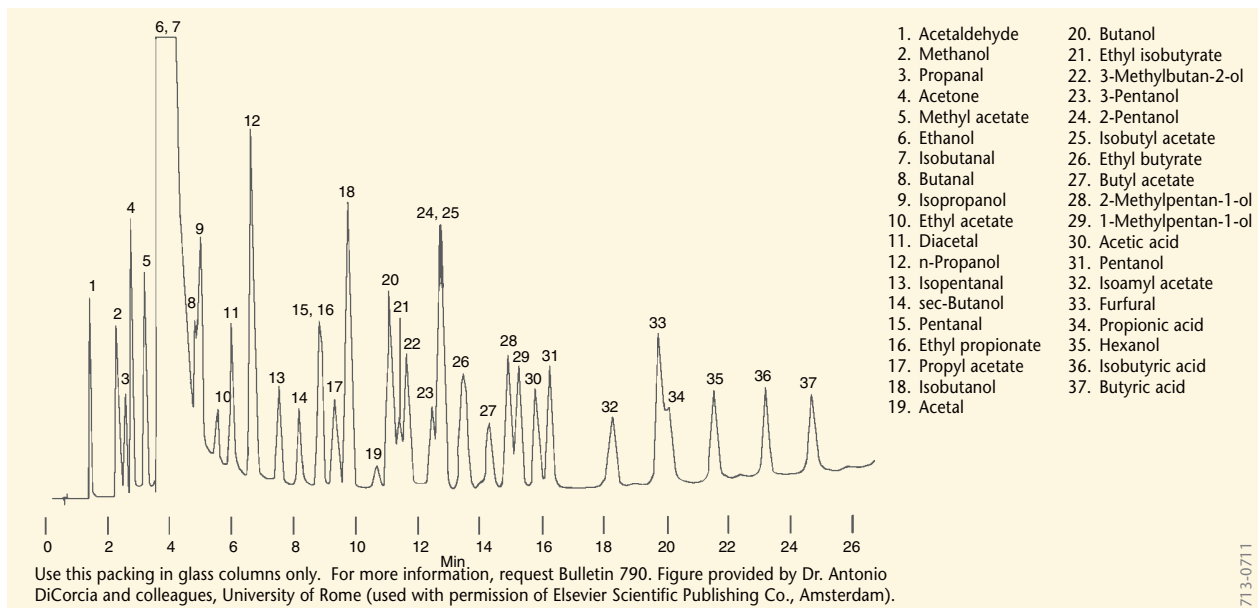


Alcohols (GC)

Packing: **80/120 Carbowax B / 5% Carbowax 20M**
Cat. No.: **11812-U** (15g/bottle)
Column: 2m x 2mm ID glass
Oven: 70°C to 150°C at 4°C
Carrier: nitrogen, 20mL/min
Det.: FID
Inj.: 1µL Scotch whiskey

Alcohols (GC)

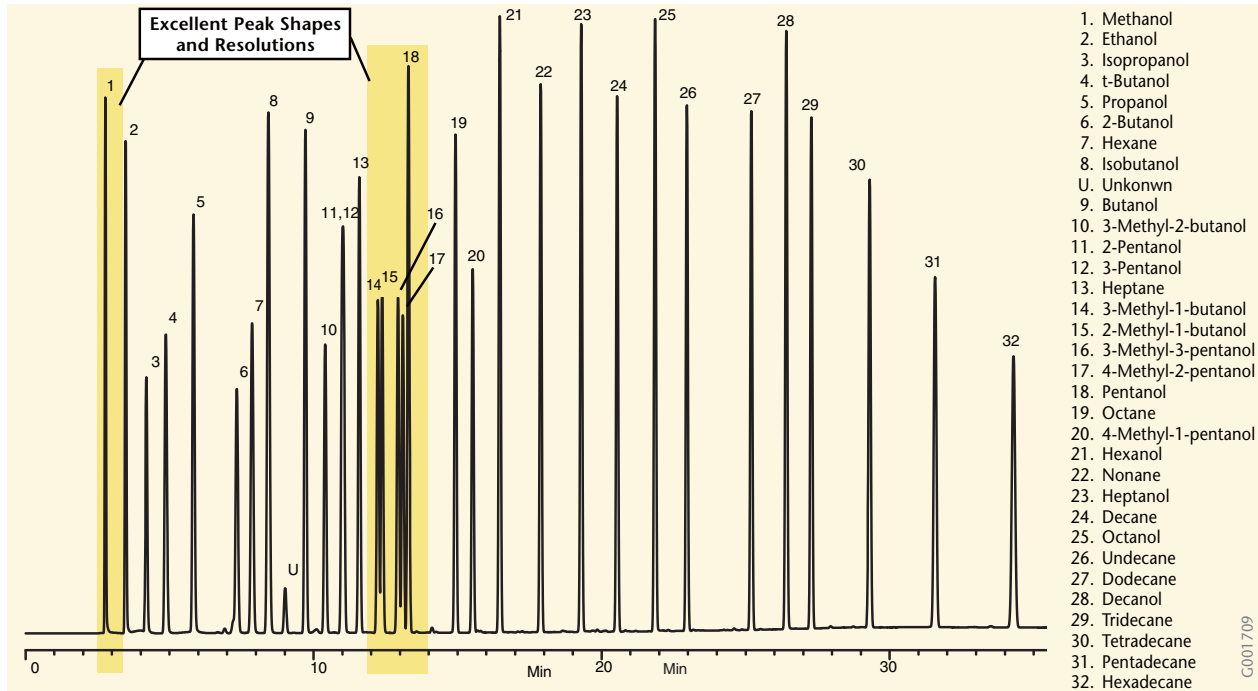
Column: **Supel-Q PLOT, 30m x 0.53mm**
Cat. No.: **25462**
Oven: 35°C (3 min) to 250°C at 16°C/min
Carrier: helium, 3mL/min (set at 35°C)
Det.: FID, 250°C
Inj.: 0.1µL



713-0711

Alcoholic Beverage/Fermentation Components (GC)

Packing: 80/120 Carboxpack B AW/6.6% PEG 20M
 Cat. No.: 11814 (15g/bottle)
 Column: 2m x 2mm ID glass
 Oven: 80°C to 200°C at 4°C/min
 Carrier: nitrogen
 Det.: FID
 Inj.: 1µL water:ethanol (50:50), 40-60ppm each analyte



G001709

Hydrocarbons and Alcohols (GC)

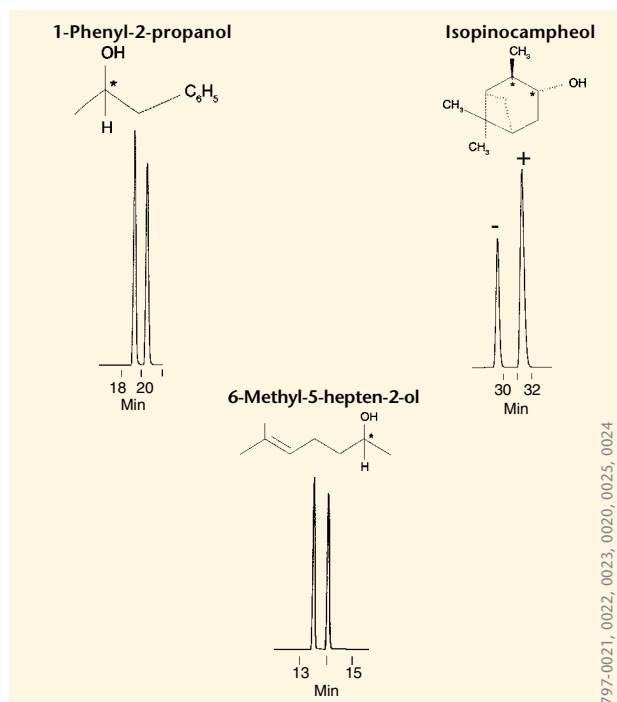
Column: Equity-1, 30m x 0.53mm ID, 3.0µm
 Cat. No.: 28076-U
 Oven: 40° C (5 min) to 225°C @ 8°C /min
 Inj.: 250°C
 Det.: FID, 275°C
 Flow: Helium, 30 cm/sec @ 40°C
 Injection: 0.10µL, split 100:1
 Liner: Split, cup design
 Sample: 32 component mixed solvent sample, equal by weight

Order: 1.800.325.3010 Technical Service: 1.800.359.3041 Web: www.sigma-aldrich.com/supelco

Gas Chromatography

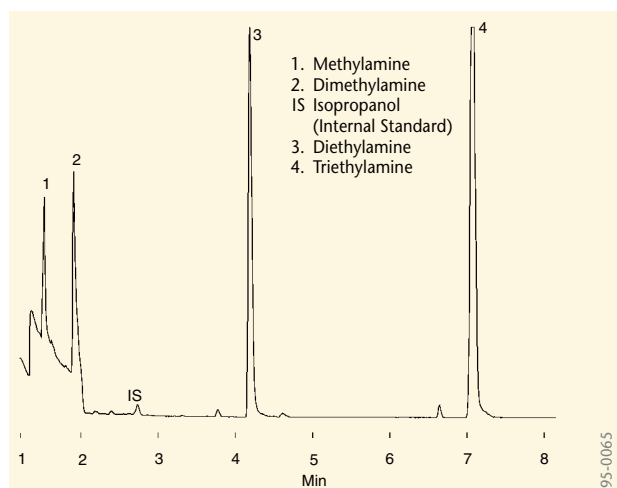
GC Applications

Alcohols, Amines



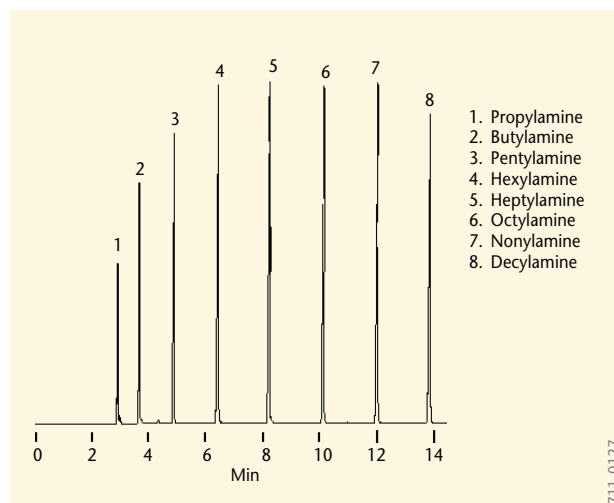
Alcohol Enantiomers (GC)

Column: β -DEX 325, 30m x 0.25mm ID, 0.25 μ m film
 Cat. No.: 24308
 Oven: 110°C, 1-phenyl-2-propanol; 100°C, isopinocampheol;
 90°C, 6-methyl-5-hepten-2-ol
 Carrier: helium, 20cm/sec set at the analysis temperature
 Det.: FID, 300°C
 Inj.: 1 μ L methylene chloride (1 mg/mL each analyte), split (100:1), 220°C



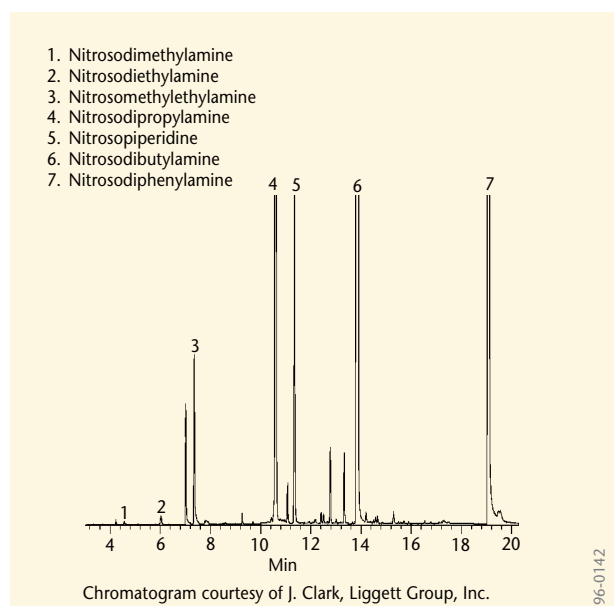
Amines (SPME/GC)

Sample: amines at 5ppm in water, 27% NaCl, pH 9.5
 SPME Fiber: polydimethylsiloxane/divinylbenzene, 65 μ m film
 Cat. No.: 57310
 Extraction: 20 min, fiber immersed in water, rapid stirring
 Desorption: 5 min, 270°C
 Column: SPB-1 SULFUR, 30m x 0.32mm ID, 4.0 μ m film
 Cat. No.: 24158
 Oven: 50C (2min) to 150°C at 10°C/min
 Carrier: helium, 25cm/sec (set at 50°C)
 Det.: GC/MS, selected ions at 0.6 sec/scan
 Inj.: splitless/split, closed initial 5 min, 270°C, 0.75mm ID splitless liner



Amines, Primary (GC)

Column: Carbowax Amine, 30m x 0.53mm ID,
 1.0 μ m film
 Cat. No.: 25353
 Oven: 50°C to 200°C at 8°C/min, hold 10 min
 Carrier: helium, 20cm/sec (set at 170°C)
 Det.: FID, 220°C
 Inj.: 0.02 μ L neat amines mix, split (100:1), 220°C

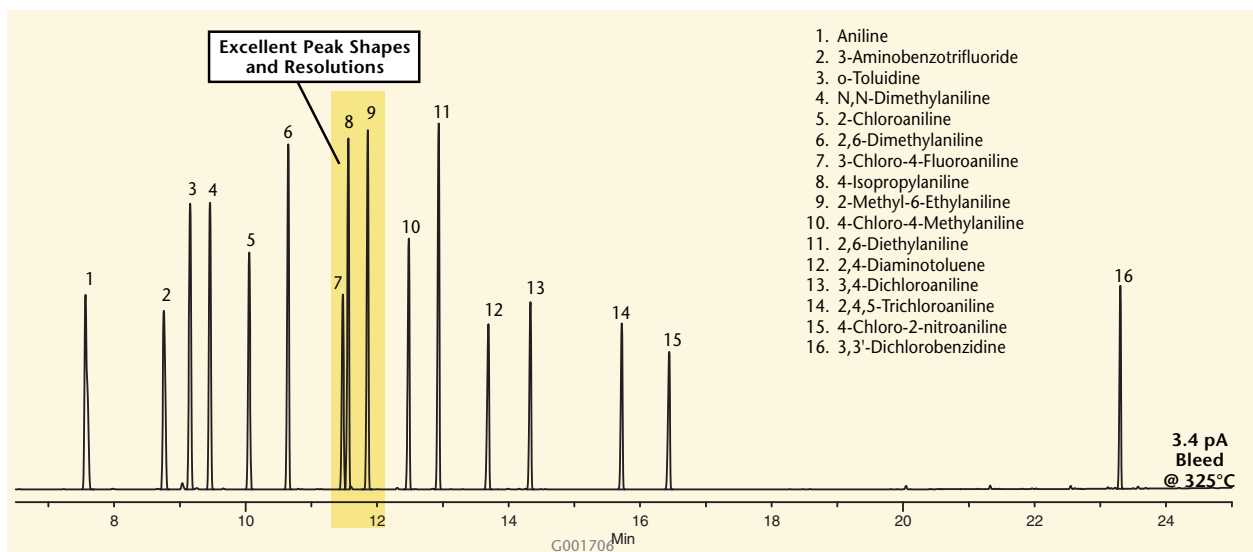


Nitrosamines (SPME/GC)

Sample: analytes in water +25% KCl, pH 10.0
 SPME Fiber: polydimethylsiloxane/divinylbenzene, 65 μ m film
 Cat. No.: 57310-U
 Extraction: immersion, 15min (rapid stirring)
 Desorption: 270°C, 1min
 Column: PTA-5, 30m x 0.32mm ID, 0.5 μ m film
 Cat. No.: 24331
 Oven: 50°C (1min) to 250°C at 10°C/min, hold 2 min
 Carrier: helium, 30cm/sec
 Det.: GC/MS (quadrupole, selected ion mode)
 Inj.: splitless, 250°C (0.75mm ID liner)

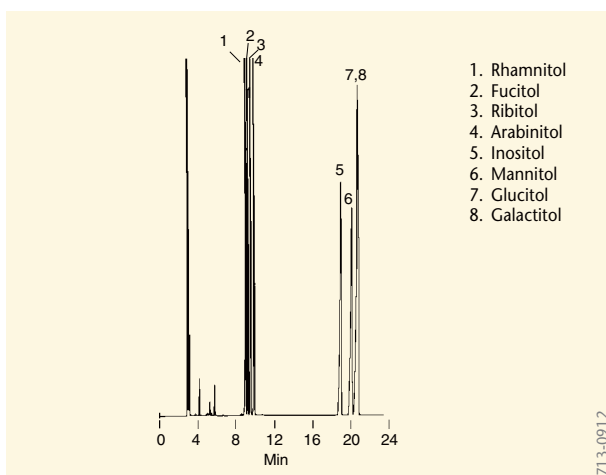
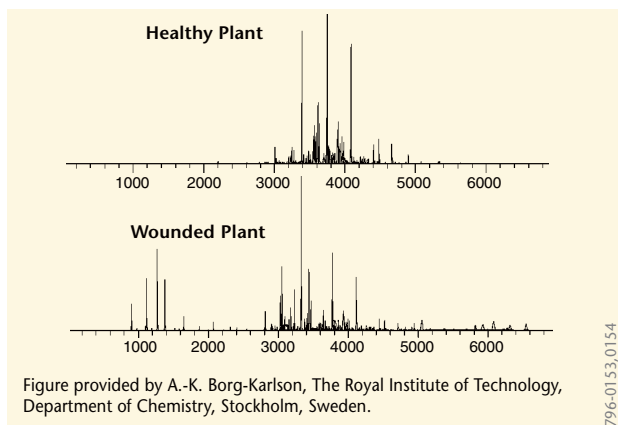
GC Applications

Anilines, Aromatics, Alditol Acetates



Anilines (GC)

Column: **Equity-5, 30m x 0.25mm ID, 0.25µm**
 Cat. No.: **28089-U**
 Oven: 50°C (2 min) to 200°C @ 10°C/min to 325°C @ 15°C/min
 Inj.: 250°C
 Det.: FID, 325°C
 Flow: Helium, constant flow, 1.3 mL/sec @ 50°C
 Injection: 1.0µL, splitless (0.5 min)
 Liner: Splitless, 4mm ID single taper
 Sample: 50ng on-column of a custom anilines mix



Alditol Acetates (GC)

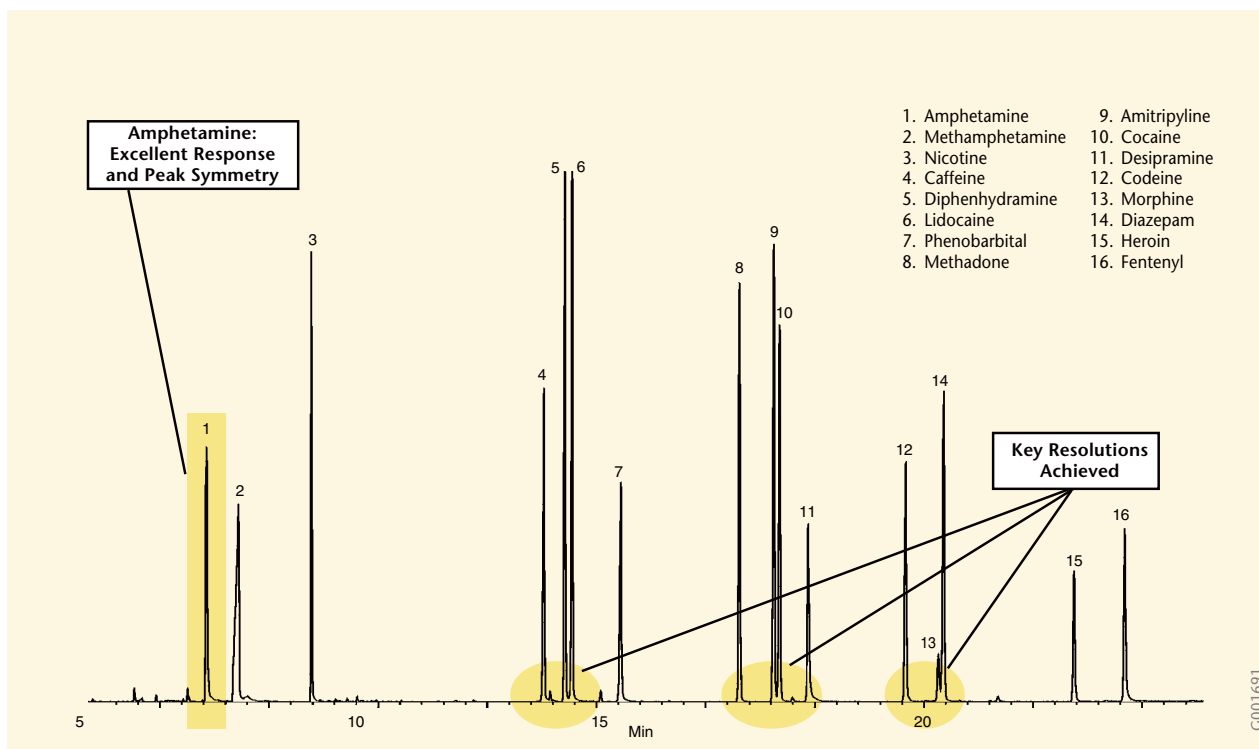
Column: **SPB-1701, 30m x 0.25mm ID, 0.25µm film**
 Cat. No.: **24113**
 Oven: 220°C
 Carrier: helium, 20cm/sec (set at 220°C)
 Det.: FID, 260°C
 Inj.: 1µL, split 100:1 (5ng each compound on column)

Mono- and Sesquiterpenes in Spruce Seedlings (SPME/GC)

Sample: headspace surrounding *Picea abies* seedlings
 SPME Fiber: **polydimethylsiloxane, 100µm film**
 Cat. No.: **57300-U**
 Extraction: headspace, 60 min
 Desorption: 30 sec, 225°C
 Column: poly(5% diphenyl)/95% dimethylsiloxane), 30m x 0.25mm ID, 0.25µm film
 Supelco
 Equivalent: **Equity-5 (Cat. No. 28089-U)**
 Oven: 40°C (4 min) to 200°C at 4°C/min, hold 16 min
 Carrier: helium, 10psi
 Det.: EID, 70ev
 Inj.: splitless (splitter opened after 30 sec), 225°C

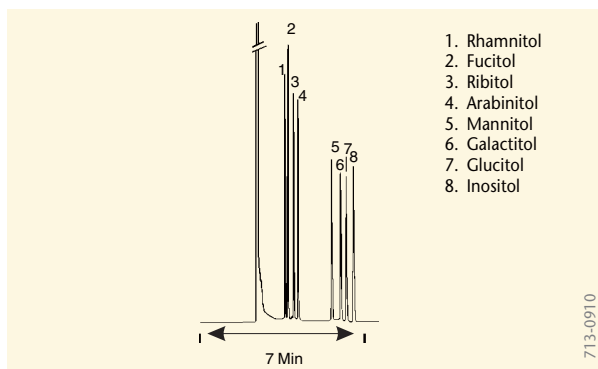
GC Applications

Alditol Acetates, Drugs



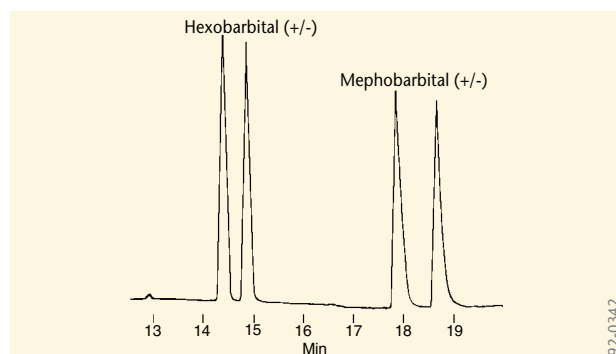
Drug Screen (GC/MS)

Column: **Equity-5, 30m x 0.25mm ID, 0.25 μ m**
 Cat. No.: **28089-U**
 Oven: 45°C (2 min) to 110°C @ 25°C/min to 200°C @ 15°C/min to 280°C
 Inj.: 250°C
 Det.: 5973 MSD, 40-450 amu scan range, 325°C transfer line
 Flow: Helium, 40psi for 0.2 min then 0.7mL/min constant flow
 Injection: 0.3 μ L pulsed splitless @ 50mL/min (0.5 min)
 Liner: Splitless 2mm ID
 Sample: ~15ng on-column of a 16-component drug standard



Alditol Acetates (GC)

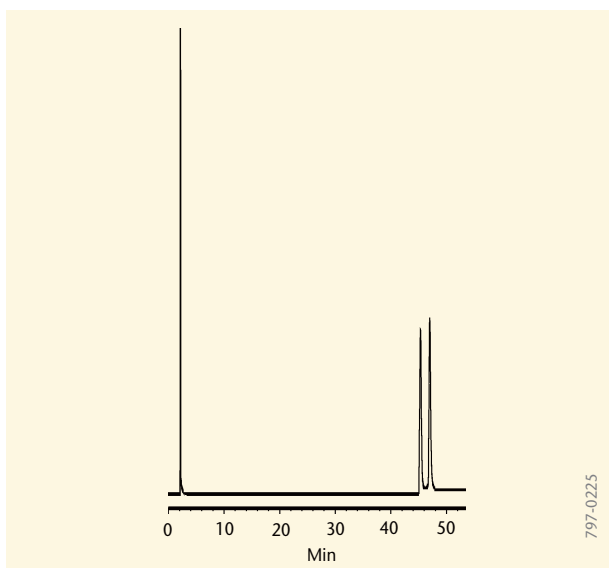
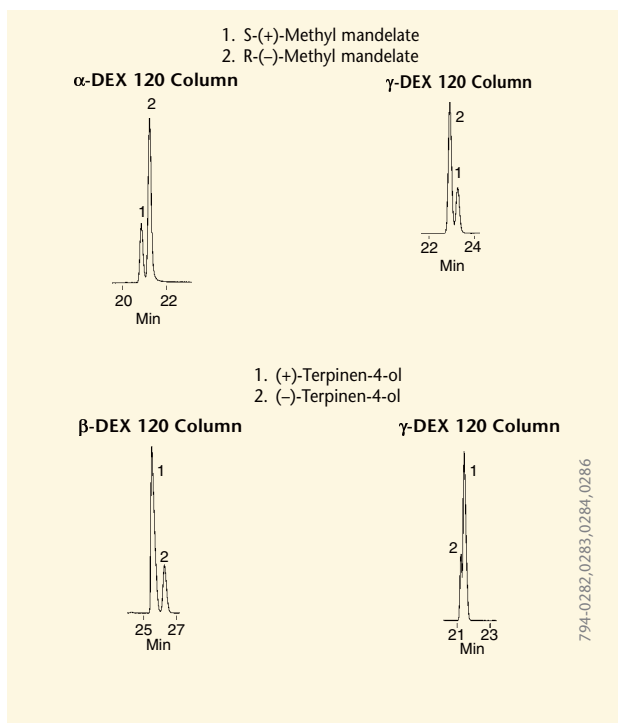
Column: **SP-2380, 30m x 0.25mm ID, 0.20 μ m film**
 Cat. No.: **24110-U**
 Oven: 275°C
 Carrier: helium, 20cm/sec (set at 275°C)
 Det.: FID
 Inj.: 1 μ L chloroform containing 6 μ g each sugar, split ratio 100:1



Barbiturate Enantiomers (GC)

Column: **β -DEX 120, 30m x 0.25mm ID, 0.25 μ m film**
 Cat. No.: **24304**
 Carrier: helium, 20cm/sec
 Temp.: 210°C
 Det.: 300°C, FID
 Inj.: 100:1 split, 300°C

GC Applications Enantiomers, FAMES



Enantioseparation of 4-Methyloctanoic Acid (GC)

Column: γ -DEX 120, 30m x 0.25mm ID, 0.25 μ m film

Cat. No.: 24307

Oven: 115°C

Carrier: helium, 20cm/sec

Det.: FID, 300°C

Inj.: 1 μ L methylene chloride containing ~1mg/mL racemate, split 100:1, 220°C

Enantio-Reversals (GC)

Columns: 30m x 0.25mm ID, 0.25 μ m film

Cat. Nos.: 24310 (α -DEX),

24304 (β -DEX)

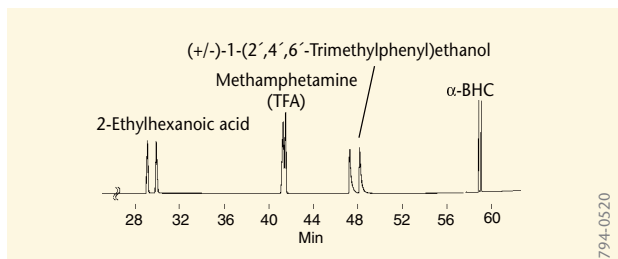
24307 (γ -DEX)

Carrier: helium, 35cm/sec

Det.: FID, 300°C

Oven: 130°C (methyl mandelate); 100°C (terpinen-4-ol)

Inj.: 1 μ L (1mg/mL in methylene chloride), split (100:1), 250°C



Enantiomers (GC)

Column: γ -DEX 120, 30m x 0.25mm ID, 0.25 μ m film

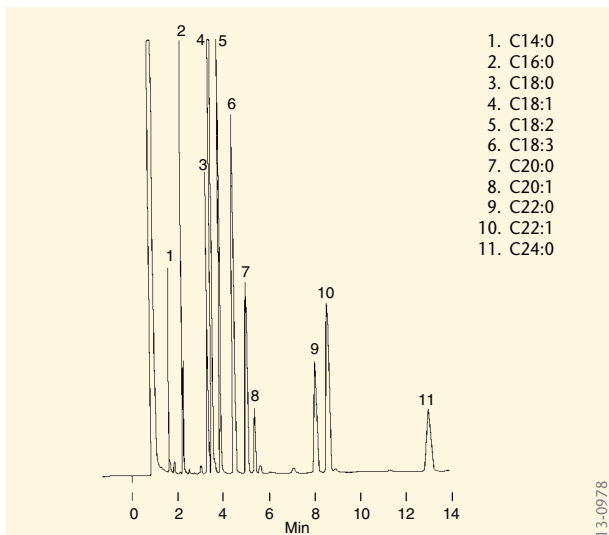
Cat. No.: 24307

Oven: 90°C to 135°C at 1°C/min, then to 240°C at 5°C/min

Carrier: helium, 20cm/sec

Det.: FID, 300°C

Inj.: 1 μ L (0.5mg/mL in methylene chloride), split (100:1), 300°C



For more information on fatty acids analyses by capillary GC, request Bulletin 855.

Fatty Acid Methyl Esters (GC)

Column: SUPELCOWAX 10, 30m x 0.53mm ID, 1.0 μ m film

Cat. No.: 25301-U

Oven: 240°C

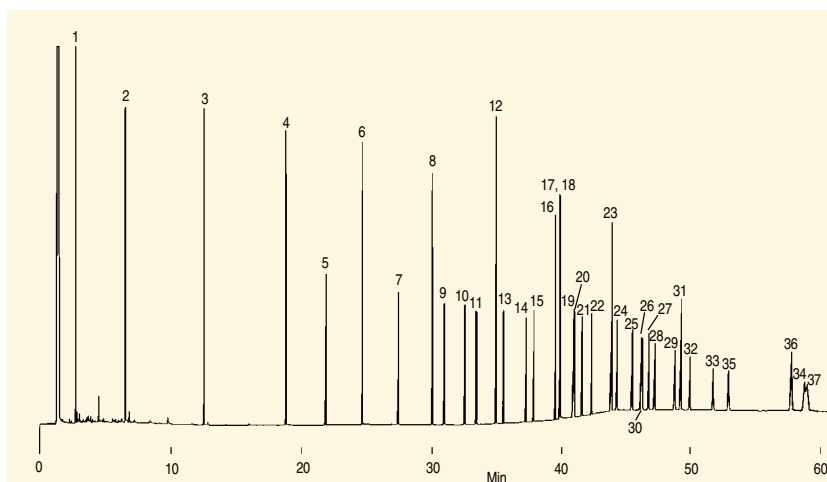
Carrier: helium, 5cc/min (flow controlled)

Det.: FID, 260°C

Inj.: 0.1 μ L Rapeseed Oil Reference Mix (Cat. No. O7756-1AMP), 2.5 μ g FAMES on column, direct injection, 250°C

GC Applications

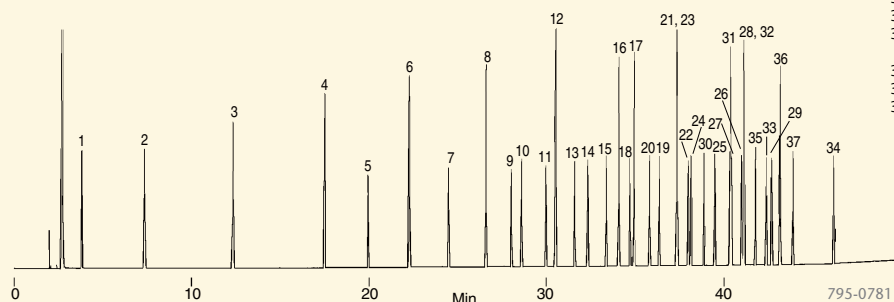
FAMES



Column: **Omegawax 250, 30m x 0.25mm ID, 0.25 μ m film**
 Cat. No.: **24136**
 Oven: 50°C (2 min) to 220°C at 4°C/min, hold 15 min
 Carrier: helium, 30cm/sec, 205°C

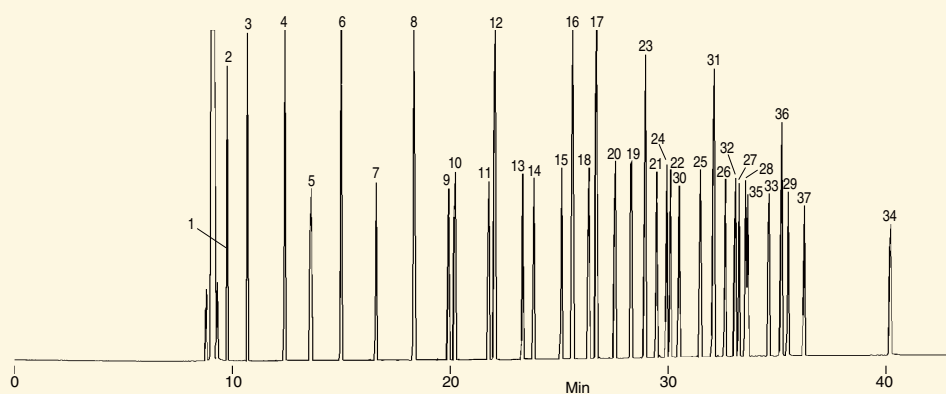
794-0661

Component (acid methyl esters)	Weight %
1. C4:0 (Butyric)	4
2. C6:0 (Caproic)	4
3. C8:0 (Caprylic)	4
4. C10:0 (Capric)	4
5. C11:0 (Undecanoic)	2
6. C12:0 (Lauric)	4
7. C13:0 (Tridecanoic)	2
8. C14:0 (Myristic)	4
9. C14:1 (Myristoleic)	2
10. C15:0 (Pentadecanoic)	2
11. C15:1 (<i>cis</i> -10-Pentadecenoic)	2
12. C16:0 (Palmitic)	6
13. C16:1 (Palmitoleic)	2
14. C17:0 (Heptadecanoic)	2
15. C17:1 (<i>cis</i> -10-Heptadecenoic)	2
16. C18:0 (Stearic)	4
17. C18:1n9c (Oleic)	4
18. C18:1n9t (Elaidic)	2
19. C18:2n6c (Linoleic)	2
20. C18:2n6t (Linolelaidic)	2
21. C18:3n6 (γ -Linolenic)	2
22. C18:3n3 (α -Linolenic)	2
23. C20:0 (Arachidic)	4
24. C20:1n9 (<i>cis</i> -11-Eicosenoic)	2
25. C20:2 (<i>cis</i> -11,14-Eicosadienoic)	2
26. C20:3n6 (<i>cis</i> -8,11,14-Eicosatrienoic)	2
27. C20:3n3 (<i>cis</i> -11,14,17-Eicosatrienoic)	2
28. C20:4n6 (Arachidonic)	2
29. C20:5n3 (<i>cis</i> -5,8,11,14,17-Eicosapentaenoic)	2
30. C21:0 (Henicosanoic)	2
31. C22:0 (Behenic)	4
32. C22:1n9 (Erucic)	2
33. C22:2 (<i>cis</i> -13,16-Docosadienoic)	2
34. C22:6n3 (<i>cis</i> -4,7,10,13,16,19-Docosahexaenoic)	2
35. C23:0 (Tricosanoic)	2
36. C24:0 (Lignoceric)	4
37. C24:1n9 (Nervonic)	2



Column: **SP-2380, 30m x 0.25mm ID, 0.20 μ m film**
 Cat. No.: **24110-U**
 Oven: 50°C (2 min) to 250°C at 4°C/min, hold 15 min
 Carrier: helium, 20cm/sec, 150°C

795-0781



Column: **SP-2560, 100m x 0.25mm ID, 0.20 μ m film**
 Cat. No.: **24056**
 Oven: 140°C (5 min) to 240°C at 4°C/min, hold 15 min
 Carrier: helium, 20cm/sec, 175°C

795-0472

Fatty Acid Methyl Esters (GC)

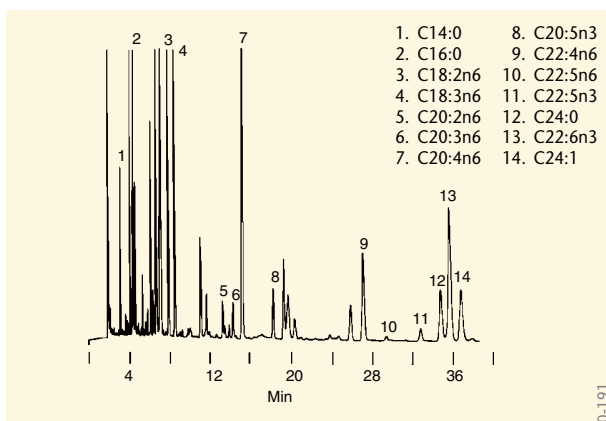
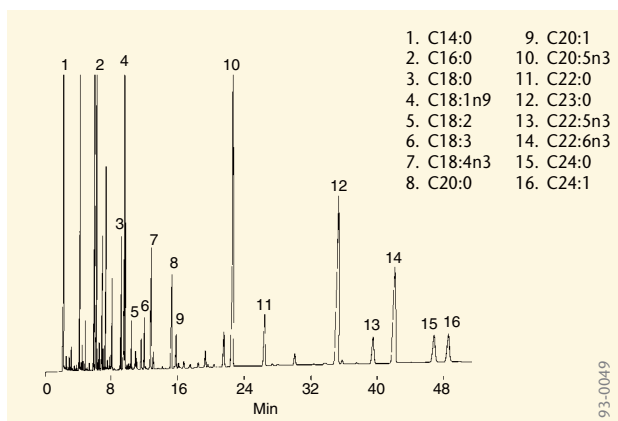
General Conditions

Det.: FID, 260°C

Inj.: 1 μ L of Supelco 37 Component FAME Mix (Cat. No. 47885-U, 10mg/mL total), split 100:1, 250°C

For more information on fatty acids analysis by capillary GC, request Bulletin 855 (T110855).

GC Applications FAMES

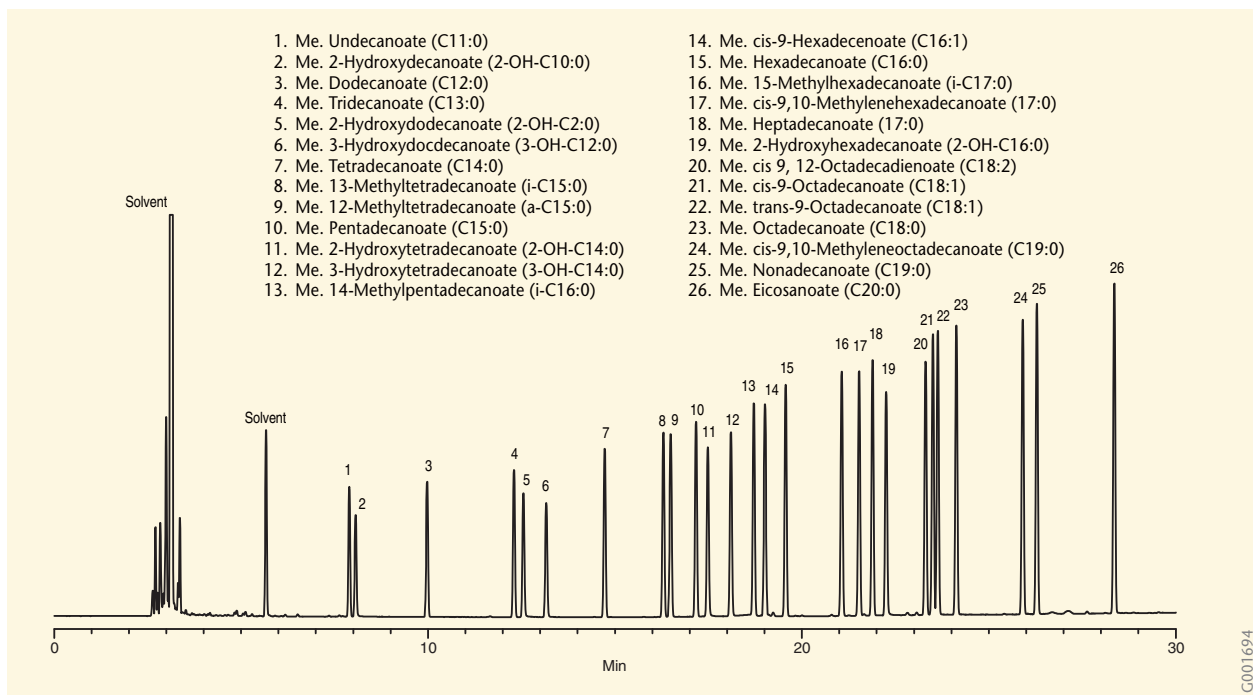


Fatty Acid Methyl Esters, Polyunsaturated (GC)

Column: PAG, 30m x 0.25mm ID, 0.25µm film
 Cat. No.: 24223
 Oven: 220°C
 Carrier: helium, 25cm/sec (set at 220°C)
 Det.: FID, 260°C
 Inj.: 1µL hexane, 50mg/mL PUFAs
 (Omegawax Test Mix, Cat. No. 48476), split 100:1, 250°C

Fatty Acid Methyl Esters, Omega-6 and Others (GC)

Column: Omegawax 320, 30m x 0.32mm ID, 0.25µm film
 Cat. No.: 24152
 Oven: 200°C
 Carrier: helium, 25cm/sec (set at 200°C)
 Det.: FID, 260°C
 Inj.: 1µL hexane containing 50µg animal source FAMES,
 split 100:1, 250°C

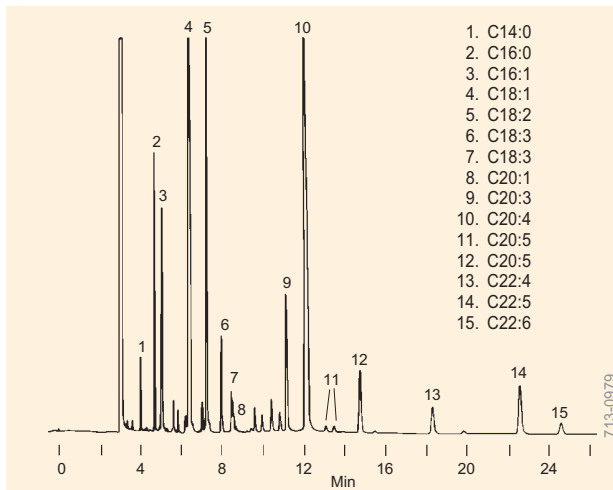


Bacterial Acid Methyl Esters (GC)

Column: Equity-1, 30m x 0.25mm ID, 0.25µm
 Cat. No.: 28046-U
 Oven: 150°C (4 min) to 250°C @ 4°C/min (5 min)
 Inj.: 250°C
 Det.: FID, 280°C
 Flow: Helium, 20cm/sec @ 150°C
 Injection: 1.0µL, split 100:1
 Liner: Split, cup design
 Sample: 100ng on-column of a 26 component BAME standard (Cat. No. 47080-U)

GC Applications

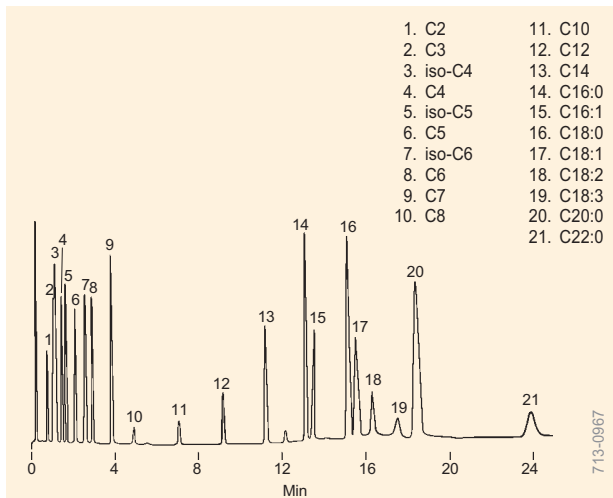
FAMES, Fatty Acids



For more information on fatty acids analyses by capillary GC, request Bulletin 855.

Fatty Acid Methyl Esters (GC)

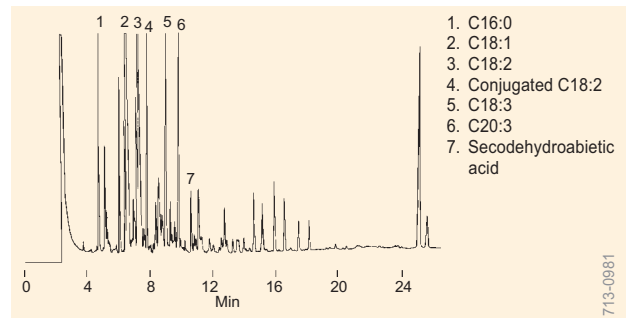
Column: SP-2330, 30m x 0.25mm ID, 0.20 μ m film
 Cat. No.: 24019
 Oven: 200°C
 Carrier: helium, 20cm/sec (set at 200°C)
 Det.: FID, 250°C
 Inj.: 0.5 μ L chloroform containing FAMES from natural source, split 100:1 (250°C)



For more information, request Bulletin 855.

Fatty Acids, Free (GC)

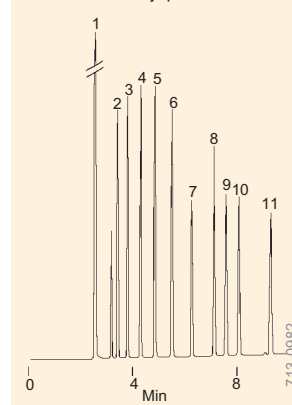
Column: Nukol, 15m x 0.53mm ID, 0.5 μ m film
 Cat. No.: 25326
 Oven: 110°C to 220°C at 8°C/min
 Carrier: helium, 20mL/min
 Det.: FID, 250°C
 Inj.: 1 μ L containing 25-400ng each analyte, direct injection, 250°C



Tall Oil Methyl Esters (GC)

Column: SP-2380, 30m x 0.25mm ID, 0.20 μ m film
 Cat. No.: 24110-U
 Oven: 170°C to 260°C at 4°C/min, hold 4 min
 Carrier: helium, 20cm/sec at 185°C
 Det.: FID, 280°C
 Inj.: 2 μ L methylene chloride, split 100:1, 250°C

1. Dimethyl malonate (C3)
2. Dimethyl succinate (C4)
3. Dimethyl glutarate (C5)
4. Dimethyl adipate (C6)
5. Dimethyl pimelate (C7)
6. Dimethyl sebacate (C8)
7. Dimethyl azelate (C9)
8. Dimethyl sebacate (C10)
9. Dimethyl terephthalate
10. Dimethyl isophthalate
11. Dimethyl phthalate



Fatty Acids, C2-C7 (GC)

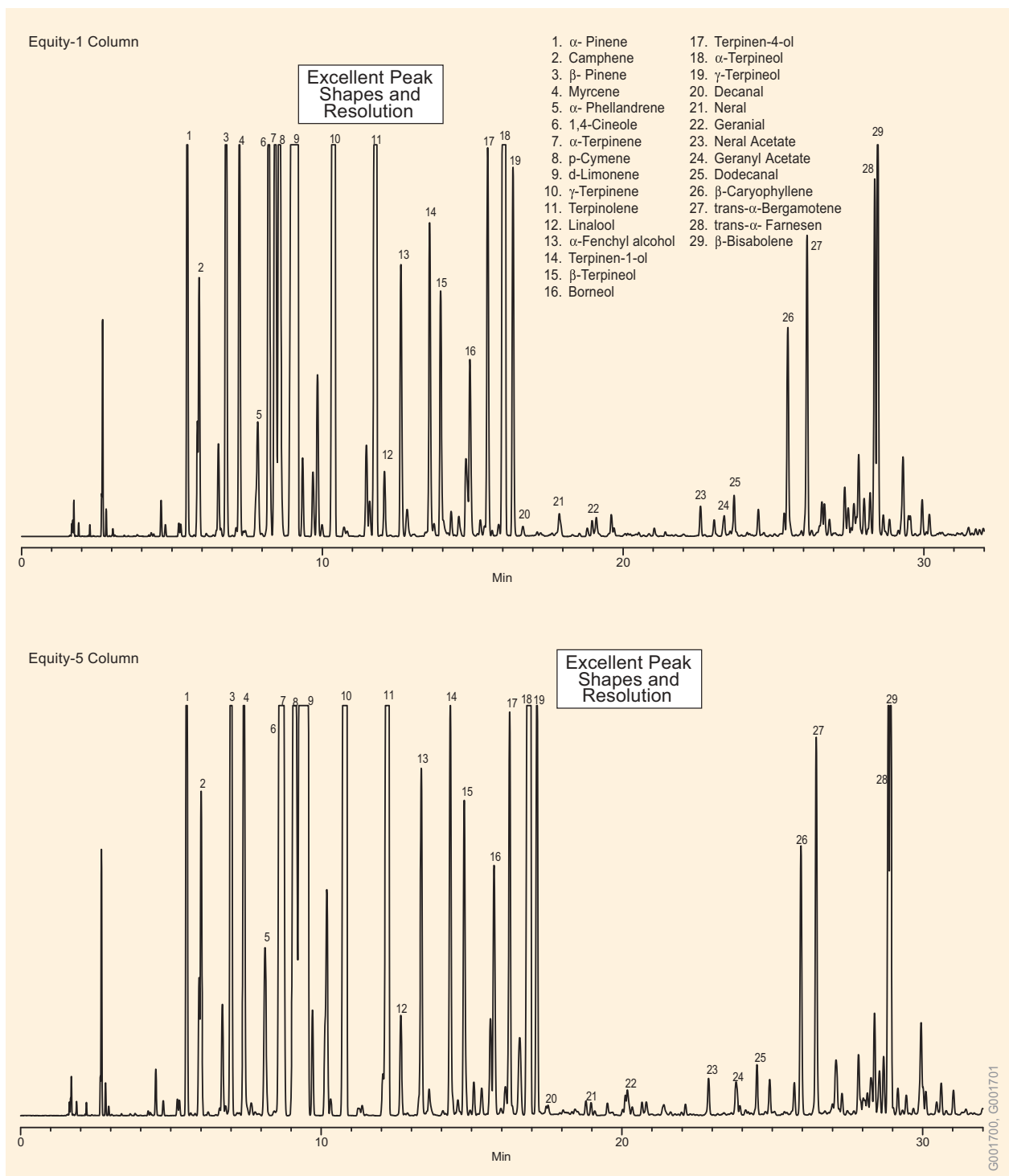
Column: Nukol, 30m x 0.25mm ID, 0.25 μ m film
 Cat. No.: 24107
 Oven: 185°C
 Carrier: helium, 20cm/sec (set at 185°C)
 Det.: FID, 250°C
 Inj.: 1 μ L water containing 10mM each analyte (Cat. No. 46975-U), split 100:1, 220°C

Acid Methyl Esters, Dibasic (GC)

Column: SP-2380, 30m x 0.25mm ID, 0.20 μ m film
 Cat. No.: 24110-U
 Oven: 170°C to 200°C at 4°C/min
 Carrier: helium, 20cm/sec at 185°C
 Det.: FID, 250°C
 Inj.: 0.1 μ L methylene chloride containing 0.1 μ g each analyte, split 100:1, 250°C

GC Applications

Foods, Flavors, and Fragrances



Distilled Lime Oil (GC)

Column: Equity-1, 30m x 0.25mm ID, 0.25 μ m
 Cat. No.: 28046-U
 Column: Equity-5, 30m x 0.25mm ID, 0.25 μ m
 Cat. No.: 28089-U
 Oven: 75°C (8 min) to 200°C @ 4°C/min (10 min)
 Inj.: 250°C
 Det.: FID, 250°C
 Flow: Helium, 30cm/sec @ 110°C
 Injection: Wet Needle, split 100:1
 Liner: Split, cup design
 Sample: Distilled lime oil

Order: 1.800.325.3010 Technical Service: 1.800.359.3041 Web: www.sigma-aldrich.com/supelco

Gas Chromatography

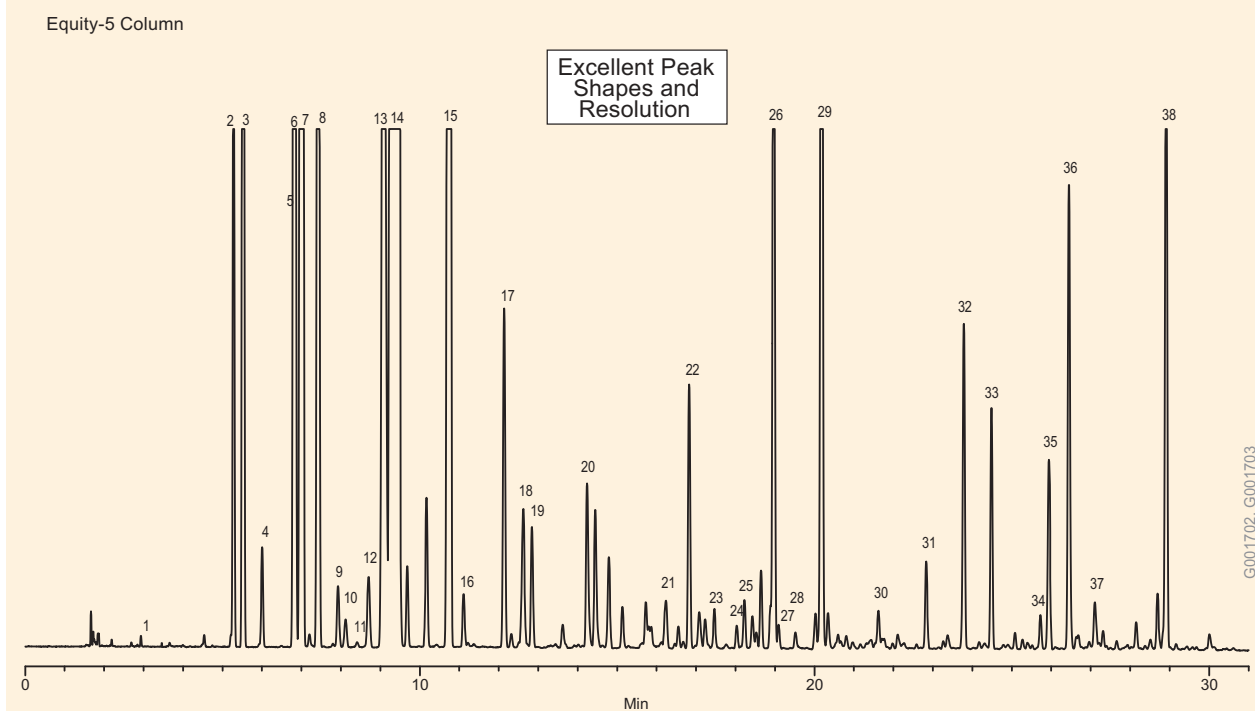
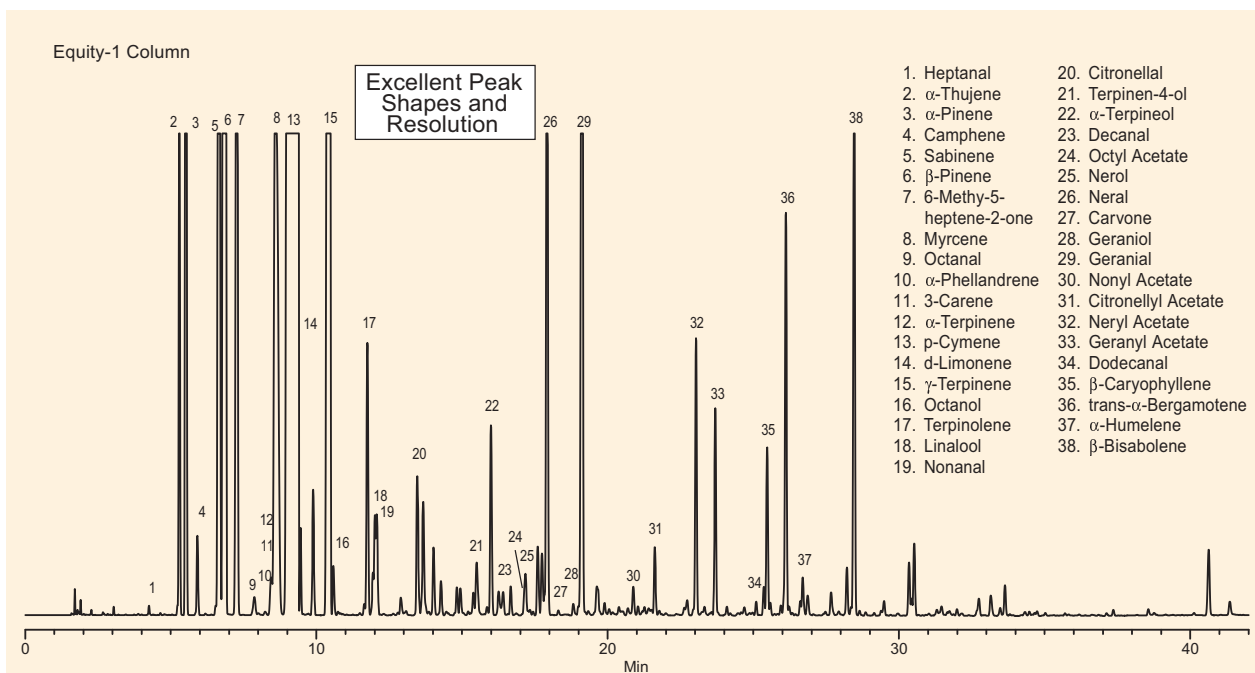
SUPELCO

GC Applications

Foods, Flavors, and Fragrances

Gas Chromatography

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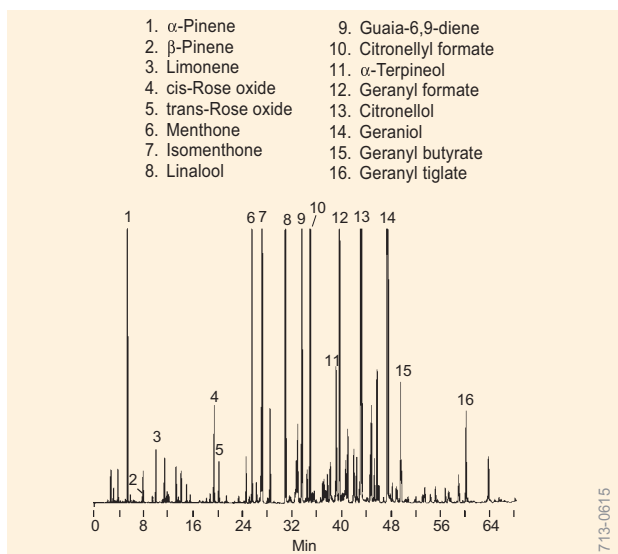
Cold Pressed Lemon Oil (GC)

Column: Equity-1, 30m x 0.25mm ID, 0.25 μ m
 Cat. No.: 28046-U
 Column: Equity-5, 30m x 0.25mm ID, 0.25 μ m
 Cat. No.: 28089-U
 Oven: 75°C (8 min) to 200°C @ 4°C/min (10 min)
 Inj.: 250°C
 Det.: FID, 250°C
 Flow: Helium, 30cm/sec @ 110°C
 Injection: Wet Needle, split 100:1
 Liner: Split, cup design
 Sample: Distilled lime oil

SUPELCO

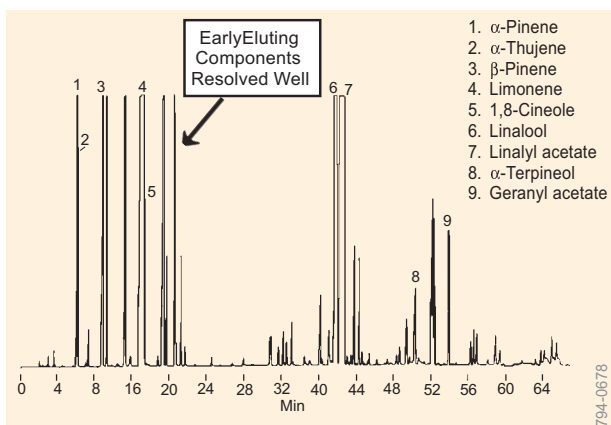
G001702, G001703

GC Applications Foods, Flavors, and Fragrances



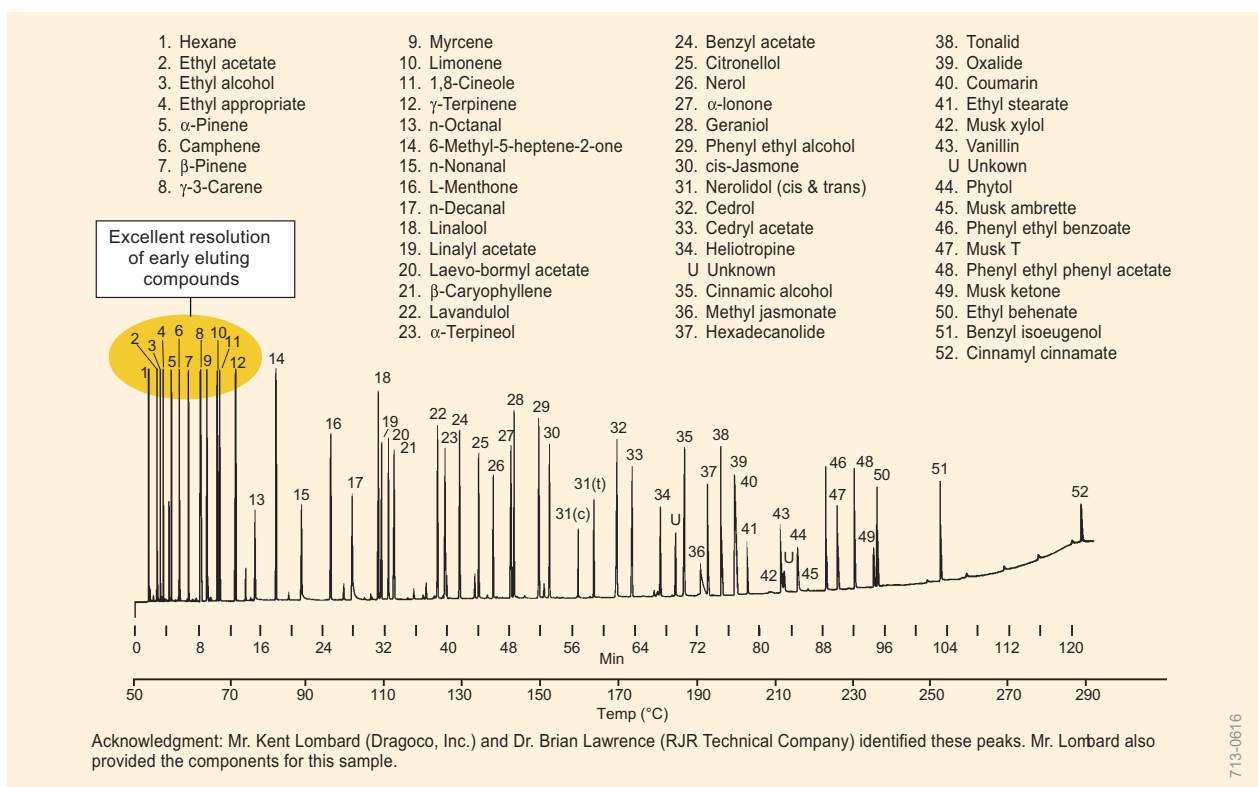
Geranium Oil Bourbon (GC)

Column: SUPELCOWAX 10, 30m x 0.25mm, 0.25 μ m film
 Cat. No.: 24079
 Oven: 50°C (2 min) to 230°C at 2°C/min, hold 1min
 Carrier: helium, 20cm/sec (set at 155°C)
 Det.: FID
 Inj.: 0.2 μ L neat oil, split (100:1)



Bergamot Oil, Italian (GC)

Column: SUPELCOWAX 10, 30m x 0.25mm ID, 0.25 μ m film
 Cat. No.: 24079
 Oven: 50°C for 2 min then to 230°C at 2°C/min, hold 1 min
 Carrier: helium, 20cm/sec (set at 155°C)
 Det.: FID
 Inj.: 0.2 μ L, split (100:1)



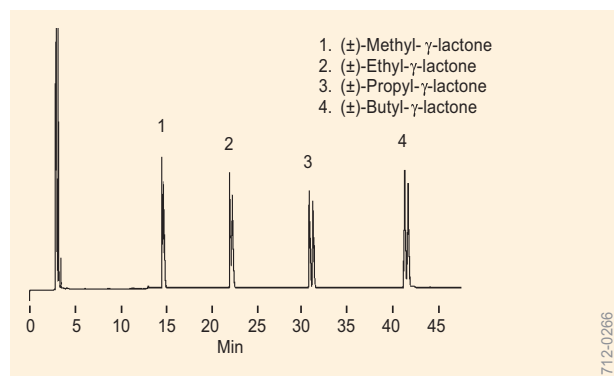
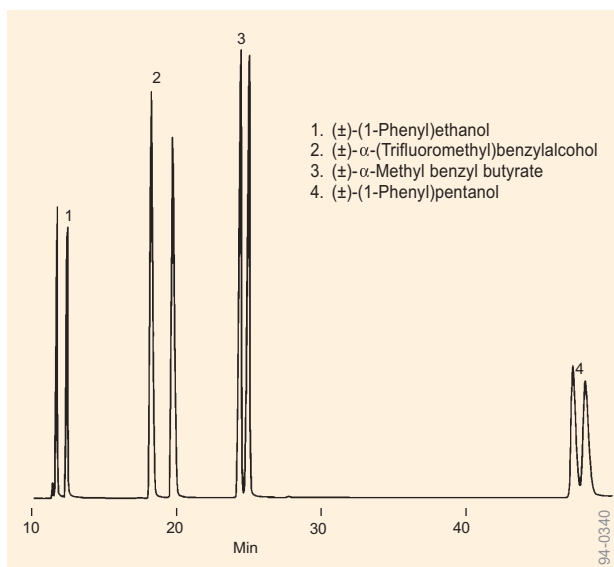
Acknowledgment: Mr. Kent Lombard (Dragoco, Inc.) and Dr. Brian Lawrence (RJR Technical Company) identified these peaks. Mr. Lombard also provided the components for this sample.

Fragrance Components (GC)

Column: SUPELCOWAX 10, 30m x 0.25mm ID, 0.25 μ m film
 Cat. No.: 24079
 Oven: 50°C for 2 min then to 280°C at 2°C/min, hold 20 min
 Carrier: helium, 25cm/sec (set at 200°C)
 Det.: FID
 Inj.: 0.2 μ L, split (100:1)

GC Applications

Foods, Flavors, and Fragrances

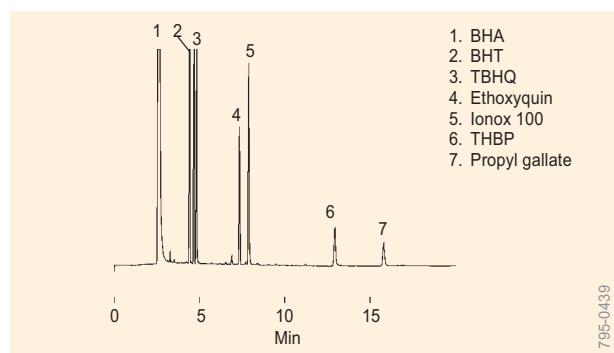


Lactones (GC)

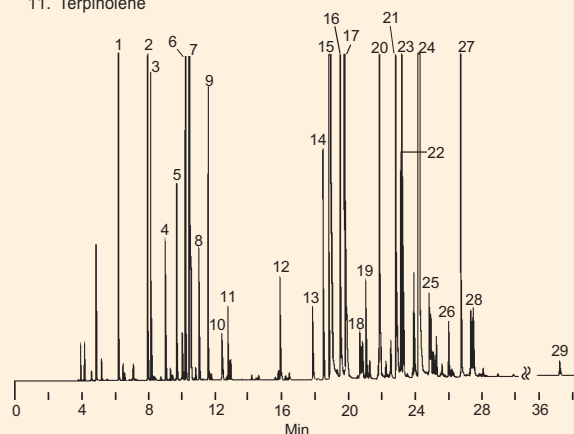
Column: β-DEX 110, 30m x 0.25mm ID, 0.25μm film
Cat. No.: 24301
Oven: 90°C to 200°C at 1°C/min
Carrier: helium, 20cm/sec (set at 90°C)
Det.: FID, 300°C
Inj.: 1μL of 0.5mg/mL in CH₂Cl₂, split (100:1), 300°C

Phenylethanols (GC)

Column: β-DEX 120, 30m x 0.25mm, 0.25μm film
Cat. No.: 24304
Oven: 120°C
Carrier: helium, 20cm/sec
Det.: FID, 300°C
Inj.: 1μL methylene chloride (0.5mg/mL each analyte), split (100:1) 200°C



- | | | |
|-----------------|---------------------------|---------------------|
| 1. α-Pinene | 12. 3-Octanol | 21. Neo-menthol |
| 2. β-Pinene | 13. 1-Octen-3-ol | 22. Terpinene-4-ol |
| 3. Sabinene | 14. trans-Sabinenehydrate | 23. β-Caryophyllene |
| 4. Myrcene | 15. L-Menthone | 24. L-Menthol |
| 5. α-Terpinene | 16. Menthofuran | 25. Pulegone |
| 6. L-Limonene | 17. D-Isomenthone | 26. α-Terpineol |
| 7. 1,8-Cineole | 18. Beta-Bourbonene | 27. Gemacrene-D |
| 9. γ-Terpinene | 19. Linalool | 28. Piperitone |
| 10. para-Cymene | 20. Methyl acetate | 29. Viridiflorol |
| 11. Terpinolene | | |



Peppermint Oil (GC)

Column: SUPELCOWAX 10, 60m x 0.25mm, 0.25μm film
Cat. No.: 24081
Oven: 4 min (75°C) to 200°C at 4°C/min, hold 5 min
Carrier: helium, 25cm/sec (set at 155°C)
Det.: FID
Inj.: 0.2μL, split (100:1)

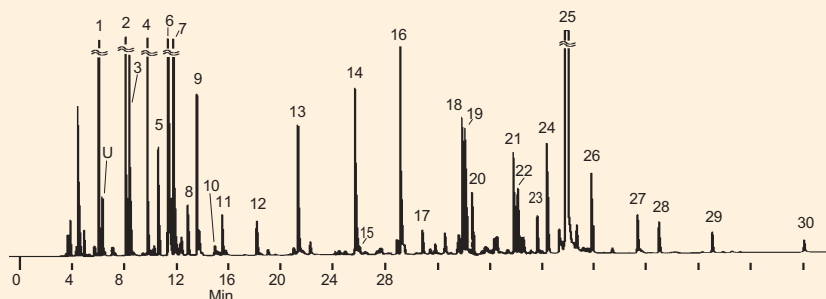
Antioxidants (GC)

Column: SAC-5, 30m x 0.25mm ID, 0.25μm film
Cat. No.: 24156
Oven: 200°C
Carrier: helium, 30cm/sec
Det.: FID, 250°C
Inj.: 2μL, 200μg/mL each component, split 100:1

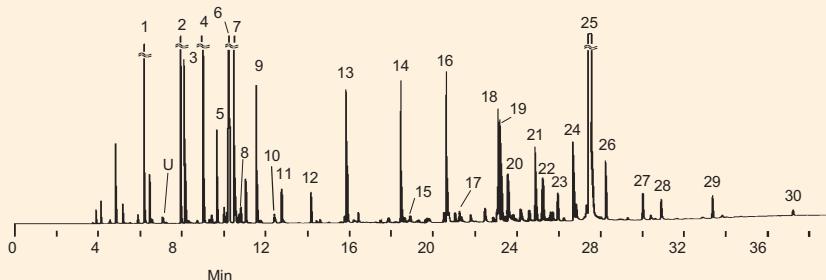
GC Applications

Foods, Flavors, and Fragrances

30m SUPELCOWAX 10 Column



60m SUPELCOWAX 10 Column



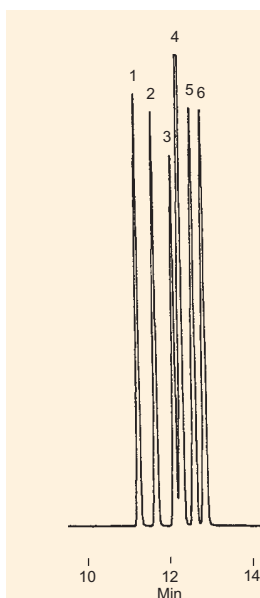
1. α -Pinene
2. β -Pinene
3. Sabinene
4. Myrcene
5. α -Terpinene
- U Unknown
6. L-Limonene
7. 1,8-Cineole
9. γ -Terpinene
10. para-Cymene
11. Terpinolene
12. 3-Octyl acetate
13. 3-Octanol
14. trans-Sabinenehydrate
15. L-Menthone
16. Beta-Bourbonene
17. Linalool
18. Terpinene-4-ol
19. β -Caryophyllene
20. Dihydrocarvone
21. trans-Dihydrocarvyl acetate
22. trans- β -Farnesene
23. α -Terpineol
24. Gemacrene-D
25. Carvone
26. cis-Carvyl acetate
27. trans-Carveol
28. cis-Carveol
29. cis-Jasmone
30. Viridiflorol

Mr. William Faas of A.M. Todd Company provided the sample and assisted with peak identification.

794-0677, 0676

Native Spearmint Oil (GC)

Column: SUPELCOWAX 10, 30m x 0.25mm, 0.25 μ m film
 Cat. No.: 24079
 Column: SUPELCOWAX 10, 60m x 0.25mm, 0.25 μ m film
 Cat. No.: 24081
 Carrier: helium, 25cm/sec (set at 155°C)
 Oven: 4min., at 75°C, then to 200°C at 4°C/min and hold 5 min
 Det.: FID
 Inj.: 0.2 μ L, split (100:1)



1. (+) Neomenthol
2. (-) Neomenthol
3. (+) Menthol
4. (-) Menthol
5. (-) Isomenthol
6. (+) Isomenthol

713-0089

Menthol Enantiomers (GC)

Column: α -DEX 120,
 30m x 0.25mm, 0.25 μ m film
 Cat. No.: 24310
 Oven: 110°C
 Carrier: helium, 20cm/sec
 Det.: FID, 300°C
 Inj.: 1 μ L, split (100:1), 0.5mg/mL each component

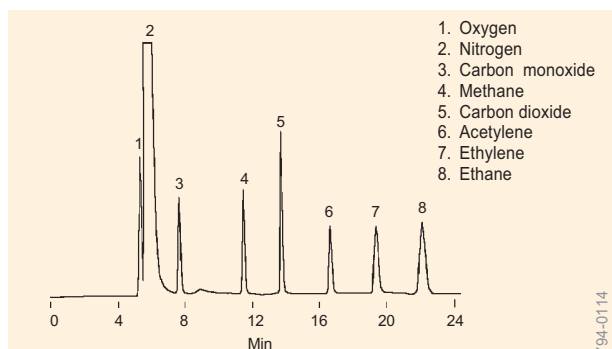
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Gas
Chromatography

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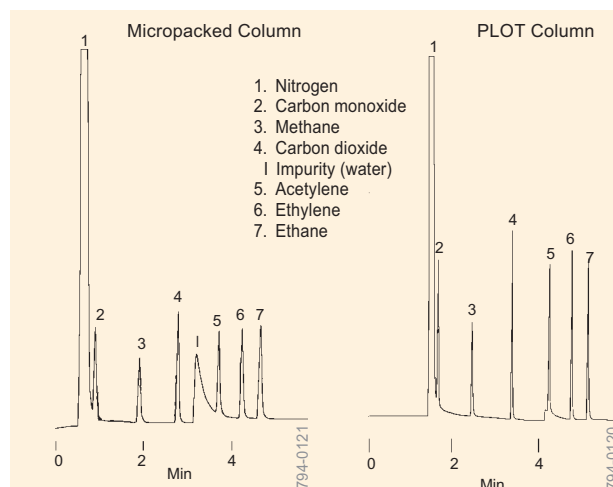
GC Applications

Permanent Gases and Light Hydrocarbons, Glycols



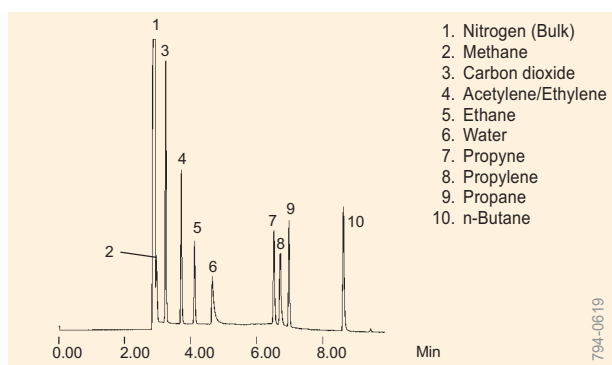
Permanent Gases and C2 Hydrocarbons (GC)

Packing: 60/80 Carboxen-1000
Column: 15 ft. x 1/8 in. stainless steel (2.1mm ID)
Cat. No.: 12390-U (general config.)
Oven: 35°C (5 min) to 225°C at 20°C/min
Carrier: helium, 30mL/min
Det.: TCD
Inj.: 0.6mL Scott gas mix (Cat. No. 23437) oxygen added 1% (4-6µg) each analyte (except nitrogen) on column



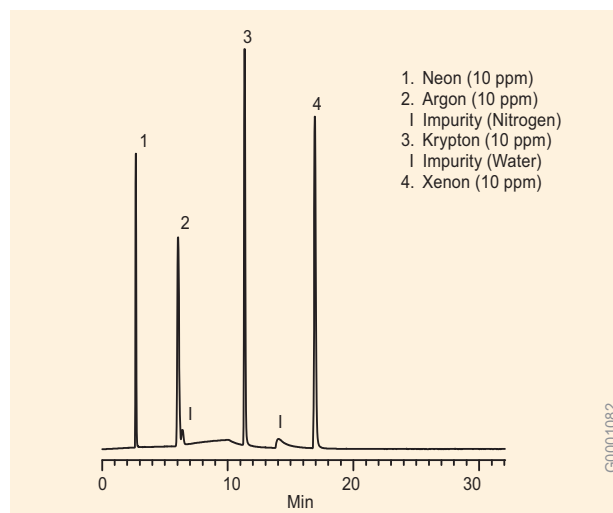
Permanent Gases and Light Hydrocarbons (GC)

Column: Carboxen 1004 micropacked, 2m x 1/16 in. stainless steel
Cat. No.: 12846
Oven: 35°C (1 min) to 225°C at 24°C/min
Column: Carboxen 1006 PLOT, 30m x 0.53mm ID
Cat. No.: 25461
Oven: 35°C (5 min) to 225°C at 24°C/min
Carrier: helium, 22cm/sec
Det.: TCD, 230°C
Inj.: 50µL (micropacked column) or 35µL (PLOT column), 1% each analyte in nitrogen (Cat. No. 23437), direct, 230°C



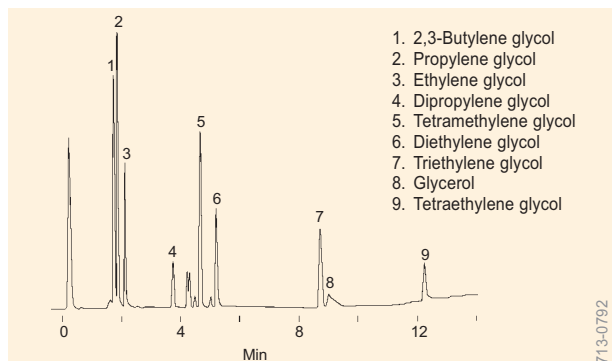
Permanent Gases and Light Hydrocarbons (GC)

Column: Supel-Q PLOT, 30m x 0.53mm
Cat. No.: 25462
Oven: 35°C (3 min) to 250°C at 16°C/min
Carrier: helium, 3mL/min (set at 35°C)
Det.: TCD, 250°C
Inj.: 0.1µL



Nobel Gases (GC)

Column: Carboxen-1010 PLOT, 30m x 0.53mm ID
Cat. No.: 25467
Oven: 35°C (6 min) to 225°C at 24°C/min
Carrier: helium, 3mL/min (set at 35°C)
Det.: TCD

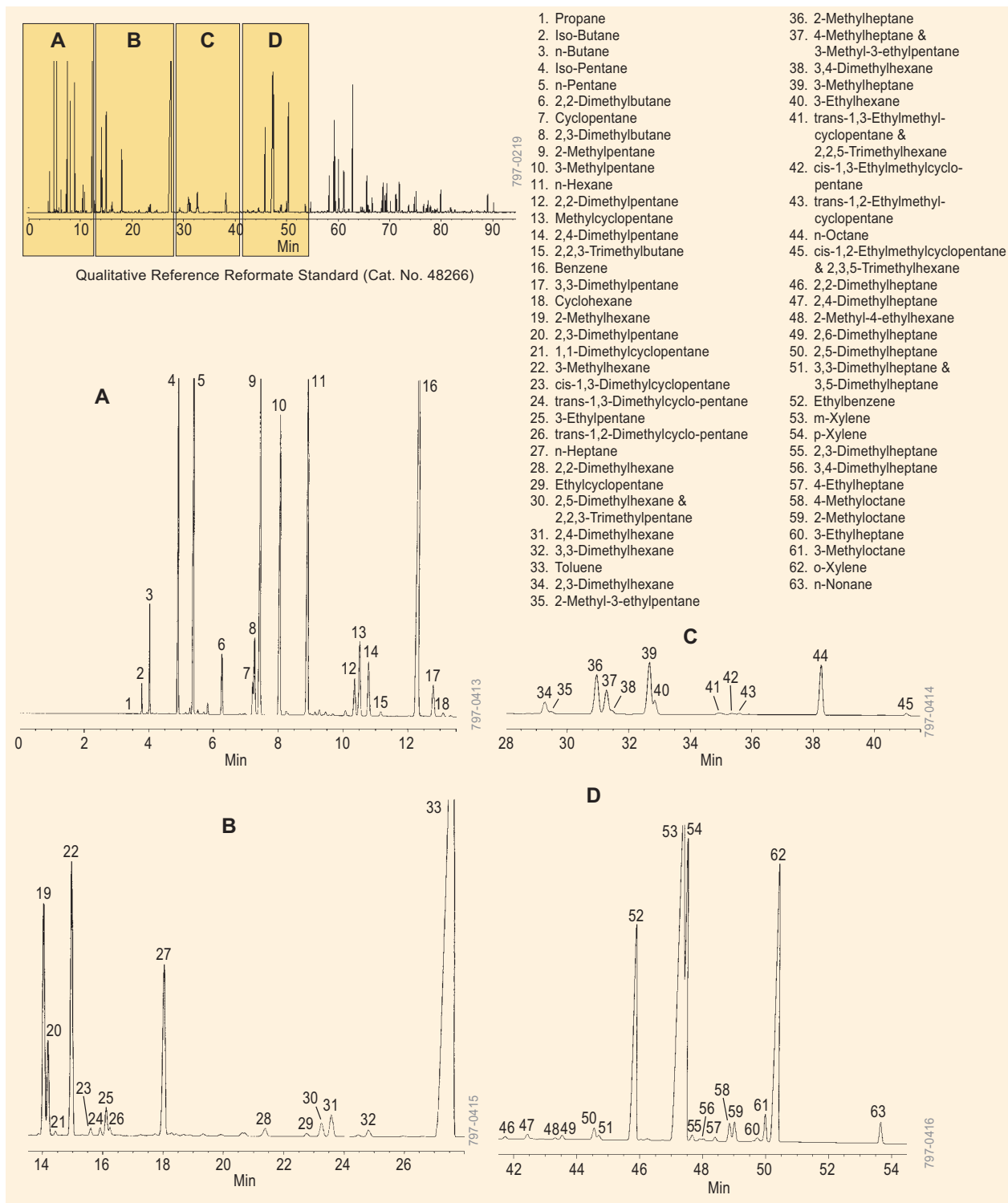


Glycols (GC)

Column: Nukol, 15m x 0.53mm ID, 0.5µm film
Cat. No.: 25326
Oven: 110°C to 220°C at 8°C/min
Carrier: helium, 15mL/min
Det.: FID, 250°C
Inj.: 1µL water containing 100ppm each glycol, direct injection

GC Applications

Hydrocarbons



Hydrocarbons by ASTM Method D 5134 (GC)

Column: Petrocol DH 50.2, 50m x 0.20mm ID, 0.50µm film
 Cat. No.: 24133-U
 Oven: 35°C (30 min) to 200°C at 2°C/min (15 min)
 Carrier: helium, 19-21cm/sec at 35°C (see ASTM D5134)
 Fuel Gas: hydrogen (approx. 30mL/min)
 Oxidizing Gas: air (approx. 250mL/min)
 Make-up Gas: nitrogen (approx. 30mL/min)
 Det.: FID, 250°C
 Inj.: 0.2µL, split 200:1, 200°C

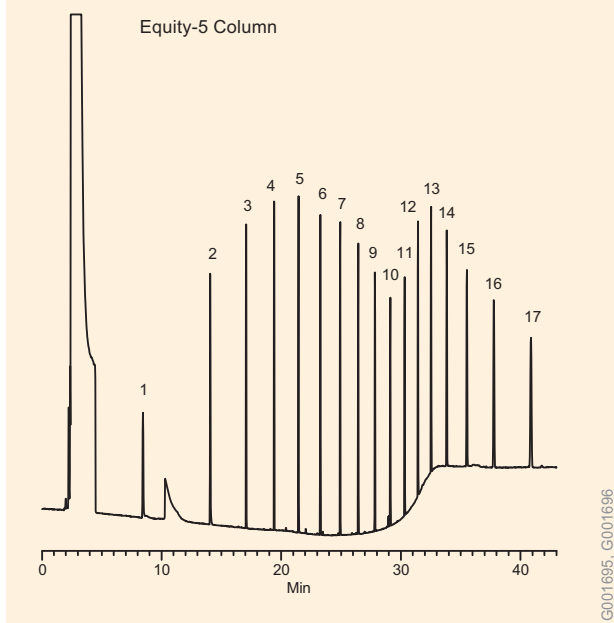
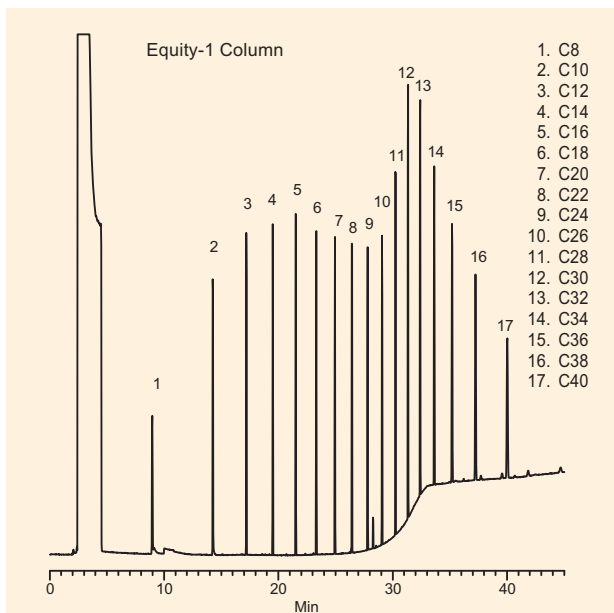
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Gas Chromatography

SUPELCO

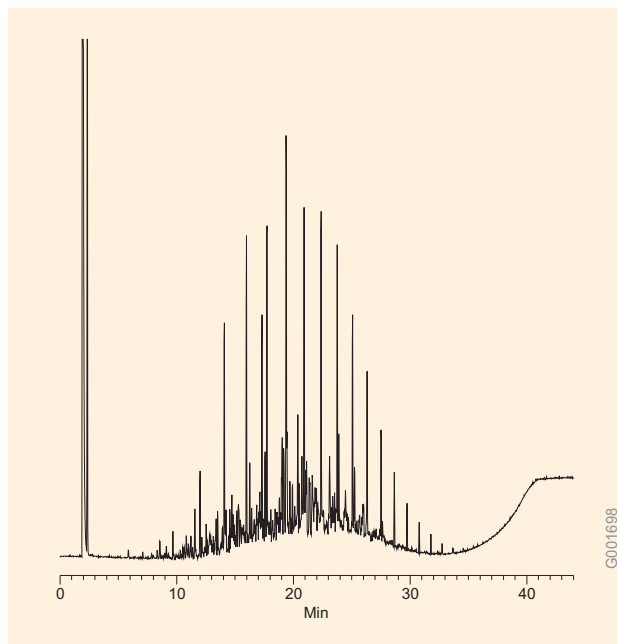
GC Applications

Hydrocarbons



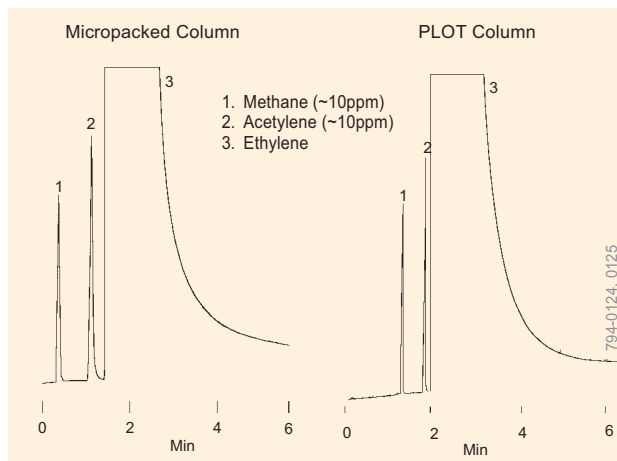
Simple Hydrocarbons (GC)

Column: Equity-1, 30m x 0.25mm ID, 0.25 μ m
 Cat. No.: 28046-U
 Column: Equity-5, 30m x 0.25mm ID, 0.25 μ m
 Cat. No.: 28089-U
 Oven: 40°C (8 min) to 325°C @ 12°C/min (16 min)
 Inj.: 275°C
 Det.: FID, 325°C
 Flow: Helium, constant flow, 1.2 mL/sec @ 40°C
 Injection: 1.0 μ L, splitless (2.0 min)
 Liner: 2mm ID splitless
 Sample: 100ng on-column of a 17 component n-hydrocarbons standard (Cat. No. 46855-U)



Diesel Fuel (GC)

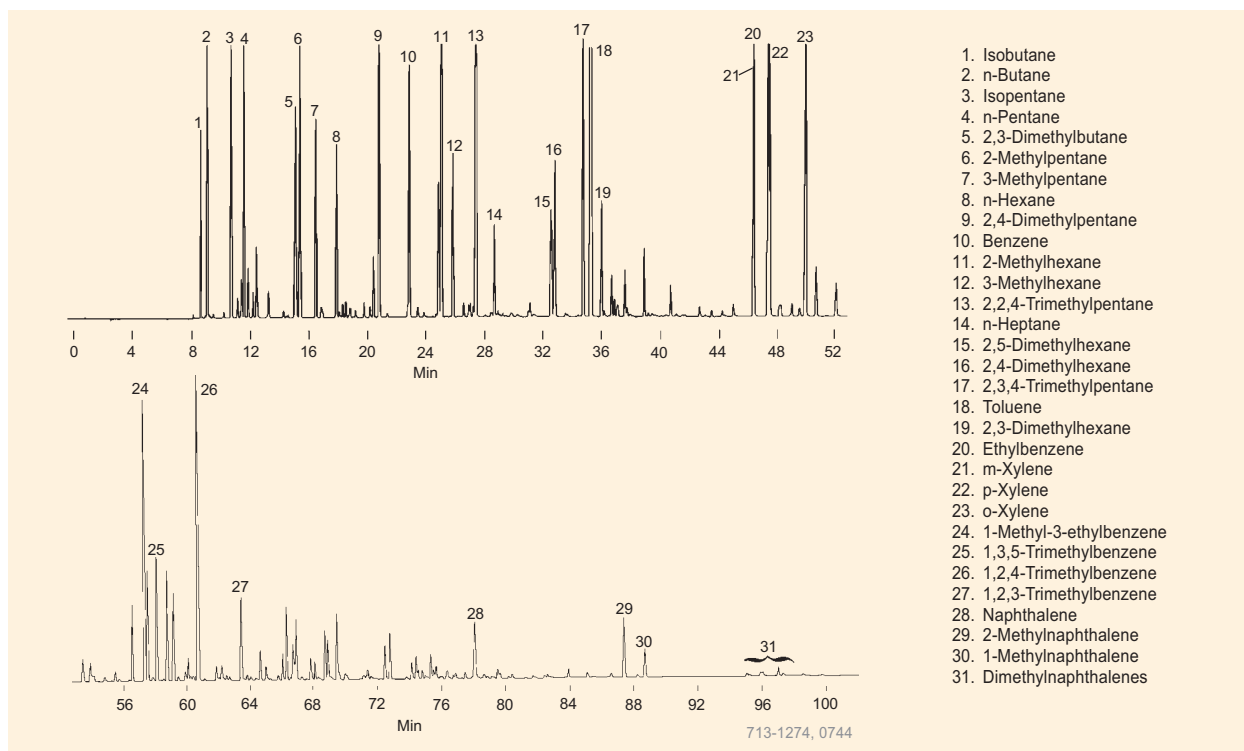
Column: Equity-1, 30m x 0.25mm ID, 0.25 μ m
 Cat. No.: 28046-U
 Oven: 40°C (4 min) to 325°C @ 8°C/min
 Inj.: 275°C
 Det.: FID, 325°C
 Flow: Helium, constant flow, 1.2mL/sec. @ 40°C
 Injection: 1.0 μ L, split 200:1
 Liner: 4mm ID single taper
 Sample: 100ng on-column of a No. 2 Fuel Oil standard (Cat. No. 47515-U)



Ethylene Impurities (GC)

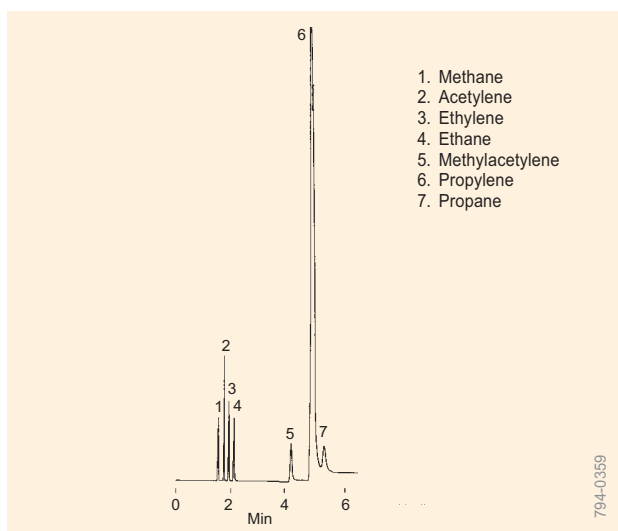
Column: Carboxen 1004 micropacked, 2m x 1/16 in. stainless steel
 Cat. No.: 12846
 Column: Carboxen 1006 PLOT, 30m x 0.53mm ID
 Cat. No.: 25461
 Oven: 165°C
 Carrier: helium, 22cm/sec (set at 35°C)
 Det.: FID, 230°C
 Inj.: 10 μ L ethylene, direct, 230°C

GC Applications Hydrocarbons



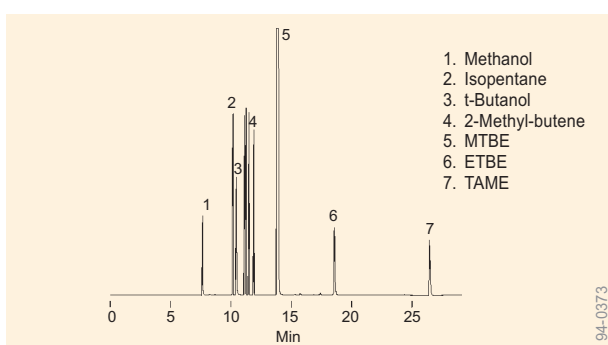
Gasoline (GC)

Column: Petrocol DH, 100m x 0.25mm ID, 0.5µm film
 Cat. No.: 24160-U
 Oven: 35°C (15 min) to 200°C at 2°C/min, hold 5 min
 Carrier: helium, 20cm/sec (set at 35°C)
 Det.: FID, 250°C
 Inj.: 0.1µL premium unleaded gasoline, split 100:1, 250°C



Propylene Impurities (GC)

Column: Carboxen 1006 PLOT, 30m x 0.32mm ID
 Cat. No.: 24241-U
 Oven: 200°C (4 min) to 250°C at 24°C/min
 Carrier: helium, 76cm/sec (set at 200°C)
 Det.: FID, 230°C
 Inj.: 20µL propylene, approx. 1% each contaminant, direct, 230°C



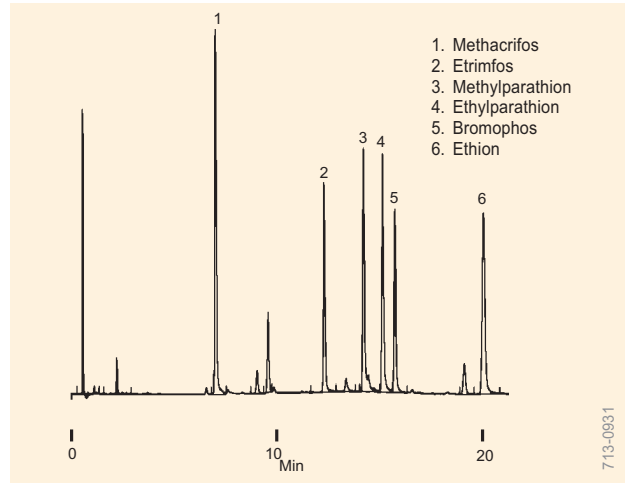
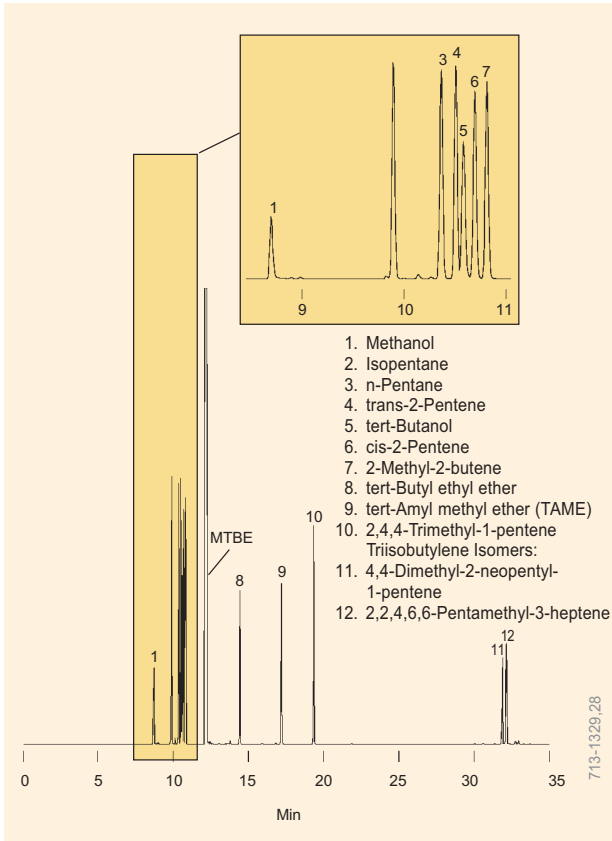
MTBE Contaminants (GC)

Column: Petrocol DH Octyl, 100m x 0.25mm ID, 0.50µm film
 Cat. No.: 24282
 Oven: 35°C (15 min) to 200°C at 1°C/min, hold 15 min
 Carrier: helium, 24cm/sec (set at 35°C)
 Det.: FID, 250°C
 Inj.: 0.1µL split (215:1), 250°C

GC Applications

Hydrocarbons, Free Acids, Pesticides

Gas Chromatography

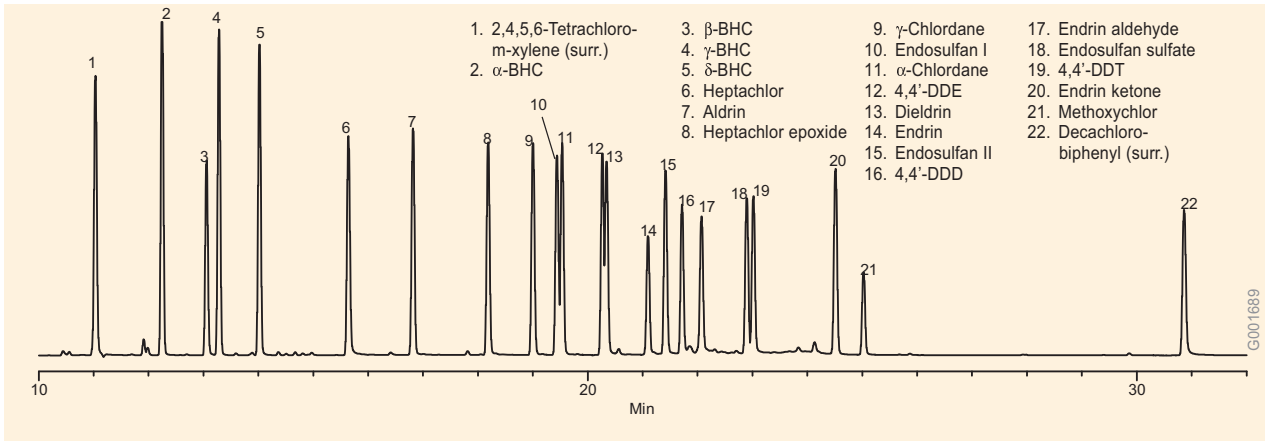


Organophosphorus Pesticides (GC)

Column: SPB-608, 30m x 0.53mm ID, 0.5µm film
 Cat. No.: 25312
 Oven: 125°C (0.5 min) to 230°C at 6°C/min, hold 2 min, to 245°C at 3°C/min
 Carrier: helium, 8mL/min
 Det.: FPD, 280°C
 Inj.: 1µg/mL each component, direct injection

MTBE Contaminants (GC)

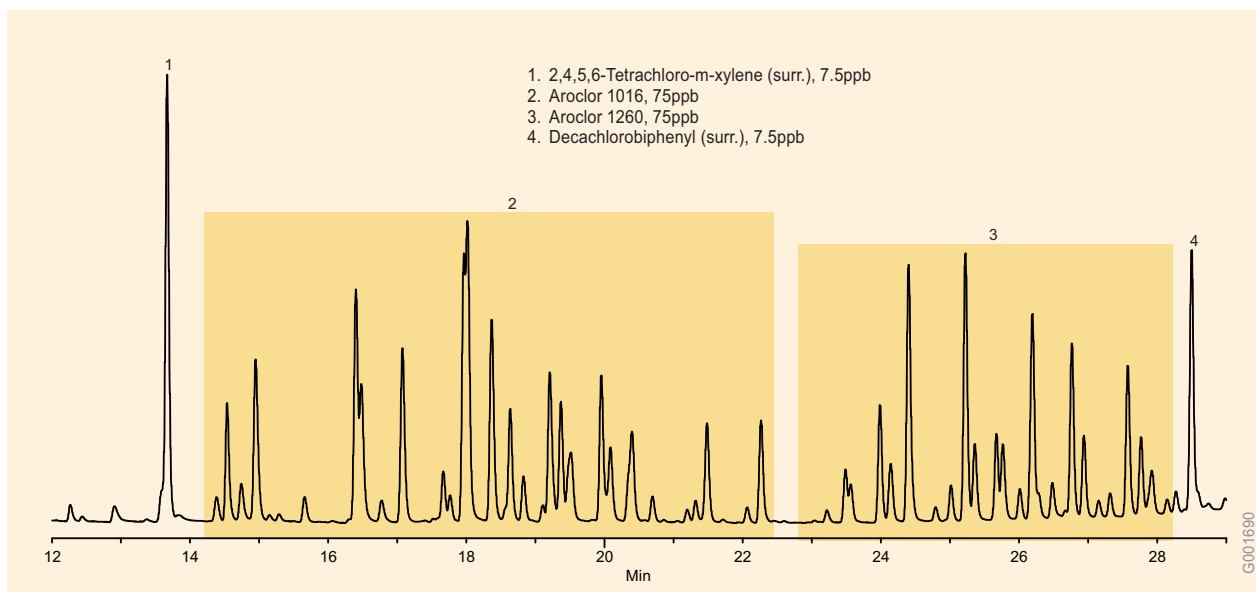
Column: Petrocol DH, 100m x 0.25mm ID, 0.50µm film
 Cat. No.: 24160-U
 Oven: 50°C (13 min) to 180°C at 10°C/min
 Carrier: helium, 20cm/sec; vent flow 140mL/min (set at 35°C)
 Det.: FID (310°C)
 Inj.: 1µL MTBE containing 1% each analyte (MTBE Contaminants Mix A, Cat. No. 47942) split (200:1) (250°C)



US EPA Method 8081 Chlorinated Pesticides (GC)

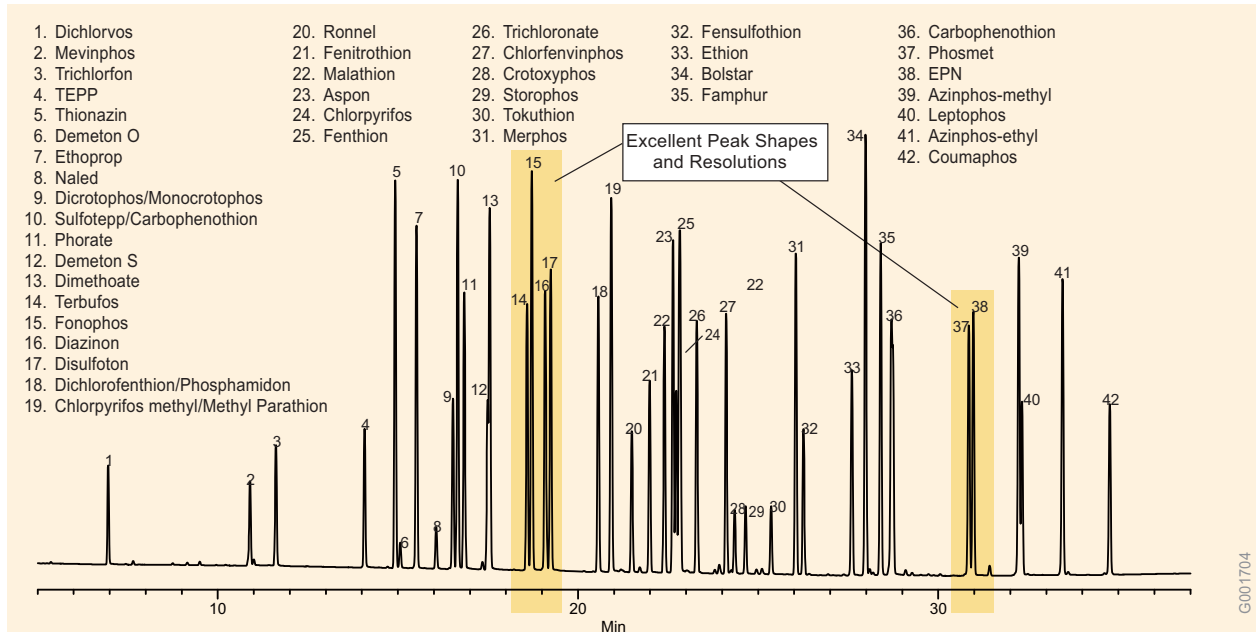
Column: Equity-5, 30m x 0.25mm ID, 0.25µm
 Cat. No.: 28089-U
 Oven: 100°C (2 min) to 160°C @ 15°C/min to 300°C @ 5°C/min (10 min)
 Inj.: 225°C
 Det.: ECD, 310°C
 Flow: Helium, 30cm/sec @ 100°C
 Injection: 2.0µL, splitless (0.5 min)
 Liner: Splitless double taper, unpacked
 Sample: 50ppb of a 22 component chlorinated pesticide standard (Cat. No. 46845-U)

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US EPA Method 8082 Polychlorinated Biphenyls (GC)

Column: Equity-5, 30m x 0.25mm ID, 0.25µm
 Cat. No.: 28089-U
 Oven: 100°C (2 min) to 160°C @ 15°C/min to 300°C @ 5°C/min (10 min)
 Inj.: 225°C
 Det.: ECD, 310°C
 Flow: Helium, 30cm/sec. @ 100°C
 Injection: 2.0µL, splitless (0.5 min)
 Liner: Splitless double taper, unpacked
 Sample: Aroclor Mix 1 standard at 75ppb with surrogates at 7.5ppb (Cat. No. 46846-U)



US EPA Method 8141 Organophosphorus Pesticides (GC)

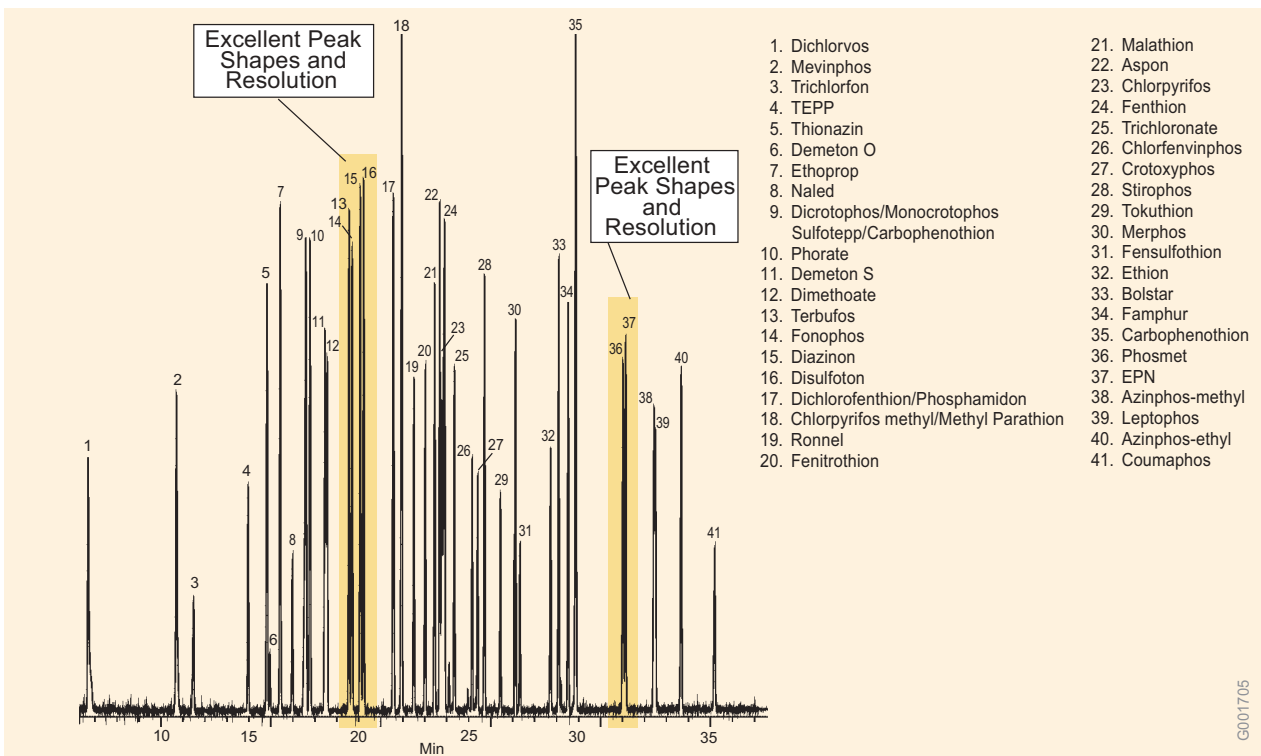
Column: Equity-5, 30m x 0.25mm ID, 0.25µm
 Cat. No.: 28089-U
 Oven: 120°C (3 min) to 300°C @ 5°C/min
 Inj.: 250°C
 Det.: NPD, 320°C
 Flow: Helium, 25cm/sec @ 120°C
 Injection: 1.0µL, splitless (0.5 min)
 Liner: Splitless, double taper
 Sample: 40ng on-column of a custom organophosphorus pesticides mix

GC Applications

Pesticides, Phenols

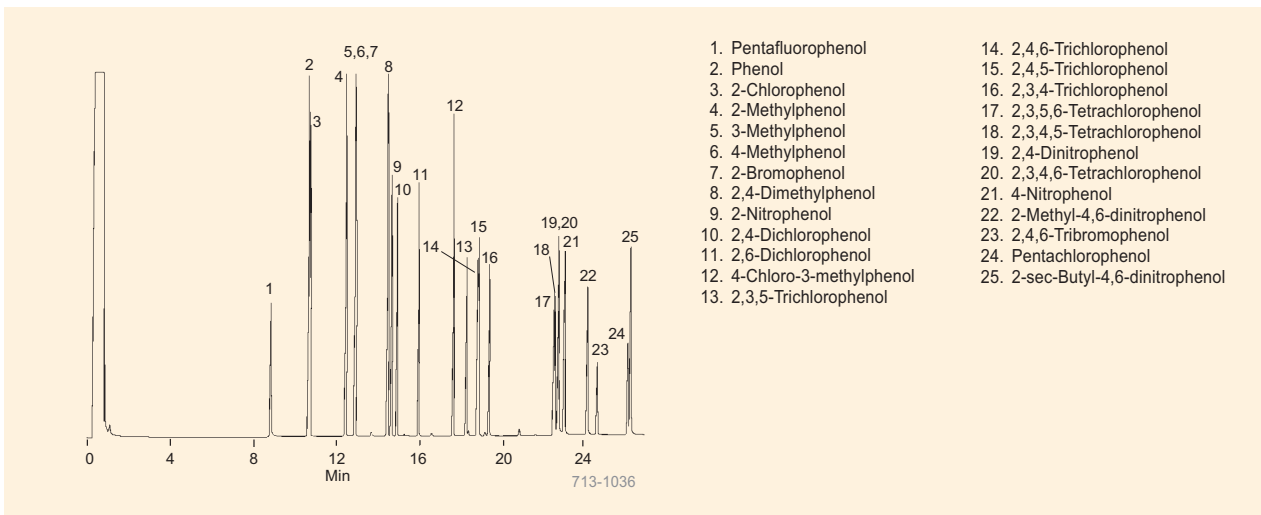
Gas Chromatography

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US EPA Method 8141 Organophosphorus Pesticides (GC/MS)

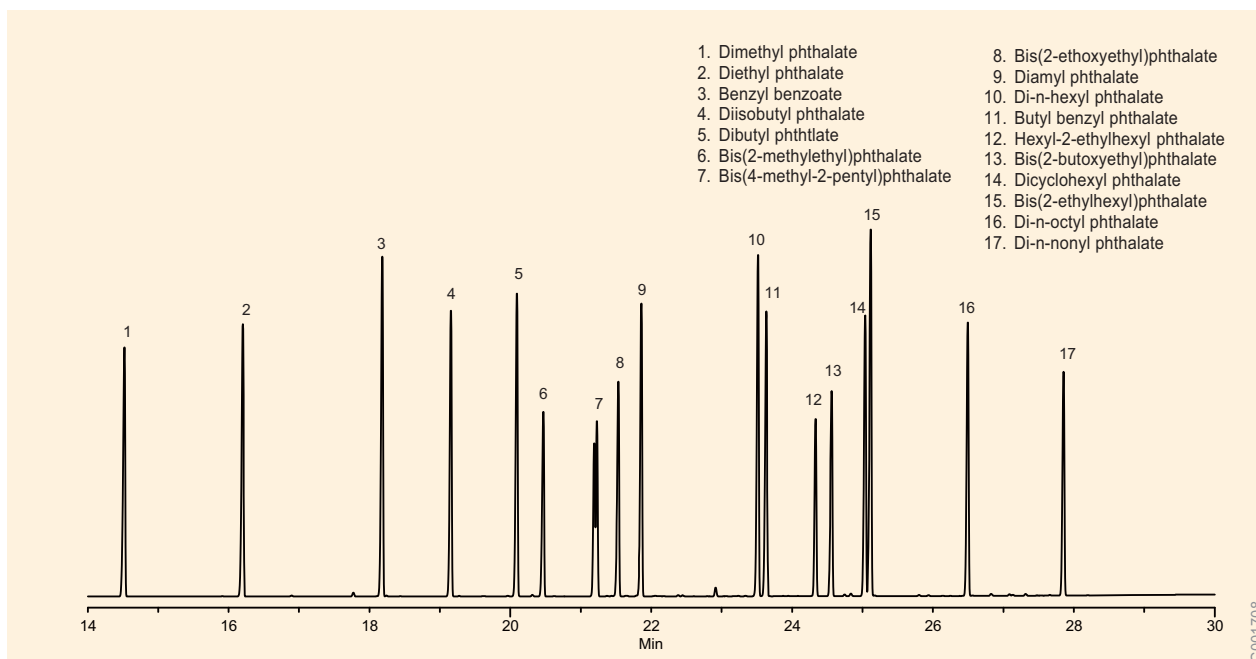
Column: Equity-5, 30m x 0.25mm ID, 0.25µm
 Cat. No.: 28089-U
 Oven: 120°C (3 min) to 270°C @ 5°C/min
 Inj.: 250°C
 Det.: MSD, Scan range 45-450 amu, 325°C transfer line
 Flow: Helium, 30cm/sec @ 120°C
 Injection: 1.0uL, splitless (0.3 min)
 Liner: Splitless, double taper
 Sample: 40ng on-column of a custom organophosphorus pesticides mix



Phenols by US EPA Method 8040 (GC)

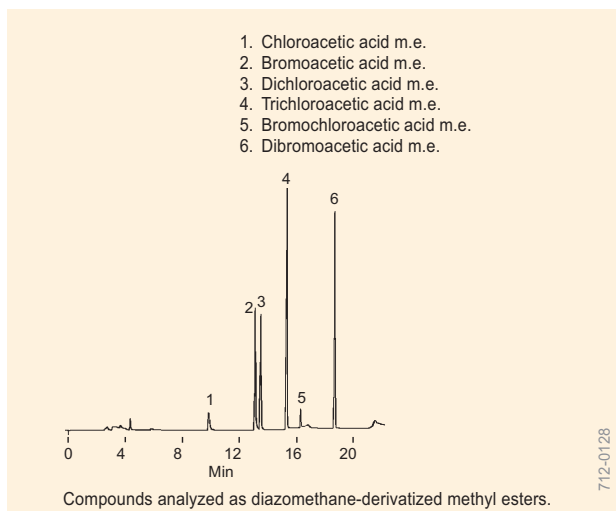
Column: SPB-608, 30m x 0.53mm ID, 0.5µm film
 Cat. No.: 25312
 Oven: 40°C (4 min) to 250°C at 8°C/min
 Carrier: helium, 30cm/sec (set at 120°C)
 Det.: FID, 275°C
 Inj.: 1µL (200µg/mL each analyte in propanol), split 100:1

GC Applications Semivolatiles



Phthalate Esters (GC)

Column: Equity-5, 30m x 0.25mm ID, 0.25 μ m
 Cat. No.: 28089-U
 Oven: 40°C (1 min) to 325°C @ 10°C/min
 Inj.: 250°C
 Det.: FID, 325°C
 Flow: Helium, Constant flow, 1.3mL/sec @ 40°C
 Injection: 1.0 μ L, splitless (0.75 min)
 Liner: Splitless, 4mm ID single taper
 Sample: 50ng on-column of a custom phthalate ester mix



Compounds analyzed as diazomethane-derivatized methyl esters.

Haloacetic Acid Methyl Esters by US EPA Method 552 (GC)

Column: SPB-1701, 30m x 0.32mm ID, 0.25 μ m film
 Cat. No.: 24184
 Oven: 50°C (10 min) to 120°C at 10°C/min, hold 3 min
 Carrier: helium, 25cm/sec
 Det.: ECD, 300°C
 Inj.: 1 μ L MTBE (20ng/mL bromochloroacetic acid, all others 200ng/mL each), splitless, 200°C

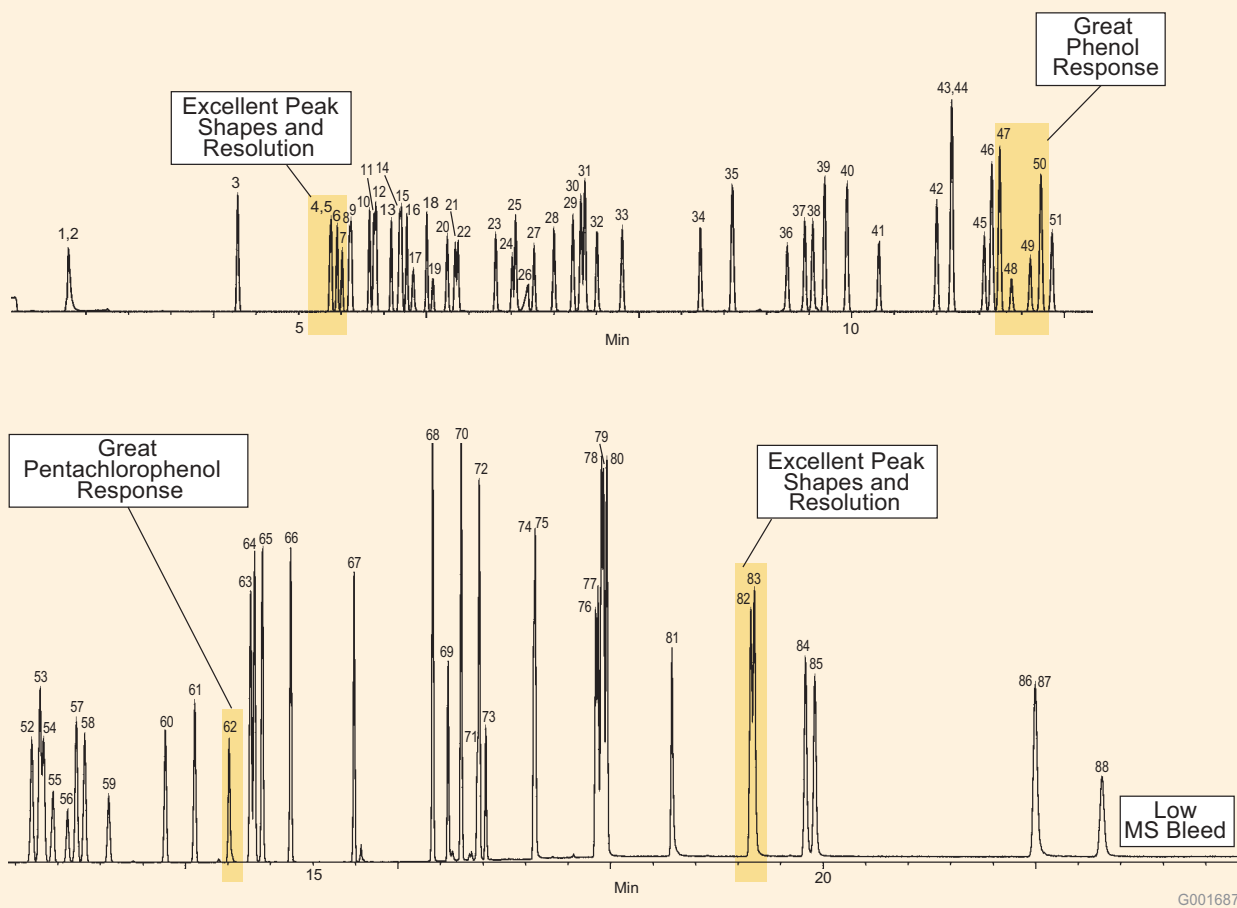
GC Applications

Semivolatiles

Gas Chromatography

Order: 1.800.325.3010 Technical Service: 1.800.359.3041 Web: www.sigma-aldrich.com/supelco

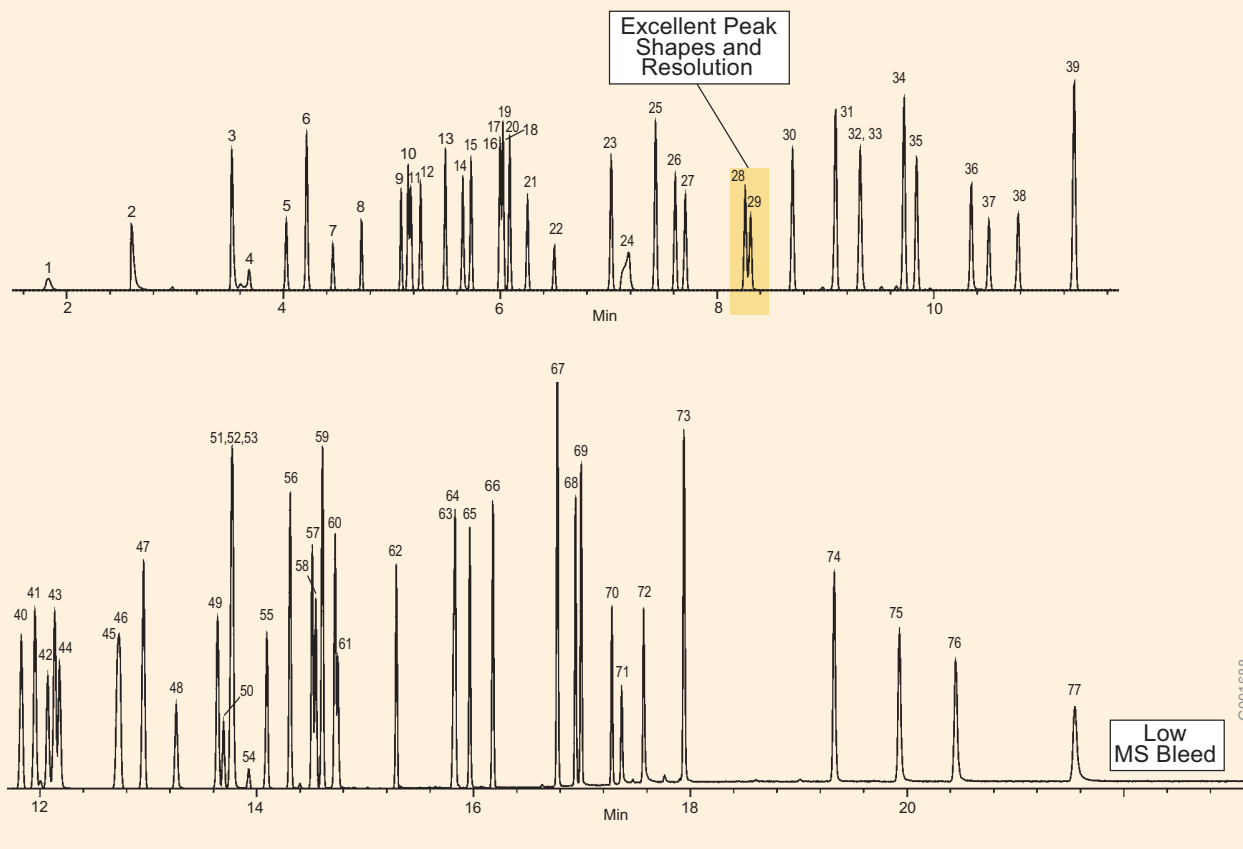
- | | | | |
|--|--------------------------------|----------------------------------|---------------------------------|
| 1. Pyridine | 23. Isophorone | 45. 3-Nitroaniline | 67. Di-n-butyl phthalate |
| 2. N-nitrosodimethylamine | 24. 2-Nitrophenol | 46. Acenaphthene-d10 (Int. Std.) | 68. Fluoranthene |
| 3. 2-Fluorophenol (Surr.) | 25. 2,4-Dimethylphenol | 47. Acenaphthene | 69. Benzidine |
| 4. Phenol-d6 (Surr.) | 26. bis(2-Chloroethoxy)methane | 48. 2,4-Dinitrophenol | 70. Pyrene |
| 5. Phenol | 27. Benzoic Acid | 49. 4-Nitrophenol | 71. Aramite#1 |
| 6. Aniline | 28. 2,4-Dichlorophenol | 50. Dibenzofuran | 72. Terphenyl-d14 (Surr.) |
| 7. Bis(2-chloroethyl)ether | 29. 1,2,4-Trichlorobenzene | 51. 2,4-Dinitrotoluene | 73. Aramite#2 |
| 8. 2-Chlorophenol-d4 (Surr.) | 30. Naphthalene-d8 (Int. Std.) | 52. Diethyl phthalate | 74. 3,3'-Dimethylbenzidine |
| 9. 2-Chlorophenol | 31. Naphthalene | 53. Fluorene | 75. Butylbenzyl phthalate |
| 10. 1,3-Dichlorobenzene | 32. 4-Chloroaniline | 54. 4-Chlorophenyl phenyl ether | 76. 3,3'-Dichlorobenzidine |
| 11. 1,4-Dichlorobenzene-d4 (Int. Std.) | 33. Hexachlorobutadiene | 55. 4-Nitroaniline | 77. Bis(2-ethylhexyl) phthalate |
| 12. 1,4-Dichlorobenzene | 34. 4-Chloro-3-methylphenol | 56. 2-Methyl-4,6-dinitrophenol | 78. Benzo(a)anthracene |
| 13. Benzyl alcohol | 35. 2-Methylnaphthalene | 57. N-nitrosodiphenylamine | 79. Chrysene-d12 (Int. Std.) |
| 14. 1,2-Dichlorobenzene-d4 (Surr.) | 36. Hexachlorocyclopentadiene | 58. Azobenzene | 80. Chrysene |
| 15. 1,2-Dichlorobenzene | 37. 2,4,6-Trichlorophenol | 59. 2,4,6-Tribromophenol (Surr.) | 81. Di-n-octyl phthalate |
| 16. 2-Methylphenol | 38. 2,4,5-Trichlorophenol | 60. 4-Bromophenyl phenyl ether | 82. Benzo(b)fluoranthene |
| 17. Bis(2-chloroisopropyl)ether | 39. 2-Fluorobiphenyl (Surr.) | 61. Hexachlorobenzene | 83. Benzo(k)fluoranthene |
| 18. 4-Methylphenol | 40. 2-Chloronaphthalene | 62. Pentachlorophenol | 84. Benzo(a)pyrene |
| 19. N-Nitroso-di-n-propylamine | 41. 2-Nitroaniline | 63. Phenanthrene-d10 (Int. Std.) | 85. Perylene-d12 (Int. Std.) |
| 20. Hexachloroethane | 42. Dimethyl phthalate | 64. Phenanthrene | 86. Indeno(1,2,3-cd)pyrene |
| 21. Nitrobenzene-d5 (Surr.) | 43. Acenaphthylene | 65. Anthracene | 87. Dibenz(a,h)anthracene |
| 22. Nitrobenzene | 44. 2,6-Dinitrotoluene | 66. Carbazole | 88. Benzo(g,h,i)perylene |



US EPA Method 8270 Semivolatile Compounds (GC/MS), Primary Analyte List

Column: Equity-5, 30m x 0.25mm ID, 0.5µm
 Cat. No.: 28092-U
 Oven: 40°C (2 min) to 100°C @ 50°C/min to 200°C @ 10°C/min to 325°C @ 30°C/min (7.5 min)
 Inj.: 280°C
 Det.: 5973 MSD, Scan range 45-450 amu, 325°C transfer line
 Flow: Pressure programmed, 20psi (0.0 min), ramp to 80psi (0.0 min), ramp to 16.5psi (3 min), ramp to 25psi (hold for remainder of run)
 Injection: 1.0µL, splitless (0.61 min)
 Liner: Single taper, unpacked
 Sample: 50ng on-column of a 74 component semivolatile standard, 6 internal standards, and 8 surrogates

- | | | | |
|--|---|---------------------------------|--------------------------------------|
| 1. 1,4-Dioxane | 20. o-Toluidine | 39. Acenaphthene-d10 | 58. Pentachloronitrobenzene |
| 2. Pyridine | 21. Nitrobenzene-d5 (surr) | 40. Pentachlorobenzene | 59. Phenanthrene-d10 (internal std.) |
| 3. 2-Picoline | 22. N-Nitrosopiperidine | 41. 1-Naphthylamine | 60. Disulfoton |
| 4. N-Nitroso-methylethylamine | 23. o,o,o-Triethylphosphorothioate | 42. 2,3,5,6-Tetrachlorophenol | 61. Dinoseb |
| 5. Methyl Methanesulfonate | 24. α,α -Dimethylphenethylamine | 43. 2-Naphthylamine | 62. Methyl Parathion |
| 6. 2-Fluorophenol (surr) | 25. Naphthalene-d8 (internal std.) | 44. 2,3,4,6-Tetrachlorophenol | 63. 4-Nitroquinoline-1-oxide |
| 7. N-Nitrosodiethylamine | 26. 2,6-Dichlorophenol | 45. 5-Nitro-o-toluidine | 64. Parathion |
| 8. Ethyl Methanesulfonate | 27. Hexachloropropene-1 | 46. Thionazin | 65. Methapyrilene |
| 9. Phenol-d6 (surr) | 28. Phenylenediamine | 47. Diphenylamine | 66. Isodrin |
| 10. Aniline | 29. N-Nitrosodibutylamine | 48. 2,4,6-Tribromophenol (surr) | 67. p-Terphenyl-d14 (surr) |
| 11. Pentachloroethane | 30. Safrole | 49. Sulfotep | 68. 4-Dimethylaminoazobenzene |
| 12. 2-Chlorophenol-d4 (surr) | 31. 1-Methylnaphthalene | 50. 1,3,5-Trinitrobenzene | 69. Chlorobenzilate |
| 13. 1,4-Dichlorobenzene-d4 (internal std.) | 32. 1,2,4,5-Tetrachlorobenzene | 51. Diallate-1 | 70. Famphur |
| 14. Benzyl alcohol | 33. Isosafrole | 52. Phorate | 71. Kepone |
| 15. 1,2-Dichlorobenzene-d4 (surr) | 34. 2-Fluorobiphenyl (surr) | 53. Phenacetin | 72. 2-Acetylaminofluorene |
| 16. 3-Methylphenol | 35. Isosafrole-2 | 54. Diallate-2 | 73. Chrysene-d12 (internal std.) |
| 17. N-Nitrosopyrrolidine | 36. 1,4-Naphthoquinone | 55. Dimethoate | 74. 7,12-Dimethylbenz(a)anthracene |
| 18. Acetophenone | 37. 1,3-Dinitrobenzene | 56. 4-Aminobiphenyl | 75. Perylene-d12 (internal std.) |
| 19. N-Nitrosomorpholine | 38. 1,4-dinitrobenzene | 57. Pronamide | 76. 3-Methylcholanthrene |
| | | | 77. Dibenzo(a,j)acridine |



US EPA Method 8270 Semivolatile Compounds (GC/MS), Supplemental Appendix IX List

- Column: Equity-5, 30m x 0.25mm ID, 0.5 μ m
- Cat. No.: 28092-U
- Oven: 40°C (2 min) to 100°C @ 50°C/min to 200°C @ 10°C/min to 325°C @ 30°C/min (7.5 min)
- Inj.: 280°C
- Det.: 5973 MSD, Scan range 45-450 amu, 325°C transfer line
- Flow: Pressure programmed, 20psi (0.0 min), ramp to 80psi (0.0 min), ramp to 16.5psi (3 min), ramp to 25psi (hold for remainder of run)
- Injection: 1.0 μ L, splitless (0.61 min)
- Liner: Single taper, unpacked
- Sample: 50ng on-column of a 62 component semivolatile standard, 6 internal standards, and 8 surrogates

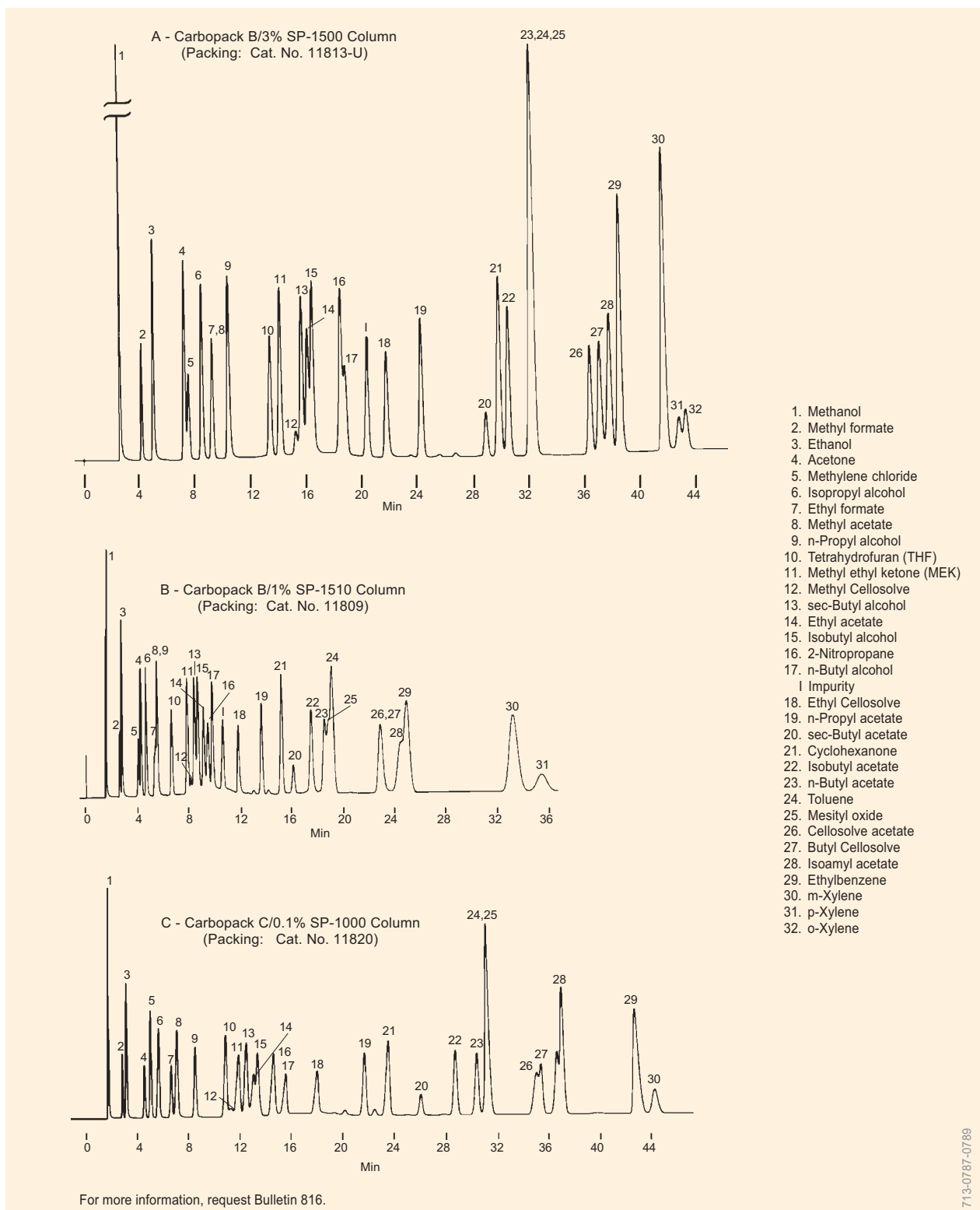
Order: 1.800.325.3010 Technical Service: 1.800.359.3041 Web: www.sigma-aldrich.com/supelco

Gas Chromatography

SUPELCO

GC Applications

Solvents



Industrial Solvents (GC)

Columns: 10' x 1/8" stainless steel

Oven: A & C - 70°C to 225°C at 4°C/min

B - 100°C to 225°C at 8°C/min

Carrier: nitrogen, 20mL/min

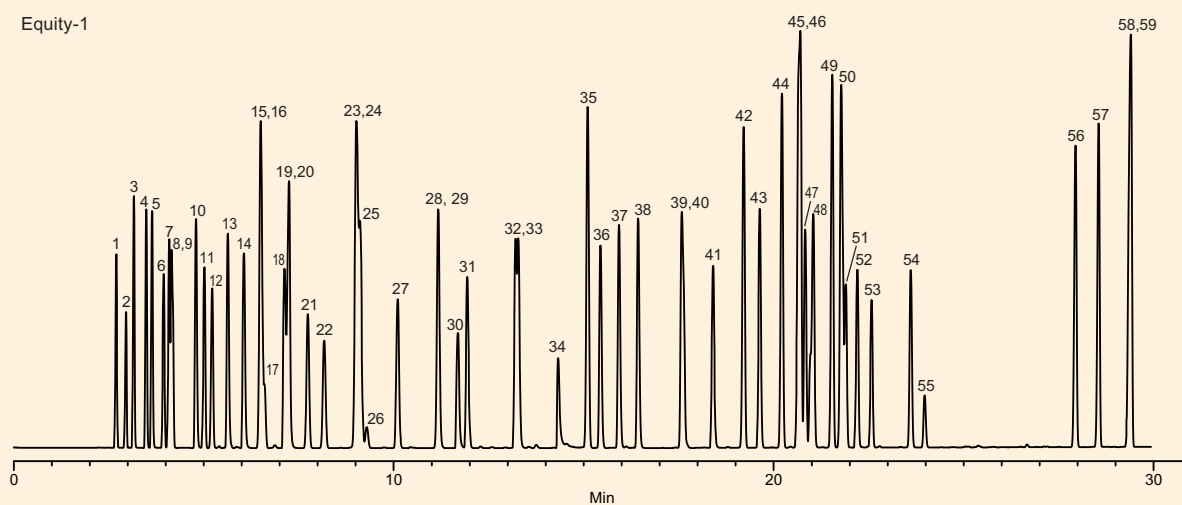
Det.: FID

Inj.: 0.3µL, 3% each component by volume (approx. 12µg each)

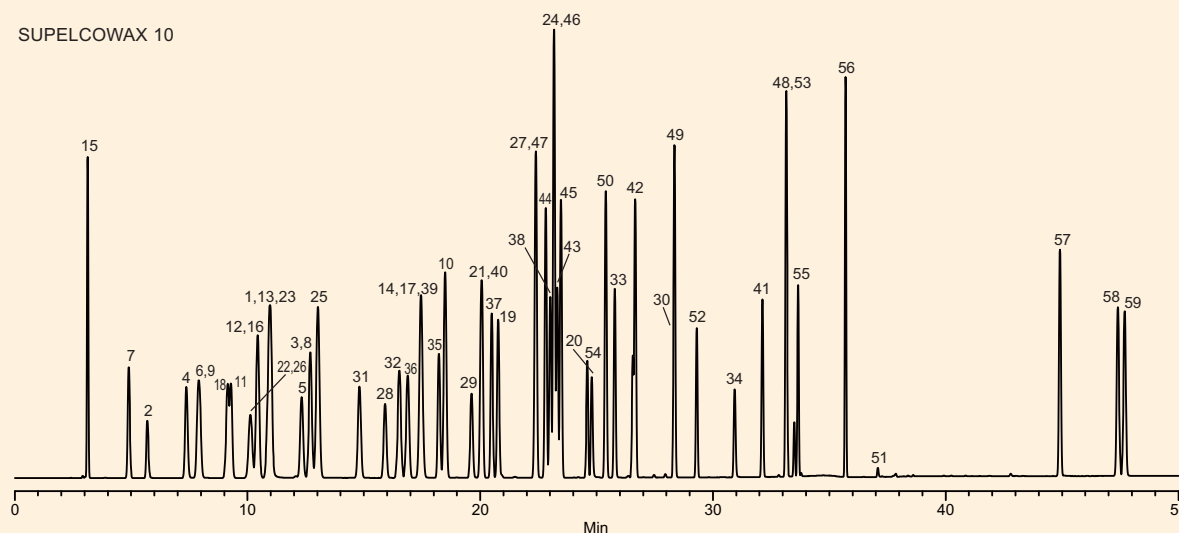
GC Applications Solvents

- | | | | |
|--------------------------------|----------------------------------|--------------------------|-------------------------------|
| 1. Methanol | 16. Ethyl acetate | 31. n-Propyl acetate | 46. p-Xylene |
| 2. Methyl formate | 17. Chloroform | 32. 4-Methyl-2-pentanone | 47. Isoamyl acetate |
| 3. Ethanol | 18. Tetrahydrofuran | 33. Isoamyl alcohol | 48. Cyclohexanol |
| 4. Acetone | 19. Isobutanol | 34. Dimethylformamide | 49. Styrene |
| 5. 2-Propanol | 20. 2-Methoxyethanol | 35. Toluene | 50. o-Xylene |
| 6. Ethyl formate | 21. 1,2-Dichloroethane | 36. Isobutyl acetate | 51. 1,1,2,2-Tetrachloroethane |
| 7. 1,1-Dichloroethylene | 22. 1,1,1-Trichloroethane | 37. 2-Hexanone | 52. 2-Ethoxyethyl acetate |
| 8. Methylene chloride | 23. Isopropyl acetate | 38. Mesityl oxide | 53. Butyl cellosolve |
| 9. Methyl acetate | 24. n-Butanol | 39. Tetrachloroethene | 54. n-Amyl acetate |
| 10. 1-Propanol | 25. Benzene | 40. n-butyl acetate | 55. 2-Methylcyclohexanol |
| 11. trans-1,2-Dichloroethylene | 26. Carbon Tetrachloride | 41. Diacetone alcohol | 56. 1,2-Dichlorobenzene |
| 12. 1,1-Dichloroethane | 27. 2-Nitropropane | 42. Chlorobenzene | 57. 2-Methylphenol |
| 13. 2-Butanone | 28. Trichloroethylene | 43. 5-Methyl-2-hexanone | 58. 3-Methylphenol |
| 14. sec-Butanol | 29. 1,4-Dioxane | 44. Ethyl benzene | 59. 4-Methylphenol |
| 15. Hexane | 30. 2-Ethoxyethanol (cellosolve) | 45. m-Xylene | |

Equity-1



SUPELCOWAX 10



Industrial Solvents (GC)

Column 1: Equity-1, 30m x 0.32mm ID, 1.0 μ m
 Column 1 Cat. No.: 28057-U
 Column 2: SUPELCOWAX 10, 30m x 0.32mm ID, 1.0 μ m
 Column 2 Cat. No.: 24211
 Oven: 35°C (8 min) to 130°C @ 4°C/min. (2 min)
 Inj.: 250°C

Det.: FID, 250°C
 Flow: Helium, 25cm/sec constant @ 35°C
 Injection: 0.5 μ L, split (200:1)
 Liner: Split, cup design
 Sample: 0.5 μ L of a 59 component neat solvent mixture

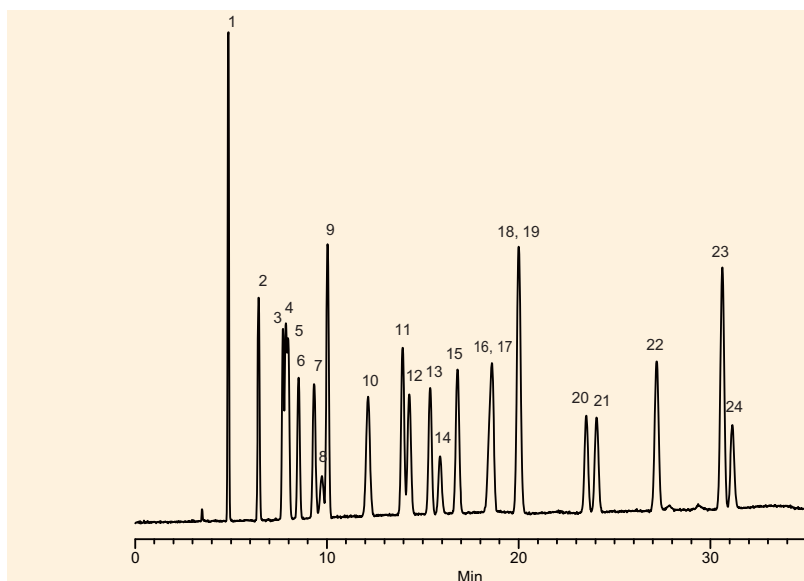
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Gas
Chromatography

SUPELCO

GC Applications

Solvents, Sterols

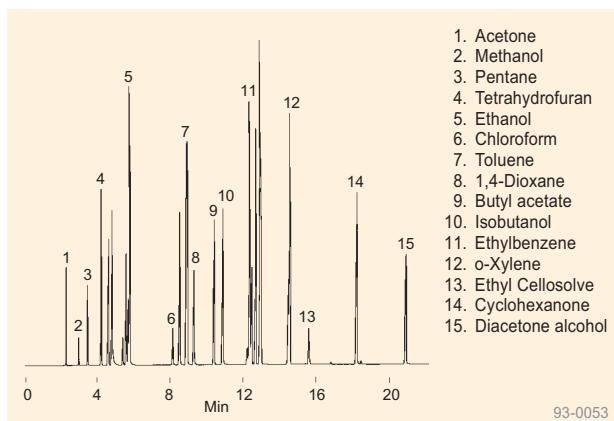


1. Methanol
2. Ethanol
3. Acetonitrile
4. Acetone
5. 2-Propanol
6. Ethyl Ether
7. 1,1-Dichloroethylene
8. Freon 113
9. Methylene Chloride
10. Methyl-tert-Butyl ether
11. 2-Butanone
12. Hexane
13. Ethyl acetate
14. Chloroform
15. Tetrahydrofuran
16. 1,1,1-Trichloroethane
17. 1,2-Dichloroethane
18. Carbon tetrachloride
19. Benzene
20. Trichloroethylene
21. 1,4-Dioxane
22. 4-Methyl-2-pentanone
23. Toluene
24. Dimethylformamide

G001697

Residual Solvents (GC)

Column: Equity-5, 30m x 0.53mm ID, 5.0 μ m
 Cat. No.: 28279-U
 Oven: 40°C (6 min) to 100°C @ 2°C/min
 Inj.: 225°C
 Det.: FID, 250°C
 Flow: Helium, 20cm/sec @ 40°C
 Injection: 1.0 μ L, split 10:1
 Liner: Split, cup design
 Sample: 5ng on-column of a 24 component solvent standard

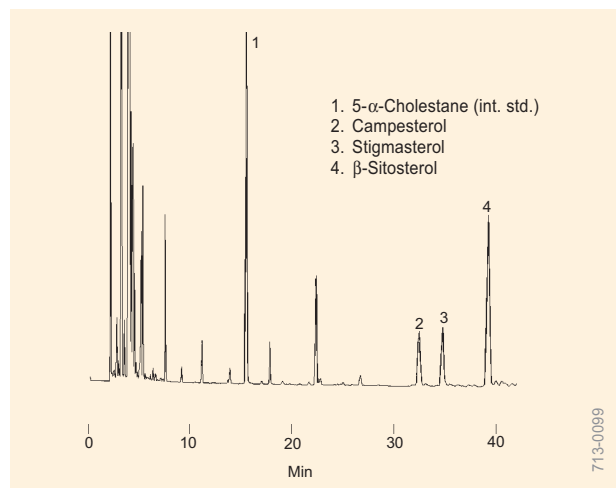


1. Acetone
2. Methanol
3. Pentane
4. Tetrahydrofuran
5. Ethanol
6. Chloroform
7. Toluene
8. 1,4-Dioxane
9. Butyl acetate
10. Isobutanol
11. Ethylbenzene
12. o-Xylene
13. Ethyl Cellosolve
14. Cyclohexanone
15. Diacetone alcohol

93-0053

Solvents (GC)

Column: PAG, 30m x 0.25mm ID, 0.25 μ m film
 Cat. No.: 24223
 Oven: 30°C (4 min) to 200°C at 4°C/min, hold 4 min
 Carrier: helium, 20cm/sec (set at 165°C),
 Det.: FID (260°C)
 Inj.: 0.1 μ L neat solvents mix, split 100:1, 250°C



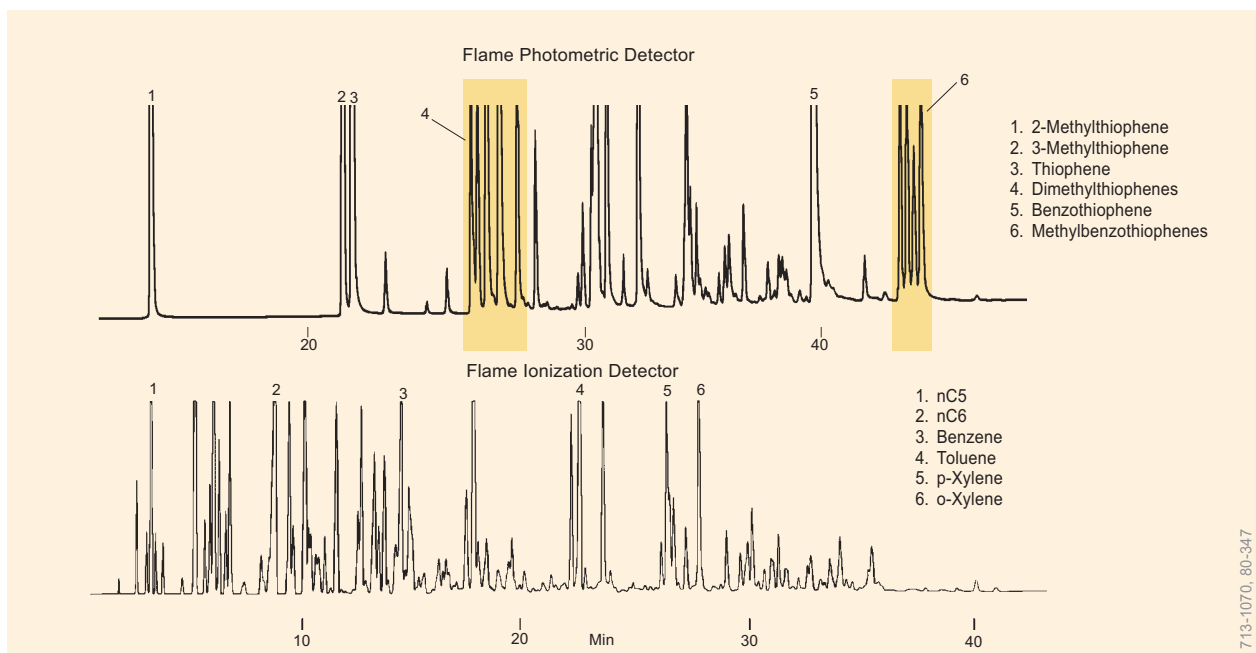
1. 5- α -Cholestane (int. std.)
2. Campesterol
3. Stigmasterol
4. β -Sitosterol

713-0099

Sterols (GC)

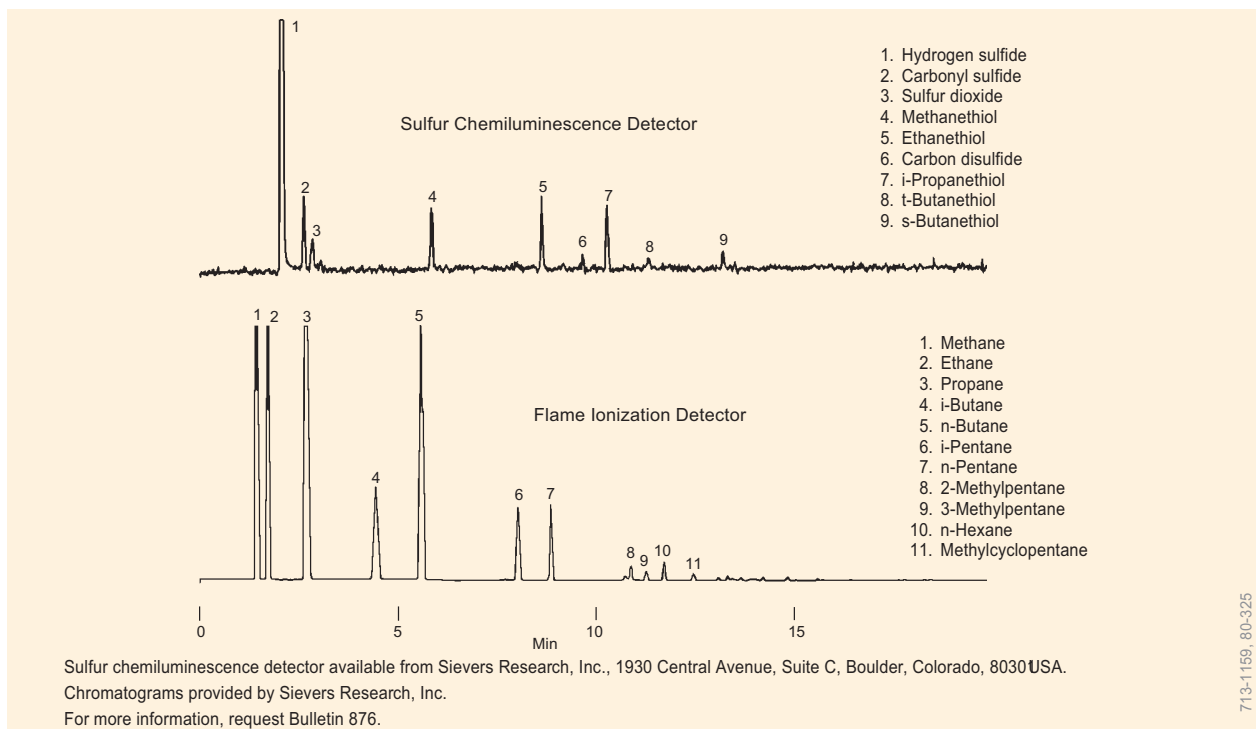
Column: SAC-5, 30m x 0.25mm ID, 0.25 μ m film
 Cat. No.: 24156
 Oven: 265°C
 Carrier: helium, 20cm/sec (set at 265°C)
 Det.: FID, 300°C
 Inj.: 1 μ L soybean oil, split 100:1, 300°C

GC Applications Sulfur Compounds



Sulfur Compounds, C3-C12 Matrix: Commercial Gasoline (GC)

Column: SPB-1 SULFUR, 30m x 0.32mm ID, 4 μ m film
 Cat. No.: 24158
 Oven: -10°C (3 min) to 300°C at 10°C/min
 Det.: FID/FPD
 Inj.: 2.0 μ L liquid, split 10:1



Sulfur Compounds, C1-C6 Matrix: Sour Natural Gas (GC)

Column: SPB-1 SULFUR, 30m x 0.32mm ID, 4 μ m film
 Cat. No.: 24158
 Oven: -10°C (3 min) to 300°C at 10°C/min
 Det.: FID/SCD
 Inj.: 2.0 μ L liquid, split 10:1

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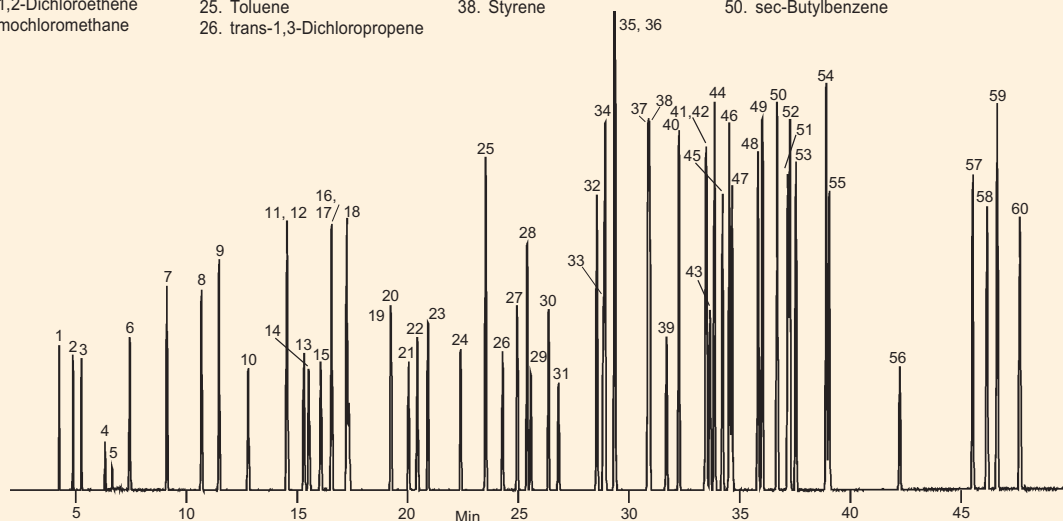
Gas
Chromatography

SUPELCO

GC Applications

Volatiles

- | | | | | |
|-----------------------------|-------------------------------|-------------------------------|-------------------------------|---------------------------------|
| 1. Dichlorodifluoromethane | 14. Chloroform | 27. 1,1,2-Trichloroethane | 39. Bromoform | 51. 1,3-Dichlorobenzene |
| 2. Chloromethane | 15. 1,1,1-Trichloroethane | 28. Tetrachloroethene | 40. Isopropylbenzene | 52. p-Isopropyltoluene |
| 3. Vinyl chloride | 16. 1,1-Dichloropropene | 29. 1,3-Dichloropropane | 41. 1,1,2,2-Tetrachloroethane | 53. 1,4-Dichlorobenzene |
| 4. Bromomethane | 17. Carbon tetrachloride | 30. Dibromochloromethane | 42. Bromobenzene | 54. n-Butylbenzene |
| 5. Chloroethane | 18. Benzene | 31. 1,2-Dibromoethane | 43. 1,2,3-Trichloropropane | 55. 1,2-Dichlorobenzene |
| 6. Trichlorofluoromethane | 19. 1,2-Dichloroethane | 32. Chlorobenzene | 44. n-Propylbenzene | 56. 1,2-Dibromo-3-chloropropane |
| 7. 1,1-Dichloroethene | 20. Trichloroethene | 33. 1,1,1,2-Tetrachloroethane | 45. 2-Chlorotoluene | 57. 1,2,4-Trichlorobenzene |
| 8. Methylene chloride | 21. 1,2-Dichloropropane | 34. Ethylbenzene | 46. 1,2,3-Trimethylbenzene | 58. Hexachlorobutadiene |
| 9. trans-1,2-Dichloroethene | 22. Dibromomethane | 35. m-Xylene | 47. 4-Chlorotoluene | 59. Naphthalene |
| 10. 1,1-Dichloroethane | 23. Bromodichloromethane | 36. p-Xylene | 48. tert-Butylbenzene | 60. 1,2,3-Trichlorobenzene |
| 11. 2,2-Dichloropropane | 24. cis-1,3-Dichloropropene | 37. o-Xylene | 49. 1,2,4-Trimethylbenzene | |
| 12. cis-1,2-Dichloroethene | 25. Toluene | 38. Styrene | 50. sec-Butylbenzene | |
| 13. Bromochloromethane | 26. trans-1,3-Dichloropropene | | | |

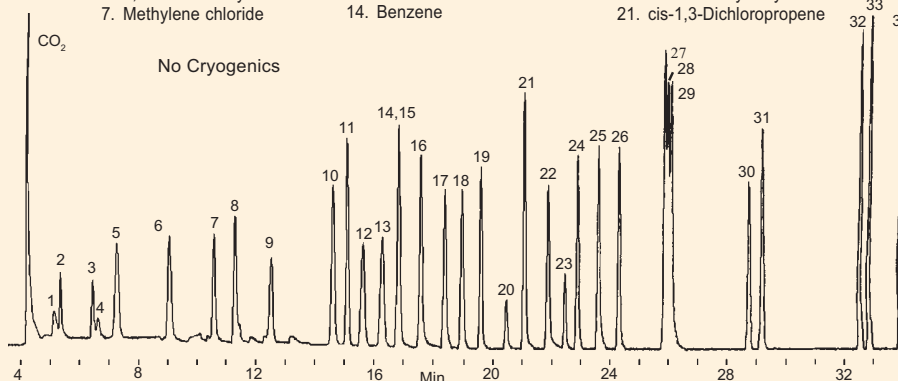


795-0454

Volatiles (GC)

Column: SPB-624, 60m x 0.25mm ID, 1.4µm film
 Cat. No.: 24256
 Oven: 35°C (4min) to 200°C at 4°C/min
 Carrier: helium, 33cm/sec (set at 40°C)
 Det.: MS (m/z = 45-300)
 Inj.: Split (70:1), 250°C 5ng/component on column

- | | | | |
|---------------------------|-------------------------------|-------------------------------|---------------------------------------|
| 1. Chloromethane | 8. trans-1,2-Dichloroethylene | 15. 1,2-Dichloroethane | 22. Toluene |
| 2. Vinyl chloride | 9. 1,1,-Dichloroethane | 16. Difluorobenzene (IS) | 23. trans-1,3-Dichloropropene |
| 3. Bromomethane | 10. Chloroform | 17. Trichloroethylene | 24. 1,1,2-Trichloroethane |
| 4. Chloroethane | 11. Bromochloromethane (IS) | 18. 1,2-Dichloropropane | 25. Tetrachloroethylene |
| 5. Trichlorofluoromethane | 12. 1,1,1-Trichloroethane | 19. Bromodichloromethane | 26. Chlorodibromomethane |
| 6. 1,1-Dichloroethylene | 13. Carbon tetrachloride | 20. 2-Chloroethyl vinyl ether | 27. Chlorobenzene-d ₆ (IS) |
| 7. Methylene chloride | 14. Benzene | 21. cis-1,3-Dichloropropene | 28. Chlorobenzene |
| | | | 29. Ethylbenzene |
| | | | 30. Bromoform |
| | | | 31. 1,1,1,2-Tetrachloroethane |
| | | | 32. 1,3-Dichlorobenzene |
| | | | 33. 1,4-Dichlorobenzene |
| | | | 34. 1,2-Dichlorobenzene |

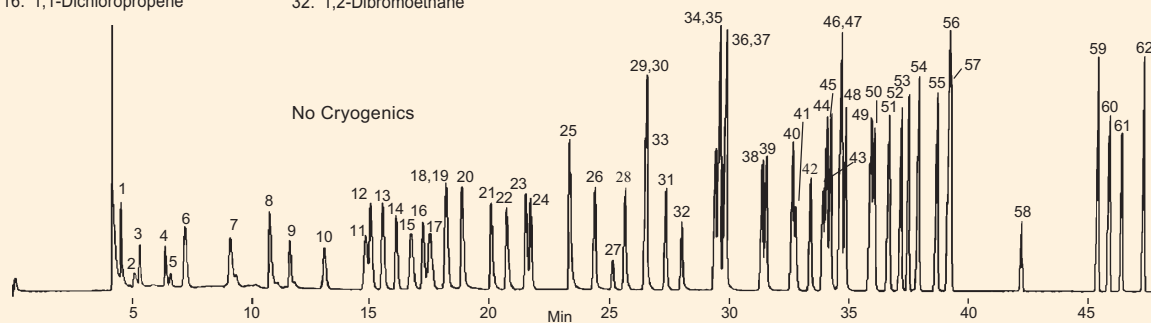


92-0010

Volatile Compounds by US EPA Method 624 (PT/GC)

Sample: 20ppb each component in 5mL water	Bake: 60°C for 10 min
Trap: VOCARB 3000	Column: VOCOL, 105m x 0.53mm ID, 3.0µm film
Cat. No.: 21066-U	Cat. No.: 25358
Purge: 11 min, 35mL/min	Oven: 35°C (4 min) to 200°C at 6°C/min
Dry Purge: 3 min	Carrier: helium, 7.5mL/min
Desorb. Temp: 250°C for 4 min	Det.: MS, Scan Range m/z = 35-260 at 0.6 sec/scan

- | | | | |
|-------------------------------|-------------------------------|-------------------------------|--|
| 1. Dichlorodifluoromethane | 17. Carbon tetrachloride | 33. Chlorobenzene | 48. 4-Chlorotoluene |
| 2. Chloromethane | 18. 1,2-Dichloroethane | 34. 1,1,1,2-Tetrachloroethane | 49. tert-Butylbenzene |
| 3. Vinyl chloride | 19. Benzene | 35. Ethylbenzene | 50. 1,2,4-Trimethylbenzene |
| 4. Bromomethane | 20. Fluorobenzene (int std) | 36. m-Xylene | 51. sec-Butylbenzene |
| 5. Chloroethane | 21. Trichloroethylene | 37. p-Xylene | 52. p-Isopropyltoluene |
| 6. Trichlorofluoromethane | 22. 1,2-Dichloropropane | 38. o-Xylene | 53. 1,3-Dichlorobenzene |
| 7. 1,1-Dichloroethylene | 23. Bromodichloromethane | 39. Styrene | 54. 1,4-Dichlorobenzene |
| 8. Methylene chloride | 24. Dibromomethane | 40. Isopropylbenzene | 55. n-Butylbenzene |
| 9. trans-1,2-Dichloroethylene | 25. cis-1,3-Dichloropropene | 41. Bromoform | 56. 1,2-Dichlorobenzene-d ₄ (int std) |
| 10. 1,1-Dichloroethane | 26. Toluene | 42. 1,1,2,2-Tetrachloroethane | 57. 1,2-Dichlorobenzene |
| 11. 2,2-Dichloropropane | 27. trans-1,3-Dichloropropene | 43. 1,2,3-Trichloropropane | 58. 1,2-Dibromo-3-chloropropane |
| 12. cis-1,2-Dichloroethylene | 28. 1,1,2-Trichloroethane | 44. n-Propylbenzene | 59. 1,2,4-Trichlorobenzene |
| 13. Chloroform | 29. 1,3-Dichloropropane | 45. Bromobenzene | 60. Hexachlorobutadiene |
| 14. Bromochloromethane | 30. Tetrachloroethylene | 46. 1,3,5-Trimethylbenzene | 61. Naphthalene |
| 15. 1,1,1-Trichloroethane | 31. Chlorodibromomethane | 47. 2-Chlorotoluene | 62. 1,2,3-Trichlorobenzene |
| 16. 1,1-Dichloropropene | 32. 1,2-Dibromoethane | | |

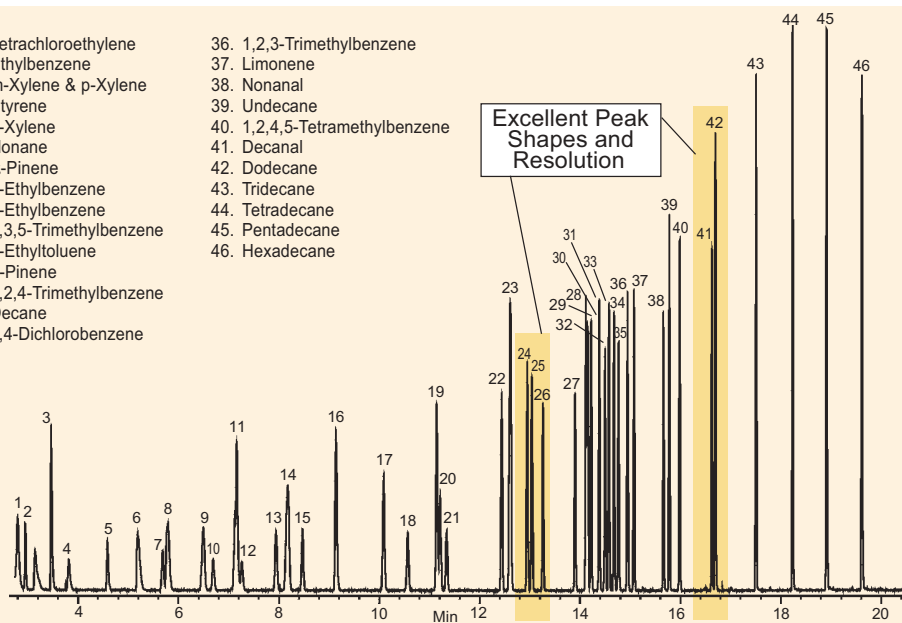


92-0134

Volatile Compounds by US EPA Method 524.2 (PT/GC)

Sample: 10ppb each component in 5mL water	Column: VOCOL, 105m x 0.53mm ID, 3.0µm film
Trap: VOCARB 3000	Cat. No.: 25358
Cat. No.: 21066-U	Oven: 35°C (10 min) to 200°C at 4°C/min, hold 10 min
Purge: 11min, 40mL/min	Carrier: helium, 10mL/min
Dry: 3 min	Det.: MS, Scan Range m/z = 35-260 at 0.6 sec/scan
Desorb. Temp: 250°C for 4 min	
Bake: 280°C for 10 min	

- | | | |
|---|----------------------------|--------------------------------|
| 1. Ethanol | 21. Tetrachloroethylene | 36. 1,2,3-Trimethylbenzene |
| 2. Acetone | 22. Ethylbenzene | 37. Limonene |
| 3. 2-Propanol | 23. m-Xylene & p-Xylene | 38. Nonanal |
| 4. Methylene chloride | 24. Styrene | 39. Undecane |
| 5. 1-Propanol | 25. o-Xylene | 40. 1,2,4,5-Tetramethylbenzene |
| 6. 2-Butanone | 26. Nonane | 41. Decanal |
| 7. Hexane | 27. α-Pinene | 42. Dodecane |
| 8. Ethyl acetate & Chloroform | 28. 3-Ethylbenzene | 43. Tridecane |
| 9. 1,2-Dichloroethane & 2,4-Dimethylpentane | 29. 4-Ethylbenzene | 44. Tetradecane |
| 10. 1,1,1-Trichloroethane | 30. 1,3,5-Trimethylbenzene | 45. Pentadecane |
| 11. Benzene and 1-Butanol | 31. 2-Ethyltoluene | 46. Hexadecane |
| 12. Carbon tetrachloride | 32. β-Pinene | |
| 13. 1,2-Dichloropropane | 33. 1,2,4-Trimethylbenzene | |
| 14. Bromodichloromethane, Isooctane & Trichloroethene | 34. Decane | |
| 15. Heptane | 35. 1,4-Dichlorobenzene | |
| 16. 4-Methyl-2-pentanone | | |
| 17. Toluene | | |
| 18. Chlorodibromomethane | | |
| 19. n-Butyl acetate | | |
| 20. Octane | | |



G001707

Indoor Air (GC/MS)

Column: Equity-1, 30m x 0.25mm ID, 1.0µm
Cat. No.: 28049-U
Oven: 35°C (3 min) to 100°C @ 8°C/min to 250°C @ 20°C/min (10 min)
Inj.: 250°C
Det.: MSD, Scan range 33-350 amu, 325°C transfer line
Flow: Helium, 30cm/sec @ 35°C
Injection: 1.0µL, split 10:1
Liner: Split, cup design
Sample: 100ng on-column of the Japanese Indoor Air Standards Mix (Cat. No. 47537-U)

Order: 1.800.325.3010 Technical Service: 1.800.359.3041 Web: www.sigma-aldrich.com/supelco

Gas Chromatography

SUPELCO