

OPTIMA[®] 17 MS silarylene phase · USP G3

★ Key features

- Medium polar silarylene phase with selectivity analogue to 50 % phenyl – 50 % methylpolysiloxane, no CN groups in the polymer
- Structure see page 309

✓ Recommended application

- Ideal for ion trap detectors
- Optimum reference column in combination with a 1 MS or 5 MS
- All-round phase for environmental analysis, ultra-trace analysis, EPA methods, pesticide, PCBs, food and drug analysis

✍ Temperature

- T_{max} 340 °C (long-term temperature),
- T_{max} 360 °C (short-term max. temperature in a temperature program)

Similar phases

- OV-17, AT[™]-50, BPX[™]-50, DB-17, DB-17ms, HP-50+, HP-17, SPB[™]-50, SPB[™]-17, SP-2250, Rtx[®]-50, CP-Sil 24 CB, 007-17, VF-17ms, ZB-50

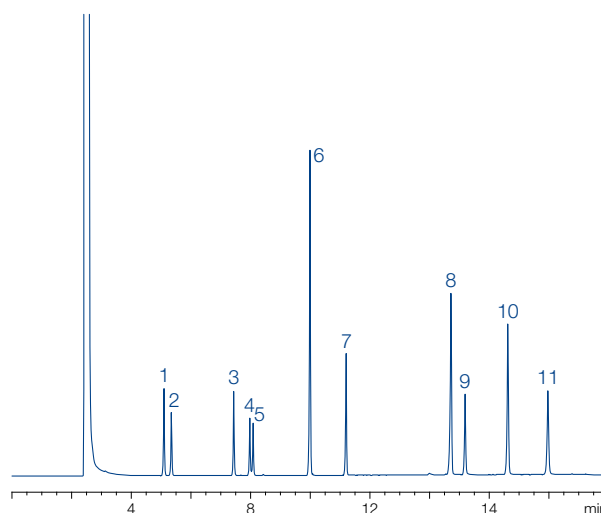
Analysis of phenols

MN Appl. No. 213600

Column: OPTIMA[®] 17 MS, 30 m x 0.25 mm ID, 0.25 µm film
 Sample: phenol mix 604
 Injection: 1.0 µL, 230 °C, split 1:30
 Carrier gas: 0.8 bar He
 Temperature: 100 °C, 10 °C/min → 250 °C
 Detector: FID 280 °C

Peaks:

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



Ordering information

OPTIMA[®] 17 MS

	Length → 30 m	60 m
0.25 mm ID (0.4 mm OD)		
0.25 µm film	726162.30	726162.60
0.32 mm ID (0.5 mm OD)		
0.25 µm film	726165.30	726165.60

In addition to this standard program we will be happy to supply columns custom-made to your specifications. Information about scope of delivery, special cages and integrated guard columns see additional information for GC columns on page 303.

Further applications can be found online in our application database at www.mn-net.com/apps



OPTIMA[®] 210 trifluoropropyl-methylpolysiloxane (50 % trifluoropropyl) · close equivalent to USP G6

★ Key features

- Midpolar phase
- Structure see page 309

✓ Recommended application

- Environmental analysis, especially for *o*-, *m*- and *p*-substituted aromatic hydrocarbons

✍ Temperature

- T_{max} 260 °C (long-term temperature),
T_{max} 280 °C (short-term max. temperature in a temperature program)

Similar phases

- OV-210, DB-210, Rtx[®]-200, 007-210

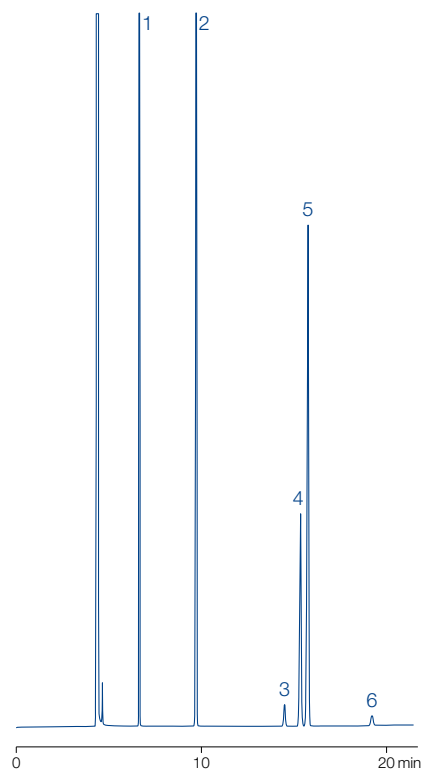
Aromatic hydrocarbons (BTX)

MN Appl. No. 200230

Column: OPTIMA[®] 210, 50 m x 0.25 mm ID, 0.5 µm film
 Injection: 0.5 µL, split 105 mL/min
 Carrier gas: 130 kPa N₂ (1.1 mL/min)
 Temperature: 50 °C
 Detector: FID 250 °C

Peaks:

1. Benzene
2. Toluene
3. Ethylbenzene
4. *p*-Xylene
5. *m*-Xylene
6. *o*-Xylene

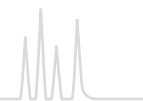


Ordering information

OPTIMA[®] 210

	Length →				
	15 m	25 m	30 m	50 m	60 m
0.25 mm ID (0.4 mm OD)					
0.25 µm film	726871.15	726871.25	726871.30	726871.50	726871.60
0.50 µm film			726874.30	726874.50	726874.60
0.32 mm ID (0.5 mm OD)					
0.25 µm film	726877.15		726877.30	726877.50	726877.60
0.50 µm film		726880.25	726880.30	726880.50	726880.60

In addition to this standard program we will be happy to supply columns custom-made to your specifications. Information about scope of delivery, special cages and integrated guard columns see additional information for GC columns on page 303.



OPTIMA[®] 225 50 % cyanopropyl-methyl – 50 % phenylmethylpolysiloxane · close equivalent to USP G7 / G19

★ Key features

- Midpolar phase
- Structure see page 309

✓ Recommended application

- Fatty acid analysis

✍ Temperature

- T_{max} 260 °C (long-term temperature),
T_{max} 280 °C (short-term max. temperature in a temperature program)

Similar phases

- OV-210, DB-210, Rtx[®]-200, 007-210

Analysis of FAME in porcine fat

MN Appl. No. 210060

Column: OPTIMA[®] 225, 25 m x 0.32 mm ID, 0.25 µm film

Injection: 1 µL, split 1:40

Carrier gas: 60 kPa H₂

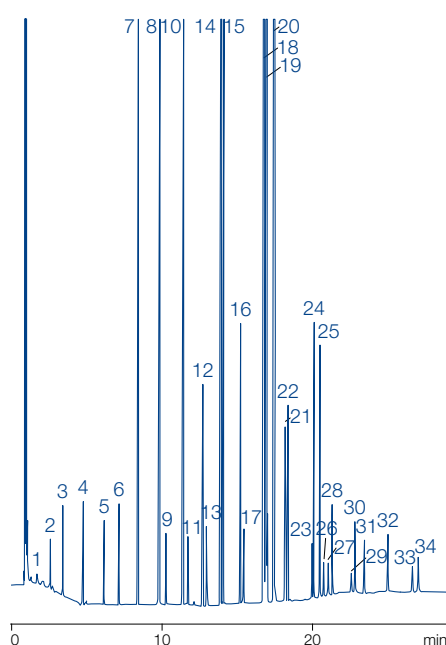
Temperature: 50 °C (2 min) → 125 °C, 30 °C/min → 160 °C, 5 °C/min → 180 °C, 20 °C/min → 200 °C, 3 °C/min → 220 °C, 20 °C/min (10 min)

Detector: FID 260 °C

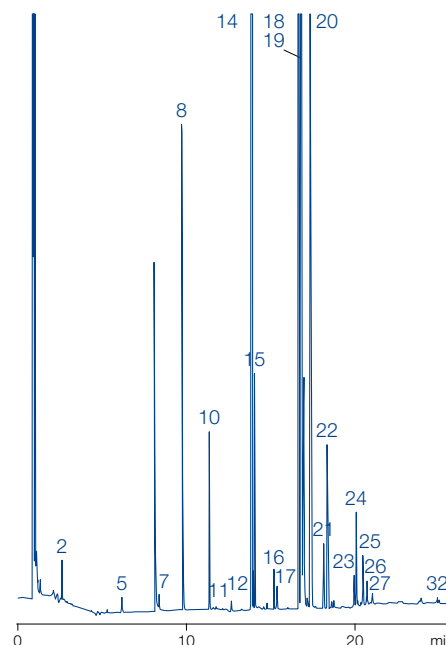
Peaks:

- | | |
|-----------|-----------|
| 1. C4:0 | 18. C18:0 |
| 2. C5:0 | 19. C18:1 |
| 3. C6:0 | 20. C18:2 |
| 4. C8:0 | 21. C18:3 |
| 5. C10:0 | 22. C19:0 |
| 6. C11:0 | 23. C20:0 |
| 7. C12:0 | 24. C20:1 |
| 8. C13:0 | 25. C20:2 |
| 9. C13:1 | 26. C20:4 |
| 10. C14:0 | 27. C20:3 |
| 11. C14:1 | 28. C20:5 |
| 12. C15:0 | 29. C22:0 |
| 13. C15:1 | 30. C22:1 |
| 14. C16:0 | 31. C22:2 |
| 15. C16:1 | 32. C22:6 |
| 16. C17:0 | 33. C24:0 |
| 17. C17:1 | 34. C24:1 |

FAME Standard



FAME in porcine fat



Courtesy of Dr. Bantleon, Mr. Leusche, Mr. Hagemann, VFG-Labor, Versmold, Germany

Ordering information

OPTIMA[®] 225

	Length →					
	10 m	15 m	25 m	30 m	50 m	60 m
0.1 mm ID (0.4 mm OD)						
0.10 µm film	726080.10					
0.25 mm ID (0.4 mm OD)						
0.25 µm film		726118.15	726118.25	726118.30	726118.50	726118.60
0.32 mm ID (0.5 mm OD)						
0.25 µm film			726352.25	726352.30	726352.50	726352.60

In addition to this standard program we will be happy to supply columns custom-made to your specifications. Information about scope of delivery, special cages and integrated guard columns see additional information for GC columns on page 303.



OPTIMA[®] 240 33 % cyanopropyl-methyl – 67 % dimethylpolysiloxane

★ Key features

- Midpolar phase
- Structure see page 309

✓ Recommended application

- FAMES, dioxins

✍ Temperature

- T_{max} 260 °C (long-term temperature),
T_{max} 280 °C (short-term max. temperature in a temperature program)

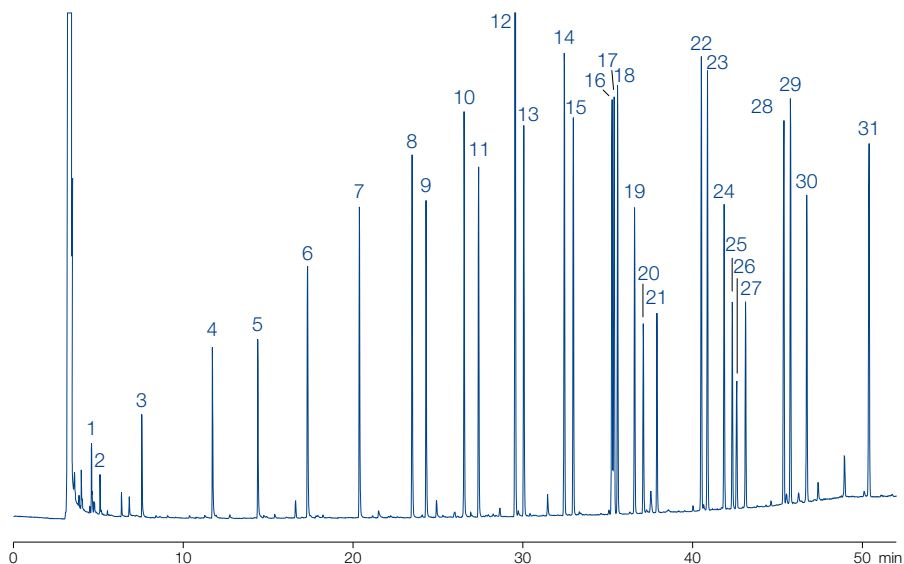
Fatty acid methyl esters *cis/trans* C18:1 (FAME)

MN Appl. No. 201620

Column: OPTIMA[®] 240, 60 m x 0.25 mm ID, 0.25 µm film
 Sample: FAME mixture
 Injection: 1.0 µL, split 1:25
 Carrier gas: 150 kPa H₂
 Temperature: 80 °C → 120 °C, 20 °C/min → 260 °C (10 min), 3 °C/min
 Detector: FID 280 °C

Peaks:

- | | |
|-------------------------|-----------------------|
| 1. C4:0 | 18. <i>cis</i> -C18:1 |
| 2. C5:0 | 19. C18:2 |
| 3. C8:0 | 20. C18:3 |
| 4. C10:0 | 21. C18:3 |
| 5. C11:0 | 22. C20:0 |
| 6. C12:0 | 23. C20:1 |
| 7. C13:0 | 24. C20:2 |
| 8. C14:0 | 25. C20:3 |
| 9. C14:1 | 26. C20:4 |
| 10. C15:0 | 27. C20:3 |
| 11. C15:1 | 28. C22:0 |
| 12. C16:0 | 29. C22:1 |
| 13. C16:1 | 30. C22:3 |
| 14. C17:0 | 31. C24:1 |
| 15. C17:1 | |
| 16. C18:0 | |
| 17. <i>trans</i> -C18:1 | |



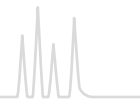
Ordering information

OPTIMA[®] 240

	Length → 25 m	30 m	50 m	60 m
0.25 mm ID (0.4 mm OD)				
0.25 µm film		726089.30	726089.50	726089.60
0.50 µm film		726090.30		726090.60
0.32 mm ID (0.5 mm OD)				
0.25 µm film	726091.25	726091.30	726091.50	726091.60
0.35 µm film		726095.30		726095.60
0.50 µm film		726096.30		726096.60

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OPTIMA® WAX polyethylene glycol 20 000 Da · USP G16

★ Key features

- Polar phase
- Structure see page 309

✓ Recommended application

- Solvent analysis and alcohols, suitable for aqueous solutions

✍ Temperature

- T_{max} 240 °C (long-term temperature), T_{max} 250 °C (short-term max. temperature in a temperature program)
- 0.53 mm ID: T_{max} 220 and 240 °C resp.

Similar phases

- PERMABOND® CW 20 M (see page 337), DB-Wax, Supelcowax, HP-Wax, HP-INNOWAX, Rtx-Wax, CP-Wax 52 CB, Stabilwax, 007-CW, BP20, AT-Wax, ZB-Wax

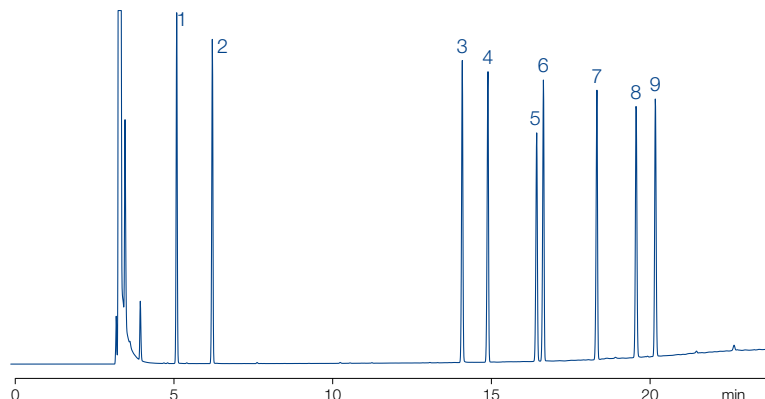
Modified Grob test

MN Appl. No. 211170

Column: OPTIMA® WAX, 50 m x 0.32 mm ID, 0.5 µm film
 Injection: 1 µL, split 1:20
 Carrier gas: 1,2 bar He
 Temperature: 80 °C → 250 °C, 8 °C/min
 Detector: FID 250 °C

Peaks:

1. Decane
2. Undecane
3. Octanol
4. Methyl decanoate
5. Dicyclohexylamine
6. Methyl undecanoate
7. Methyl dodecanoate
8. 2,6-Dimethylaniline
9. 2,6-Dimethylphenol



Ordering information

OPTIMA® WAX

	Length → 25 m	30 m	50 m	60 m
0.25 mm ID (0.4 mm OD)				
0.25 µm film	726600.25	726600.30	726600.50	726600.60
0.32 mm ID (0.5 mm OD)				
0.25 µm film	726321.25	726321.30	726321.50	726321.60
0.50 µm film	726296.25	726296.30	726296.50	726296.60
0.53 mm ID (0.8 mm OD)				
1.00 µm film	726549.25	726549.30		
2.00 µm film		726548.30		

In addition to this standard program we will be happy to supply columns custom-made to your specifications. Information about scope of delivery, special cages and integrated guard columns see additional information for GC columns on page 303.

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OPTIMA WAXplus[®] cross-linked polyethylene glycol · USP G16

★ Key features

- Polar phase with improved cross-linking for lower column bleed and better temperature stability
- Structure see page 309

✓ Recommended application

- Broad range of application, e.g., for solvents and alcohols, suitable for aqueous solutions

✍ Temperature

- T_{max} 260 °C (long-term temperature), T_{max} 270 °C (short-term max. temperature in a temperature program)

Similar phases

- DB-Wax, Supelcowax, HP-Wax, HP-INNOWAX, Rtx-Wax, CP-Wax 52 CB, Stabilwax, 007-CW, BP20, AT-Wax, ZB-Wax

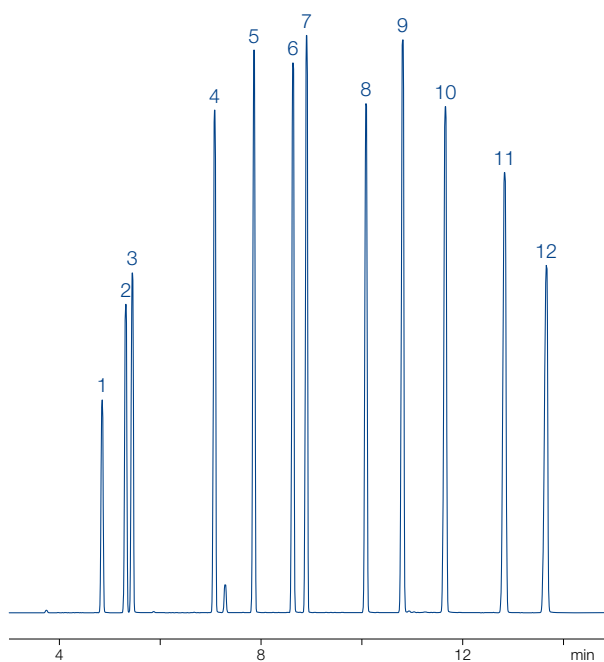
Alcohols

MN Appl. No. 214160

Column: OPTIMA WAXplus[®], 30 m x 0.25 mm ID, 0.5 µm film
 Injection: 0.1 µL, split 1:80
 Carrier gas: 1.3 bar He
 Temperature: 40 °C → 260 °C, 12 °C/min (15 min)
 Detector: FID 260 °C

Peaks:

1. Methanol
2. 2-Propanol
3. Ethanol
4. 1-Propanol
5. 2-Methyl-1-propanol
6. 1-Butanol
7. 4-Methyl-2-pentanol
8. 1-Pentanol
9. 2-Methyl-1-pentanol
10. 1-Hexanol
11. Cyclohexanol
12. 1-Heptanol



Ordering information

OPTIMA WAXplus[®]

	Length →	
	30 m	60 m
0.25 mm ID (0.4 mm OD)		
0.25 µm film	726380.30	726380.60
0.50 µm film	726381.30	726381.60
0.32 mm ID (0.5 mm OD)		
0.25 µm film	726382.30	726382.60
0.50 µm film	726383.30	726383.60

In addition to this standard program we will be happy to supply columns custom-made to your specifications. Information about scope of delivery, special cages and integrated guard columns see additional information for GC columns on page 303.



OPTIMA® FFAP polyethylene glycol 2-nitroterephthalate · USP G35 / close equivalent to USP G25

★ Key features

- Polar phase (FFAP = Free Fatty Acid Phase)
- Structure see page 309

✓ Recommended application

- Fatty acid methyl esters (FAMES), free carboxylic acids

✍ Temperature

- 0.10–0.32 mm ID:
 - T_{max} 250 °C (long-term temperature),
 - T_{max} 260 °C (short-term max. temperature in a temperature program)
- 0.53 mm ID: T_{max} 220 and 240 °C, resp.

Similar phases

- PERMABOND® FFAP (see page 338), DB-FFAP, HP-FFAP, CP-Wax 58 FFAP CB, 007-FFAP, CP-FFAP CB, Nukol™, AT-1000, SPB-1000, BP21, OV-351

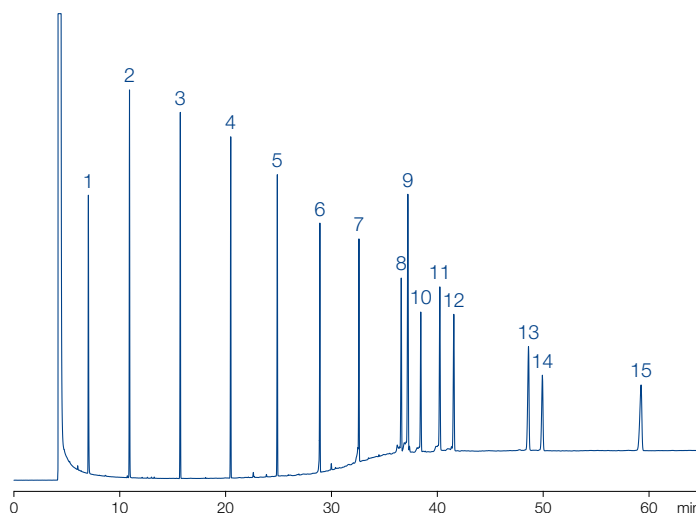
FAME test

MN Appl. No. 211140

Column: OPTIMA® FFAP, 60 m x 0.32 mm ID, 0.25 µm film
 Injection: 1.0 µL, 220 °C, split 1:40
 Carrier gas: 1.2 bar He
 Temperature: 55 °C → 250 °C, 6 °C/min
 Detector: FID 220 °C

Peaks:

1. C4
2. C6
3. C8
4. C10
5. C12
6. C14
7. C16
8. C18
9. C18:1 *cis/trans*
10. C18:2
11. C18:3
12. C20
13. C22
14. C22:1
15. C24



Ordering information

OPTIMA® FFAP

	Length →				
	10 m	25 m	30 m	50 m	60 m
0.1 mm ID (0.4 mm OD)					
0.10 µm film	726180.10				
0.25 mm ID (0.4 mm OD)					
0.25 µm film		726116.25	726116.30	726116.50	726116.60
0.32 mm ID (0.5 mm OD)					
0.25 µm film		726341.25	726341.30	726341.50	726341.60
0.50 µm film		726344.25	726344.30	726344.50	
0.53 mm ID (0.8 mm OD)					
0.50 µm film			726345.30		
1.00 µm film		726346.25			

In addition to this standard program we will be happy to supply columns custom-made to your specifications. Information about scope of delivery, special cages and integrated guard columns see additional information for GC columns on page 303.



OPTIMA[®] FFAPplus polyethylene glycol 2-nitroterephthalate · USP G35 / close equivalent to G25

★ Key features

- Polar phase
- Structure see page 309

✓ Recommended application

- FAMES, free carboxylic acids

✍ Temperature

- T_{max} 250 °C (long-term temperature),
T_{max} 260 °C (short-term max. temperature in a temperature program)

Similar phases

- DB-FFAP, HP-FFAP, CP-SIL 58 CB, 007-FFAP, CP-FFAP CB, Nukol™

FAMES from biodiesel

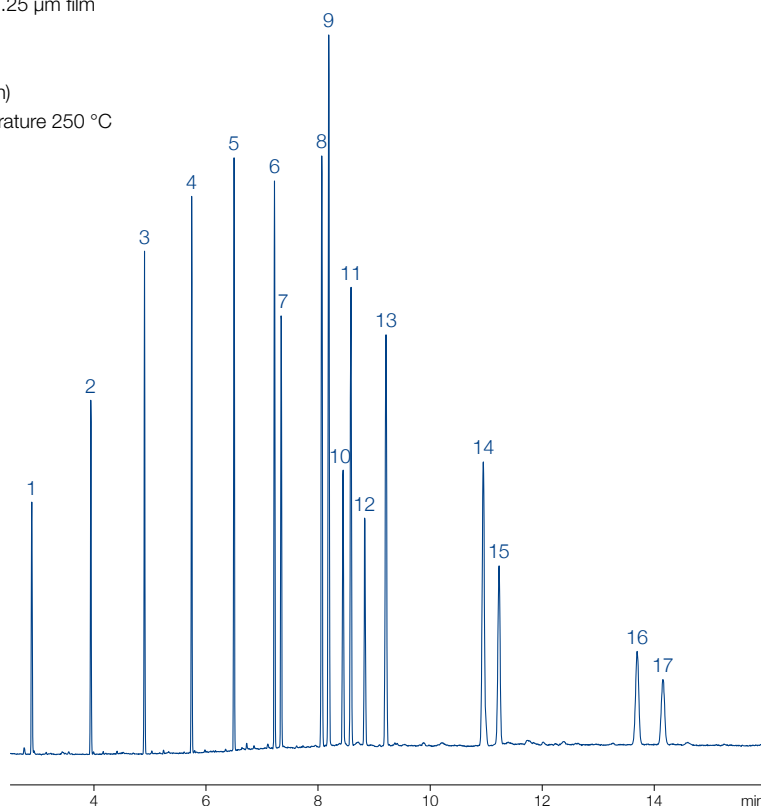
MN Appl. No. 214590

Column: OPTIMA[®] FFAPplus, 30 m x 0.25 mm ID, 0.25 µm film
 Injection: 1 µL, 260 °C, split 1:15
 Carrier gas: 40 cm/s He
 Temperature: 70 °C (1 min) → 240 °C, 30 °C/min (10 min)
 Detector: MS-EI, ion source 200 °C, interface temperature 250 °C

Peaks:

Methyl esters of:

1. Caproic acid (C6:0)
2. Caprylic acid (C8:0)
3. Capric acid (C10:0)
4. Lauric acid (C12:0)
5. Myristic acid (C14:0)
6. Palmitic acid (C16:0)
7. Palmitoleic acid (C16:1)
8. Stearic acid (C18:0)
9. Oleic acid (C18:1 *cis*)
10. Linoleic acid (C18:2 *cis*)
11. Nonadecanoic acid (C19:0)
12. Linolenic acid (C18:3)
13. Arachidic acid (C20:0)
14. Behenic acid (C22:0)
15. Erucic acid (C22:1 *cis*)
16. Lignoceric acid (C24:0)
17. Nervonic acid (C24:1 *cis*)



Ordering information

OPTIMA[®] FFAPplus

	Length →	
	30 m	60 m
0.25 mm ID (0.4 mm OD)		
0.25 µm film	726241.30	726241.60
0.50 µm film	726242.30	726242.60
0.32 mm ID (0.5 mm OD)		
0.25 µm film	726243.30	726243.60
0.50 µm film	726246.30	726246.60

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