GL Sciences

GC Capillary Column

TB-PLOT Column

Exceptional Separation for Advanced Gas Analysis

Excellent Separation.
Reliable Stability.

TB-PLOT GC Capillary Column Overview

The **TB-PLOT (Porous-Layer Open-Tubular)** Series GC Columns feature a strongly immobilized porous particle layer on the inner wall of a capillary column. They offer excellent separation performance and durability, making them ideal for analyzing volatile and gaseous components.

Features

Porous Layer Immobilization (PLOT): Stable coating of adsorbent particles on the capillary wall

Stable Column Polarity: Provides excellent reproducibility of retention time

High Surface Area: Enables high sample capacity

Various Polarities Available: Select the best column for your target compound

Excellent Separation Performance: Especially suited for volatile and gas-phase compounds

Particle Trap Options for Sensitive Systems: The strongly immobilized porous layer minimizes particle release. Particle trap configurations are available for MS and valve-based systems.

TB-PLOT Equivalent Chart

Column	Similar Phases
TB-PLOT Alumina/KCl	HP-PLOT Al_2O_3/KCl CP-Al_2O_3 PLOT/KCl Rt-Alumina BOND/KCl
TB-PLOT Alumina/S	HP-PLOT Al_2O_3/S CP-Al_2O_3 PLOT/Na_2SO_4 Rt-Alumina BOND/Na_2SO_4
TB-PLOT Alumina/M	HP-PLOT Al_2O_3/M GS-Alumina
TB-PLOT MoleSieve 5A	HP-PLOT MoleSieve CP-Molsieve 5A RT-Msieve 5A
TB-PLOT Q	HP-PLOT Q, GS-Q CP PoraPLOT Q, CP PoraPLOT Q HT RT-Q-BOND, Supel Q PLOT
TB-PLOT U	HP-PLOT U CP PoraPLOT U Rt-U-BOND
TB-PLOT GasPro	GS-GasPro CP-PLOT silica
TB-OxyPLOT	Lowox CP-Lowox

TB-PLOT Product Line

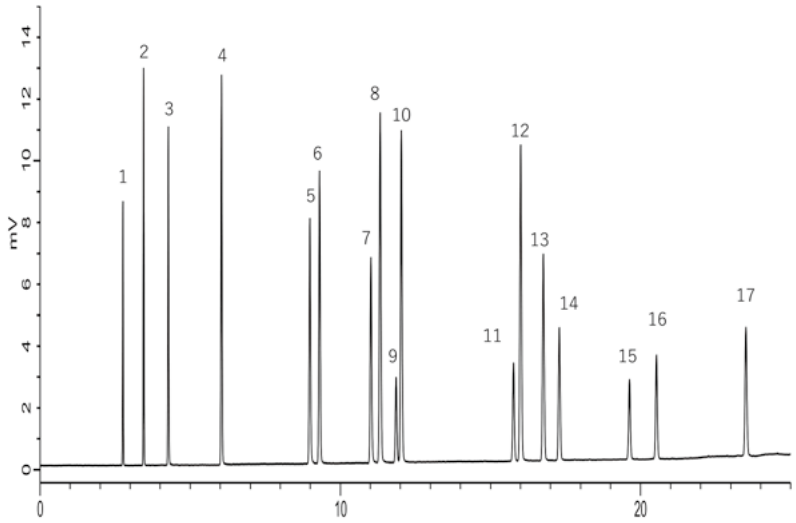
	TB-PLOT Alumina/KCl TB-PLOT Alumina/S TB-PLOT Alumina/M	TB-PLOT MoleSieve 5A	TB-PLOT Q	TB-PLOT U	TB-PLOT GasPro	TB-OxyPLOT
Stationary Phase	Aluminum oxide, modified with KCl, Na_2SO_4, or Na_2MoO_4	Molecular Sieve, zeolite, 5A	Crosslinked Divinylbenzene polymer	Crosslinked divinylbenzene ethylene glycol Dimethacrylate copolymer	Modified porous silica layer	Inorganic salt
USP Code	—	—	S3	G45	—	—
Phase Polarity	Non-polar	—	Non-polar	Non-polar	Non-polar	Very Polar
Water	No	No	Good to Excellent	Excellent	Modest	No
Acid/base resistance	No	No/Yes	Excellent	Excellent	Yes/No	Yes
Non-aqueous solvent resistance	Yes	No	Yes	Yes	Yes	Yes
Oxidation	No	No	Modest	Vulnerable	Modest	No
Fixed gas separation at ambient temperature	Air/C1	Yes	Air/C1/CO_2	Air/C1/CO_2	Air/C1/CO_2	No
C1 to C5 separation	Excellent Baseline	No (C1 and C2)	Most compounds; poor baseline separation of isomers	Most compounds; poor baseline separation of isomers	Most	Yes
Hydrocarbons	C1 to C6 (C10 for short columns)	None	C1 to C10	C1 to C10	C1 to C12	C1 to C20
Isomer Separation (HC)	Excellent	—	Modest	Modest	Modest	Modest
Separation of polar/ oxygenated compounds	Minimal	No	Good to excellent	Good to excellent	Good	Excellent, light oxygenates eluting after C10/C14
Surface adsorption	Oxygenated, acid, base, CO_2, water	CO_2, Water, Acid, base, hydrocarbons, halocarbons	Ammonia	Less adsorption of sulfur gases	Alcohol, Ester, Acid, Base	not known
Elution Order	Air, C1, Mostly carbon number and aromatics	He, H_2, Ne, Ar, O_2, N_2, C1, CO	Air, C1, C2, CO_2, water, Mostly carbon number or polarity aromatics	Air, C1, C2, CO_2, C3, water, Mostly carbon number or polarity and aromatics	carbon number	Oxygenate beyond C10, Carbon Number
Applications	Hydrocarbons, halocarbons, some chemical warfare agents, cyanogen-containing gases, BTEX	Fixed gases and fixed gases from HC stream, hydrogen isotopes at 80 °C	Air, CO_2, H_2O isolation from HC stream, volatile solvents	Air, CO_2, H_2O isolation from HC stream, volatile solvents	Impurities (sulfur compound) from HC stream or air, halocarbons	Separations of ppm level oxygenates from HCs including gasoline

TB-PLOT Alumina/KCl

- Porous Al_2O_3, modified by KCl salt
- Good separation of C2–C5 olefins, least activity for propadiene
- Significant moisture effect on acetylene/propadiene retention-time shifts
- Equivalent : CP-Al_2O_3/KCl, GS-Alumina KCl, Rt-Alumina BOND/KCl

TB-PLOT Alumina/KCl is coated with potassium chloride (KCl)-modified porous alumina hydrate, making it ideal for the analysis of hydrocarbons, including dienes and alkynes.

C1–C5 Hydrocarbon



System:	GC-FID
Column:	TB-PLOT Alumina/KCl 0.53 mm I.D. × 50 m df = 15 um + Particle Trap tube 0.53 mm × 2 m
Col. Temp.:	40 °C - 10 °C/min - 200 °C
Carrier Gas:	He, 50 kPa (Constant Pressure)
Injection:	Split, 200 °C; Split Ratio 10:1
Detection:	FID, 200 °C, Range 10^0
Sample Size:	400 uL, 100 ppm

1. Methane
2. Ethane
3. Ethylene
4. Propane
5. Cyclopropane
6. Propylene
7. Acetylene
8. Isobutane
9. Propadiene
10. n-Butene
11. trans-2-Butene
12. 1-Butene
13. Isobutene
14. cis-2-Butene
15. Methylacetylene
16. 1,3-Butadiene
17. 2-Methyl-1-butene

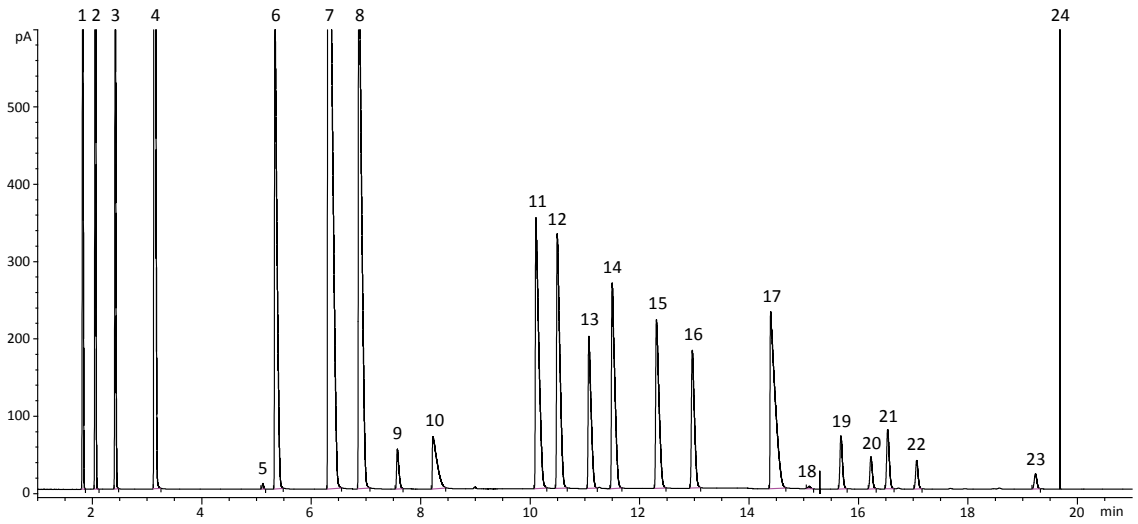
TB-PLOT Alumina/KCl Ordering Information

ID	Length	Film Thickness	Temperature Limit °C	Cat.No.
0.25 mm	25 m	5 um	-60 to 200	1010-46100
	30 m	5 um	-60 to 200	1010-46101
0.32 mm	10 m	5 um	-60 to 200	1010-46102
	15 m	8 um	-60 to 200	1010-46103
	25 m	8 um	-60 to 200	1010-46104
	30 m	8 um	-60 to 200	1010-46105
	50 m	8 um	-60 to 200	1010-46106
	60 m	8 um	-60 to 200	1010-46107
0.53 mm	15 m	15 um	-60 to 200	1010-46108
	30 m	15 um	-60 to 200	1010-46109
	50 m	10 um	-60 to 200	1010-46110
	50 m	15 um	-60 to 200	1010-46111
	60 m	15 um	-60 to 200	1010-46112

TB-PLOT Alumina/S

- Porous Al_2O_3, modified with Na_2SO_4 salt
- Excellent separations of olefins C2 to C5, slight adsorption of propadiene
- Least moisture effect on acetylene/propadiene retention time shifting
- Equivalent : CP-Al_2O_3/Na_2SO_4, GS-Alumina, HP-PLOT Al_2O_3 S, Rt-Alumina BOND/Na_2SO_4

TB-PLOT Alumina/S is coated with "S" salt-modified porous alumina hydrate, which enables excellent separation of hydrocarbons and C_2 to C_5 olefins.



System: GC-FID
Column: TB-PLOT Alumina/S
0.53 mm x 50 m df = 15 um
Col. Temp.: 60 °C (2 min hold) - 5 °C/min - 160 °C - (5 min hold)
Carrier Gas: H2, 5 mL/min
Injection: Split (Split Rate 10:1), 180 °C
Detection: FID, 200 °C
Sample Size: 100 uL

1. Methane
2. Ethane
3. Ethylene
4. Propane
5. Cyclopropane
6. Propylene
7. iso-Butane
8. n-Butane
9. Propadiene
10. Acetylene
11. Methyl cyclobutene
12. trans-2-Butene
13. 1-Butene
14. Isobutylene
15. cis-2-Butene
16. iso-Pentane
17. n-Pentane
18. 1,3-Butadiene
19. Methyl Acetylene
20. trans-2-Pentene
21. 1-Pentene
22. 2-Methyl-2-Butene
23. cis-2-Pentene
24. Hexane

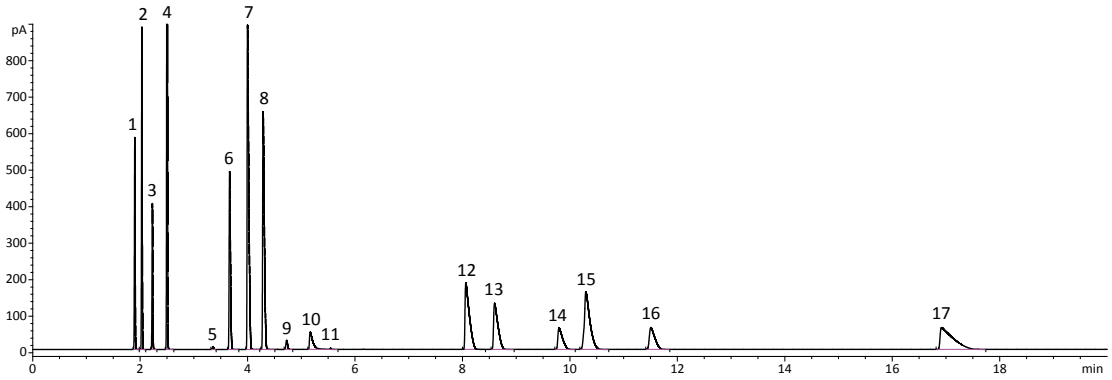
TB-PLOT Alumina/S Ordering Information

ID	Length	Film Thickness	Temperature Limit °C	Cat.No.
0.25 mm	25 m	5 um	-60 to 200	1010-46200
	30 m	5 um	-60 to 200	1010-46201
0.32 mm	15 m	8 um	-60 to 200	1010-46202
	25 m	8 um	-60 to 200	1010-46203
	30 m	5 um	-60 to 200	1010-46204
	30 m	8 um	-60 to 200	1010-46205
	50 m	5 um	-60 to 200	1010-46206
	50 m	8 um	-60 to 200	1010-46207
	60 m	8 um	-60 to 200	1010-46208
0.53 mm	15 m	15 um	-60 to 200	1010-46209
	30 m	8 um	-60 to 200	1010-46210
	30 m	15 um	-60 to 200	1010-46211
	50 m	10 um	-60 to 200	1010-46212
	50 m	15 um	-60 to 200	1010-46213
	60 m	15 um	-60 to 200	1010-46214

TB-PLOT Alumina/M

- Porous Al_2O_3, modified by Na2MoO4 salt
- Good separations of olefins C2 to C5, less adsorption of propadiene
- Modest moisture effect on acetylene/propadiene retention time shifting
- Equivalent : HP-PLOT/Al_2O_3 "M", GS-Alumina

TB-PLOT Alumina/M features a sodium molybdate-modified alumina stationary phase with medium polarity. It is well-suited for analyzing C1 to C8 hydrocarbon isomers and provides excellent separation of acetylene from butylene and isobutane.



System: GC-FID
Column: TB-PLOT Alumina/M
0.53 mm I.D. x 50 m df = 15 um
Col. Temp.: 100 °C
Carrier Gas: H_2 (Constant Pressure)
Injection: Split, Split Flow 40 mL/min, 180 °C
Detection: FID, 200 °C
Sample Size: 20 uL

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

TB-PLOT Alumina/M Ordering Information

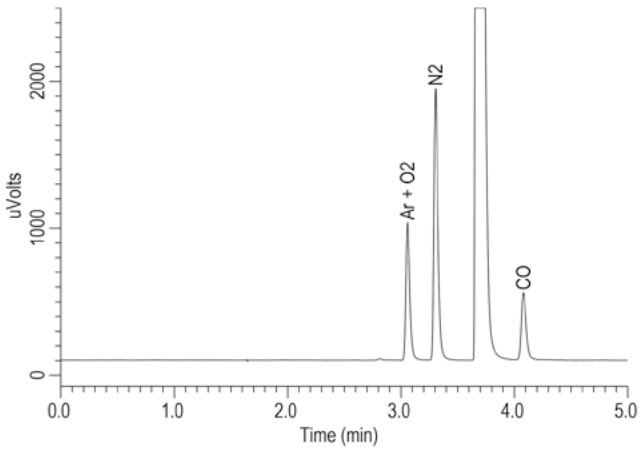
ID	Length	Film Thickness	Temperature Limit °C	Cat.No.
0.32 mm	15 m	8 um	-60 to 200	1010-46300
	30 m	8 um	-60 to 200	1010-46301
	50 m	8 um	-60 to 200	1010-46302
0.53 mm	15 m	15 um	-60 to 200	1010-46303
	30 m	15 um	-60 to 200	1010-46304
	50 m	15 um	-60 to 200	1010-46305
	60 m	15 um	-60 to 200	1010-46306

TB-PLOT MoleSieve 5A

- Molecular sieve, zeolite, 5A
- Immobilized, rinsable with water or methanol
- Wide range of column dimensions and stationary phase film thicknesses
- High theoretical plate counts / High column efficiency
- Argon/Oxygen separation at ambient temperature
- Equivalent : CP-Molsieve 5A, HP-PLOT Molesieve 5A, GS-MoleSieve, Rt-Msieve 5A

TB-PLOT Molesieve 5A column is packed with 5A-type zeolite molecular sieves, which provide excellent separation of permanent gases.

Gases



System: GC-TCD
Column: TB-PLOT Molesieve 5A
0.53 mm I.D. × 50 m df = 50 µm
Col. Temp.: 150 °C
Carrier Gas: He, 70 kPa (Constant Pressure)
Injection: 160 °C
Detection: TCD, 80 °C
Sample Size: 0.1 mL, 2.5 % each

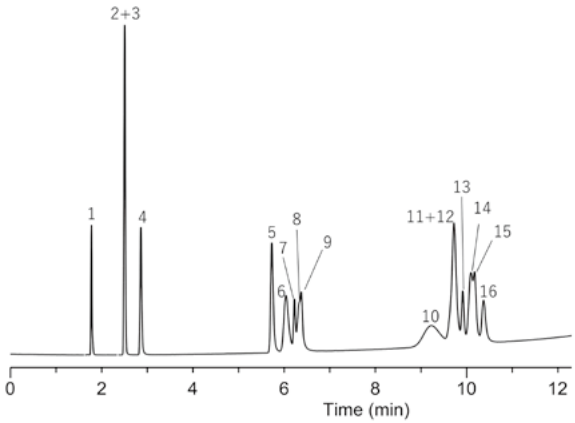
TB-PLOT Molesieve 5A Ordering Information

ID	Length	Film Thickness	Temperature Limit °C	Cat.No.
0.32 mm	5 m	12 um	-80 to 300	1010-46400
	15 m	12 um	-80 to 300	1010-46401
	15 m	25 um	-80 to 300	1010-46402
	30 m	12 um	-80 to 300	1010-46403
0.53 mm	5 m	25 um	-80 to 300	1010-46404
	15 m	25 um	-80 to 300	1010-46405
	15 m	50 um	-80 to 300	1010-46406
	30 m	25 um	-80 to 300	1010-46407
	30 m	50 um	-80 to 280/300	1010-46408
	50 m	50 um	-80 to 280/300	1010-46409

TB-PLOT Q

- Porous Divinylbenzene polymer
- Highest temperature limit and lowest column bleed
- Good separation of volatile sulfur compounds, CO_2, and oxygenated solvent vapors from light hydrocarbon C1–C4 streams
- Equivalent : CP-PoraBOND Q, CP-PoraPLOT Q, HP-PLOT Q, Rt-Q-BOND

Suitable for natural gas, refinery gases, chemical weapon gas, CFCs, sulfurs, amines.



System: GC-FID
Column: TB-PLOT Q
0.53 mm × 30 m df=20 µm
Carrier Gas: He, 30 kPa
Col. Temp.: 40 °C - 10 °C/min - 160 °C
Injection: Split Flow 50 ml/min
250 °C
Detection: 250 °C
Sample Size: 200uL, each 100 ppm

1. Methane
2. Ethylene
3. Acetylene
4. Ethane
5. Propylene
6. Propane
7. Propadiene
8. Cyclopropane
9. Methyl acetylene
10. Isobutane
11. Isobutene
12. 1-Butene
13. 1,3-Butadiene
14. n-Butane
15. trans-2-Butene
16. cis-2-Butene

TB-PLOT Q - Ordering Information

ID	Length	Film Thickness	Temperature Limit °C	Cat.No.
0.25 mm	15 m	4 um	-60 to 260/280	1010-46600
	15 m	8 um	-60 to 260/280	1010-46601
	30 m	8 um	-60 to 260/280	1010-46602
0.32 mm	10 m	10 um	-60 to 260/280	1010-46603
	15 m	10 um	-60 to 250/260	1010-46604
	15 m	15 um	-60 to 260/280	1010-46605
	25 m	5 um	-60 to 260/280	1010-46607
	25 m	15 um	-60 to 250/260	1010-46608
	30 m	10 um	-60 to 260/280	1010-46609
	30 m	15 um	-60 to 260/280	1010-46610
	50 m	5 um	-60 to 260/280	1010-46612
	60 m	10 um	-60 to 260/280	1010-46613

ID	Length	Film Thickness	Temperature Limit °C	Cat.No.
0.53 mm	10 m	20 um	-60 to 250/260	1010-46614
	10 m	30 um	-60 to 250/260	1010-46615
	15 m	20 um	-60 to 250/260	1010-46616
	15 m	30 um	-60 to 250/260	1010-46617
	25 m	10 um	-60 to 250/260	1010-46619
	25 m	20 um	-60 to 250/260	1010-46620
	25 m	30 um	-60 to 250/260	1010-46621
	30 m	15 um	-60 to 250/260	1010-46622
	30 m	20 um	-60 to 250/260	1010-46623
	30 m	30 um	-60 to 250/260	1010-46624
	30 m	40 um	-60 to 250/260	1010-46626
	50 m	10 um	-60 to 250/260	1010-46627
	50 m	15 um	-60 to 250/260	1010-46628
	50 m	30 um	-60 to 250/260	1010-46629

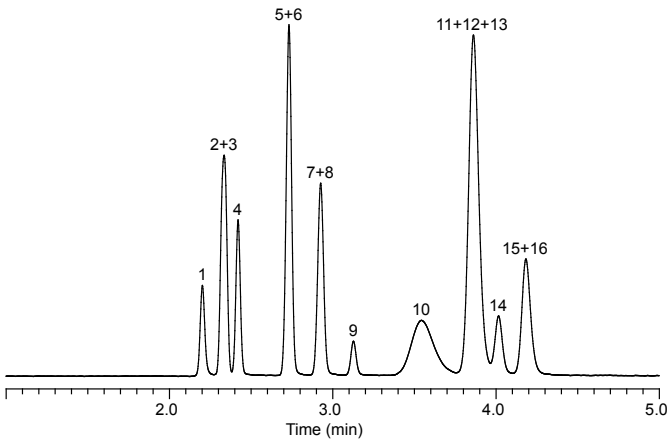
TB-PLOT Q with Particle Trap - Ordering Information

ID	Length	Film Thickness	Particle Trap	Temperature Limit °C	Cat.No.
0.32 mm	15 m	15 um	2 m	-60 to 260/280	1010-46606
	30 m	15 um	2 m	-60 to 260/280	1010-46611
0.53 mm	15 m	30 um	2 m	-60 to 250/260	1010-46618
	30 m	30 um	2 m	-60 to 250/260	1010-46625
	50 m	30 um	2 m	-60 to 250/260	1010-46630

TB-PLOT U

- Porous Divinylbenzene, ethylene glycol dimethacrylate co-polymer
- Highest temperature limit and lowest column bleed
- Good separations of volatile sulfurs, amines, acids, CO_2, oxygenate solvent vapors from light hydrocarbon C1 to C4 stream
- Equivalent: CP-PoraBOND U, HP-PLOT U, Rt-U-BOND

TB-PLOT U is made of cross-linked divinylbenzene/ethylene glycol dimethacrylate copolymer, which provides superior selectivity for natural gas, refinery gases, CFCs, sulfur compounds, and amines.



System: GC-FID

Column: TB-PLOT U
0.53 mm I.D. × 30 m, df = 30 um + particle traps, 2 m each, at both ends

Carrier Gas: He, 40 kPa

Col. Temp.: 150 °C

Injection: Split Flow 50 mL/min
190 °C

Detection: FID, 190 °C

Sample Size: 200 uL each 100 ppm

1. Methane
2. Ethylene
3. Ethane
4. Acetylene
5. Propylene
6. Propane
7. Cyclopropane
8. Propadiene
9. Methyl acetylene
10. Isobutane
11. 1-Butene
12. Isobutene
13. n-Butane
14. trans-2-Butene
15. 1,3-Butadiene
16. cis-2-Butene

TB-PLOT U - Ordering Information

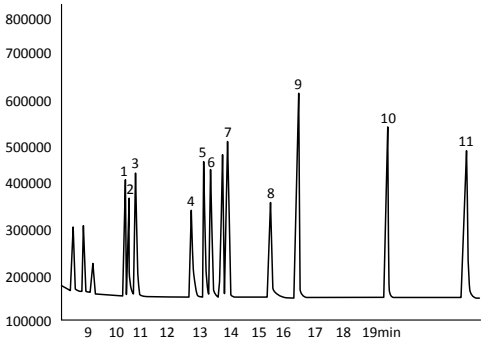
ID	Length	Film Thickness	Temperature Limit °C	Cat.No.
0.25 mm	30 m	5 um	-60 to 190/200	1010-46700
0.32 mm	10 m	10 um	-60 to 190/200	1010-46701
	15 m	10 um	-60 to 190/200	1010-46702
	25 m	7 um	-60 to 190/200	1010-46703
	30 m	10 um	-60 to 190/200	1010-46704
	30 m	20 um	-60 to 190/200	1010-46705
0.53 mm	10 m	20 um	-60 to 190/200	1010-46706
	15 m	20 um	-60 to 190/200	1010-46707
	30 m	20 um	-60 to 190/200	1010-46708
	60 m	20 um	-60 to 180/190	1010-46710

TB-PLOT U With Particle Trap - Ordering Information

ID	Length	Film Thickness	Particle Trap	Temperature Limit °C	Cat.No.
0.53 mm	30 m	20 um	2 m	-60 to 190/200	1010-46709

TB-PLOT GasPro

- Immobilized, rinseable with methanol, acetone, pentane
- Modified porous silica layer
- Good separations of volatile sulfur compounds, CO_2, solvents, light hydrocarbons C1–C5
- Equivalent: GS-GasPro, CP-Silica PLOT



System: GC-MS

Column: TB-PLOT GasPro
0.32 mm I.D. x 60 m df = 5 um

Detection: MS

1. Thiobis-methane
2. 2-Propanethiol
3. 1-Propanethiol
4. 2-Methyl-2-propanethiol
5. 2-Methyl-propanethiol
6. 2-Butanethiol
7. Dimethyl disulfide
8. 2-Methyl-2-butanethiol
9. 1-Pentanethiol
10. Diethyl disulfide
11. 1-Heptanethiol

TB-PLOT GasPro - Ordering Information

ID	Length	Film Thickness	Temperature Limit °C	Cat.No.
0.32 mm	5 m	5 um	-80 to 260/300	1010-46500
	15 m	5 um	-80 to 260/300	1010-46501
	30 m	5 um	-80 to 260/300	1010-46502
	60 m	5 um	-80 to 260/300	1010-46503

TB-OxyPLOT

- Unique selectivity for oxygenates
- Highly polar inorganic salt-based phase
- Suitable for trace-level analysis of oxygenated impurities in gas and liquid hydrocarbon streams
- Highly polar column
- Equivalent: Lowox, CP-Lowox

TB-OxyPLOT Ordering Information

ID	Length	Film Thickness	Temperature Limit °C	Cat.No.
0.53 mm	2 m	10 um	-60 to 300/320	1010-46800
	15 m	10 um	-60 to 300/320	1010-46801

TB-OxyPLOT with Particle Trap - Ordering Information

ID	Length	Film Thickness	Particle Trap	Temperature Limit °C	Cat.No.
0.53 mm	15 m	10 um	0.32 mm x 2 m	-60 to 300/320	1010-46802

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