Tracer Excel™

TRACER EXCEL™ is a range of totally new packings that employ the most advanced procedures of synthesis and chemical functionalization, resulting in some column packings that completely surpass other silica-based packings on the market.

To manufacture the silica particle, the basis of all TRACER EXCEL packings, we begin with materials of extreme purity and follow strictly controlled processes. In this way, we get a totally porous, spherically perfect particle, without surface irregularities and with an extremely low content of metals (Al, Fe, Ti and Zn).

The rigorous control of the process variables also allows us to obtain a material with a perfectly reproducible porosity and surface area, and with a practical absence of micropores. In other competitors' packings, these micropores cause chromatographic problems due to incomplete substitution of the support, while with TRACER EXCEL packings micropores are totally eliminated.

We are therefore able to offer you a complete line of HPLC packings with characteristics of reproducibility, purity, deactivation, fluido-dynamic behaviour and chemical and physical stability that are difficult to beat.

- Exceptional batch-to-batch reproducibility.
- Ultra-pure silica.
- Extremely low content of metals.
- Perfect sphericity.
- Meticulously controlled materials.
- Maximum pH range (between 1.5 and 11.0)
- 3, 5 and 10 µm particles
- Easily scaled-up, from microbore to preparative HPLC.
- Available with 300A pore size for biochromatography.
- Exceptional long lifetime.
- Wide range of packings.
- Fully deactivated after functional bonding.

TRACER EXCEL ODS-A

TRACER EXCEL ODS-A is a totally endcapped packing, notable for its extreme level of deactivation. This minimizes undesirable interactions when chromatographing strongly acidic or basic analytes or chelating compounds.

Additionally TRACER EXCEL ODS-A columns show extraordinary resistance to extreme pH values, between 1.5 to 11.0.

Maximum Stability

The chemical and structural stability of TRACER EXCEL columns leads to long useful lifetimes, even under extreme conditions where columns of most major manufacturers would suffer rapid degradation.
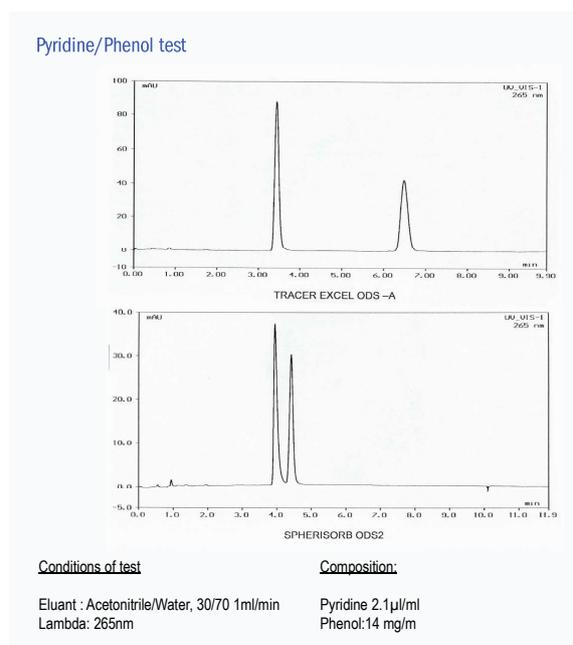
Total deactivation

Free surface silanols that are left exposed following functional bonding of the silica particle are the chief cause of peak tailing and distortion that commonly appear with basic compounds.

If the silica particle also contains significant quantities of metals, these markedly increase the acidity of these surface silanols, keeping them ionized even at low pHs. These conditions can cause deleterious effects on eluting chromatographic peaks.

The Pyridine/Phenol test is an excellent marker of the presence of these surface silanols. Under ideal conditions, the pyridine peak should elute before the phenol peak and should also elute with total symmetry without tailing. Furthermore, a broader separation between the two peaks indicates superior deactivation.

The TRACER EXCEL ODS-A column complies with the pyridine/phenol test better than other columns from major manufacturers. This demonstrates the extraordinary deactivation achieved with TRACER EXCEL ODS-A columns. Another test that demonstrates the quality of TRACER EXCEL ODS-A columns is the acidic compounds test. This type of compound yields evidence of the presence of chelating centres or points of ionic interchange that may be present in the silica particle.

Pyridine/Phenol test

Conditions of test	Composition:
Eluant : Acetonitrile/Water, 30/70 1ml/min	Pyridine 2.1µl/ml
Lambda: 265nm	Phenol:14 mg/m

TRACER EXCEL columns show perfectly symmetrical peaks in contrast to the significant tailing which appears when this test is done with other columns on the market. Symmetrical peaks are achieved even when separating basic compounds.

Once again, TRACER EXCEL columns show, thanks to their exceptional level of deactivation, excellence in obtaining perfectly symmetrical peaks where other columns on the market clearly fail (giving peaks with pronounced tails or even irreversible adsorption).

Acid Compounds Test

TRACER EXCEL ODS -A

SPHERISORB ODS2
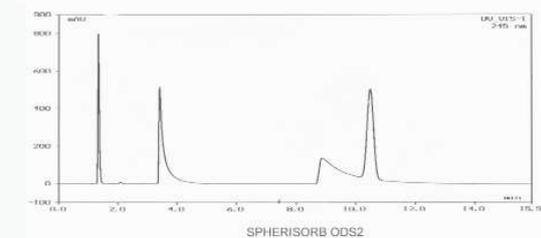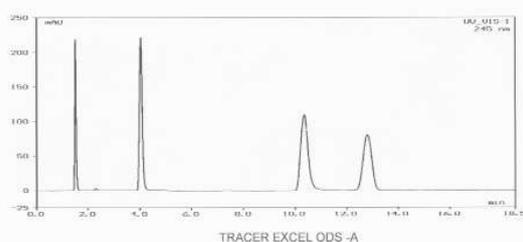
Conditions of test	Composition:
Eluant : 20 mM KH2PO4pH3.2/CH3CN 65:35	Uracil: 0.5mg/ml
1 ml/min. Temp 40ºC UV 245nm	Benzoic acid: 3.6 mg/ml
	p-Ethylbenzoic acid: 0.9 mg/ml
	Methylbenzene:3.0 mg/ml

Basic Compounds Test

Tracer Excel ODS-A

Spherisorb ODS2

Conditions of test	Composition:
Tracer Excel ODS-A	Propanolol: 0.08mg/ml
Eluant : 20 mM KH2PO4pH7/CH2CN 35:65	Diphenidramine :1.28 mg/ml
1 ml/min. Temp 25ºC UV 235nm	Acetonaphthalene: 0.2 mg/ml
	Amyltryptilene: 0.3 mg/ml

Purity of material

All of the advantages of TRACER EXCEL columns have as a base the quality of the silica particle. No bonding process can mask silica of inferior quality. Only silica particles absolutely free of metallic impurities, with a pore-size and pore-distribution absolutely controlled and synthesized through fully optimized processes, can give bonded packings of the highest grade.

The 8-quinolinol/acetylacetone test demonstrates the difference in chromatographic behavior between TRACER EXCEL ODS-A and a competitor's column with a high content of metallic impurities for the chelating compound 8-quinolinol.
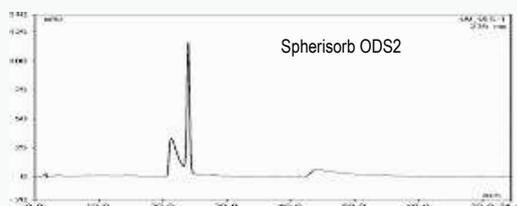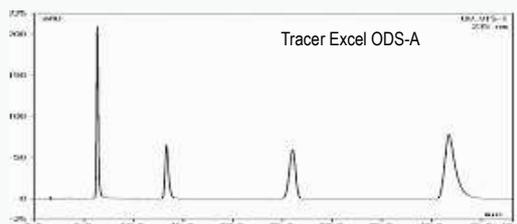
Metalic Trace Test

TRACER EXCEL ODS –A

SPHERISORB ODS2

Conditions of test	Composition:
Tracer Excel ODS-A	8-Quinolinol: 0.5mg/ml
Eluant : 10 mM KH2PO4pH6.8/Metanol 60:40	Actetylacetone: 0.5mg/ml
1 ml/min. Temp 30ºC UV 254nm	

Reproductibility

The high productivity which is now needed in analytical and governmental laboratories oblige everyone to use reliable HPLC equipment and reproducible columns.

TRACER EXCEL columns were developed with the final objective of achieving the very highest quality and reproducibility. Teknokroma's numerous and stringent process controls for every batch of packing fully guarantees high quality and exceptional reproducibility.

TRACER EXCEL ODS-B

- Compatible with 100% aqueous eluent.
- Especially suitable for the separation of hydrophilic compounds.
- Strong retention in aqueous eluents.
- Long useful life with aqueous eluents
- Selectivity complementary to TRACER EXCEL ODS-A
- High mechanical stability
- Maximum versatility.

Based on the same principles as the TRACER EXCEL ODS-A columns, the TRACER EXCEL ODS-B column presents a high selectivity for hydrophilic and polar compounds, which are poorly retained on conventional ODS columns.

A special modification in the process of functionalizing the pure silica particle prevents the collapsing effect of the C18 chains when working with mainly aqueous eluents. So you can work with excellent chromatographic performance even when the percentage of the aqueous phase is 100%.
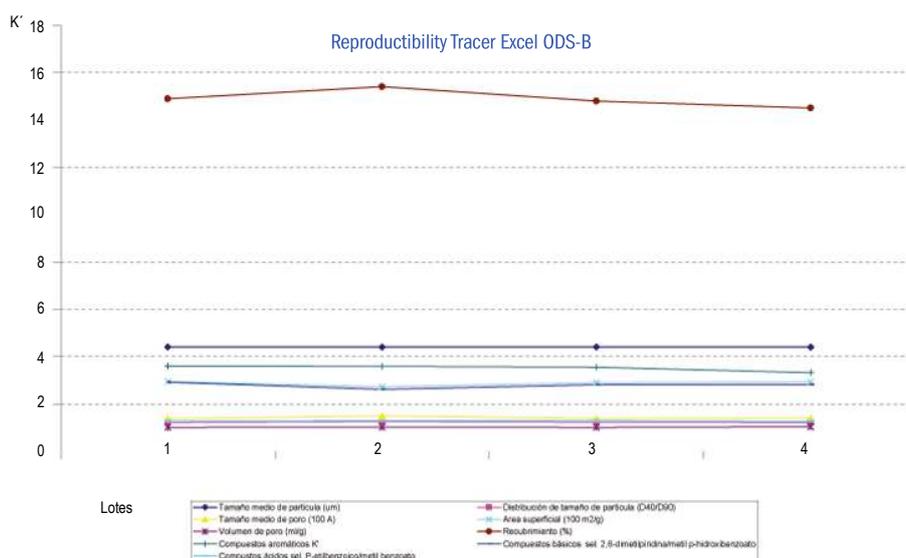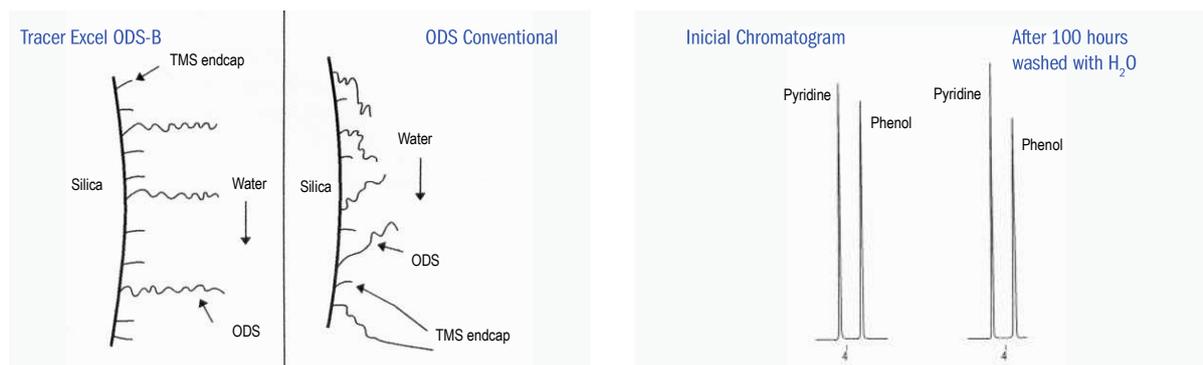
Generally, its field of application is the same as that of the TRACER EXCEL ODS-A, but its field of application is extended for samples which are especially difficult for conventional reversed phases, as is the case in separating oligosaccharides, amino acids, nucleotides and organic acids.

The special chromatographic conditions of TRACER EXCEL ODS-B also provide a specific selectivity for compounds which contain slightly polar groups in their structure.
This column is especially recommended for LC-MS in that, in many cases, the use of plugs or ionic blocking agents are avoided, which negatively affect detection when this technique is used.
As shown in the chromatogram, after more than 100 hours of operations with water no alteration is observed in retention times, selectivity or distortion in the peaks of pyridine and phenol - a clear indication that no collapse of the bonded phase functionality is adversely achieved with TRACER EXCEL ODS-B columns. Interestingly, the collapsing of bonded phase functionality with the majority of reversed phase columns on the market is typical under these conditions.
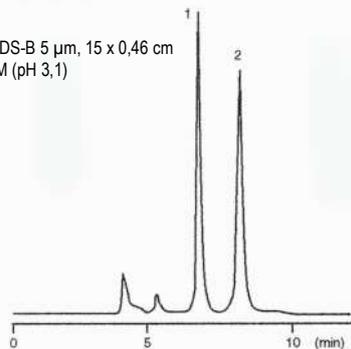
EFFECT OF AQUEOUS ELUTANTS ON THE ORGANIZATION OF HYDROCARBON CHAINS.

Tracer Excel ODS-B — ODS Conventional

Inicial Chromatogram — After 100 hours washed with H_2O

Reproductibility Tracer Excel ODS-B

Antioxidants

Column: TRACER EXCEL ODS-B 5 μm, 15 x 0,46 cm
Eluant: Phosphate Plug 0,1 M (pH 3,1)
Flow: 0,6 ml/min.
Detector: ECD

Sample: 1 Ascorbic Acid
           2 GSH

Water Soluble Vitamins

Column: TRACER EXCEL ODS-B 5 μm, 15 x 0,46 cm
Eluant: Phosphate Plug 20 mM (pH 70)CH_3CN 95/5 cm
Flow: 0.6 ml/min.
Detector: UV 210 nm

Sample: 1 Calcium Pantothenate
           2 Pyridoxine hydrochloride (B_6)
           3 Nicotinamide

Glycolid Acid and Latic Acid

Column: TRACER EXCEL ODS-B 5 μm, 15 x 0.46 cm
Eluant: H_3PO_4 0.1%
Flow: 0.6 ml/min.
Temperature: 40ºC
Detector: UV 210 nm

Sample: 1 Glycolic Acid
           2 Lactic Acid

Alcohols

Column: TRACER EXCEL ODS-B 5 μm, 15 x 0,46 cm
Eluant: H_2O
Flow: 0,6 ml/min.
Temperature: 40ºC
Detector: RID

Sample: 1 Methanol
           2 Ethanol
           3 Iso-Propanol
           4 n-propanol
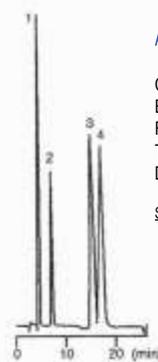
Aminoacids

Column: TRACER EXCEL ODS-B 5 μm, 15 x 0.46 cm
Eluant: H_2O
Flow: 0.6 ml/min.
Temperature: 40ºC
Detector: RID

Sample: 1 Alanine
           2 Valine
           3 Isoleucine
           4 Leucine
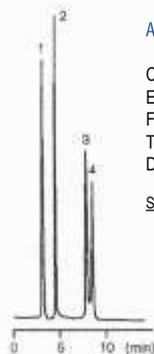
Cyclodextrin derivatives

Column: TRACER EXCEL ODS-B 5 μm, 15 x 0.46 cm
Eluant: MeOH/H_2O 70:30
Flow: 0.6 ml/min.
Temperature: ambient
Detector: UV240 nm

Sample: 1 $6^1, 6^5$ -di-O-trytyl-cG_6
           2 $6^1, 6^4$ -di-O-trytyl-cG_6
           3 $6^1, 6^3$ -di-O-trytyl-cG_6
           4 $6^1, 6^2$ -di-O-trytyl-cG_6
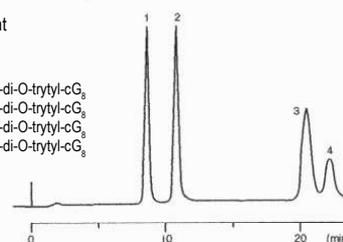
Ascorbic Acid and Glycosides

Column: TRACER EXCEL ODS-B 5 μm, 15 x 0.46 cm
Eluant: Phosphate Plug (pH 3,8)
Flow: 04 ml/min.
Temperature: Ambient
Detector:UV240 nm
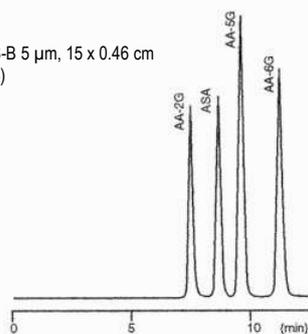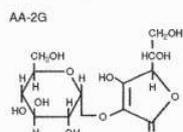
Fructo-oligosccharides

Column: TRACER EXCEL ODS-B 5 μm, 15 x 0,46 cm
Eluant: H_2O
Flow: 06 ml/min.
Temperature: Ambient
Detector:RID

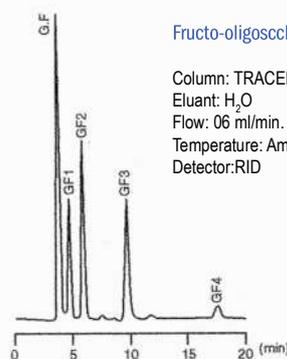The extraordinary quality of TRACER EXCEL packings have been extended to a full range of operations, covering practically all the chromatographer's needs.

Si	Material of the ultrapure silica particle, the basis of all the TRACER EXCEL range.
C8	This packing made operative with octyl groups and totally endcapped is extremely versatile. Its use is recommended for highly hydrophobic samples, which are retained excessively on ODS type packings. Developed on the same ultrapure silica as ODS-A and ODS-B, it is extremely reproducible and reliable.
C4	The same ultra pure silica of all the TRACER EXCEL range made operative with butyl groups, giving a moderately hydrophobic packing. Its principle field of application is the separation of peptides and proteins by reverse phase. In this case, the same packing is used with a 300 A porosity, more suitable for the large size of protein molecules. Another field where this packing can be highly recommended is when the sample contains compounds of a very different hydrophobic nature. This packing permits perfect separation of a sample with a single injection.
C1	The same ultrapure silica of the TRACER EXCEL range is given its special function with tri-methylchlorosilane to create a low hydrophobic reversed phase. Its field of application includes the separation of peptides and proteins by reversed phase. It can also be used as a packing for normal phase with highly polar compounds.
CN	The type CN packings are much appreciated as alternatives to ODS-type packings for their special selectivity, as well as for the possibility they offer for working in both chromatographic modes, normal and reverse phase. However, in comparison with the latter, they have always been characterised by a lesser reproducibility and a notably shorter useful life. Thanks to the extraordinary level of quality of the silica of the particle and the optimization reached by the actuating processes, the new packing TRACER EXCEL 120 CN has satisfactorily overcome these limitations, so giving the chromatogapher a completely reliable alternative. As a normal phase it is an excellent alternative to unsubstituted silica, given that retention times are much more reproducible, equilibration times much more rapid, and it does not suffer the problems of de-activation of silica itself.
NH_2	This packing, with chemically bonded groups of aminopropyl silane, can be used as a phase normal or reverse phase packing depending on the eluant used. It is recommended for separations of basic compounds under normal phase conditions. Additionally, the reactivity of the amino group makes it very suitable as a support for later modifications as for example in the synthesis of quiral phases. It is also very suitable for SFC applications
Ph	In the same way as the CN type packing, the packing substituted with dimethyl phenyl can be used in normal or reversed phase, being in this latter case a very useful alternative to ODS type packings since its aromatic groups give it a special selectivity when polar compounds are being chromatographed.
300 Angstrom	A complete range of packings with a pore diameter of 300 Angstrom units is available, ideal for undertaking separations of complex molecules of very high molecular weight, e.g. proteins and peptides.

	ODS-A	ODS-B	C8	C4	C1	CN	Ph	NH$_2$	SI
Size of pore in A units	120	120	120	120	120	120	120	120	120
Size of particle	3, 4, 5 & 10 µm	3, 4, 5 & 10 µm	3, 5 and 10 µm	3, 5 and 10 µm	3, 5 and 10 µm	3, 5 and 10 µm	3, 5 and 10 µm	3, 5 and 10 µm	3, 5 and 10 µm
Volume of pores in ml/g	1.0 ml/g	1.0 ml/g	1.0 ml/g	1.0 ml/g	1.0 ml/g	1.0 ml/g	1.0 ml/g	1.0 ml/g	1.0 ml/g
Surface area	300 m^2/g	300 m^2/g	300 m^2/g	300 m^2/g	300 m^2/g	300 m^2/g	300 m^2/g	300 m^2/g	300 m^2/g
Purity of silica	Ultrapure	Ultrapure	Ultrapure	Ultrapure	Ultrapure	Ultrapure	Ultrapure	Ultrapure	Ultrapure
%C	17%	15%	10%	8%	5%	7%	9%	4%	
Type of phase	Monofunctional and totally endcapped	Monofunctional and totally endcapped	Monofunctional and totally endcapped	Monofunctional and totally endcapped	Monofunctional	Monofunctional and totally endcapped		Trifunctional	
Metallic impurities (Al, Fe, Ti, Zr)	Less than 10ppm of each one	Less than 10ppm of each one	Less than 10ppm of each one	Less than 10ppm of each one	Less than 10ppm of each one	Less than 10ppm of each one	Less than 10ppm of each one	Less than 10ppm of each one	Less than 10ppm of each one
USP	L1	L1	L7	L26	L13	L10	L11	L8	L3

Analytical columns 0.4 cm I.D.
TRACER EXCEL 120/5 μm

Function	μm	4 cm	5 cm	10 cm	15 cm	20 cm	25 cm
ODS-A	5	TR-416336	TR-417000	TR-416337	TR-416338	TR-416339	TR-416340
ODS-B	5	TR-416341	TR-417002	TR-416342	TR-416343	TR-416344	TR-416345
Si	5	TR-416356	TR-417004	TR-416357	TR-416358	TR-416359	TR-416360
C8	5	TR-416361	TR-417006	TR-416362	TR-416363	TR-416364	TR-416365
C4	5	TR-416366	TR-417008	TR-416367	TR-416368	TR-416369	TR-416370
C1	5	TR-416371	TR-417010	TR-416372	TR-416373	TR-416374	TR-416375
NH2	5	TR-416376	TR-417012	TR-416377	TR-416378	TR-416379	TR-416380
CN	5	TR-416381	TR-417014	TR-416382	TR-416383	TR-416384	TR-416385
Ph	5	TR-416386	TR-417016	TR-416387	TR-416388	TR-416389	TR-416390

Ultrarapid columns 0.4 cm I.D.
TRACER EXCEL 120/3 μm

Function	μm	4 cm	5 cm	10 cm	15 cm	20 cm	25 cm
ODS-A	3	TR-413460	TR-417018	TR-413461	TR-413462	TR-413463	TR-413464
ODS-B	3	TR-413465	TR-417020	TR-413466	TR-413467	TR-413468	TR-413469
Si	3	TR-413470	TR-417022	TR-413471	TR-413472	TR-413473	TR-413474
C8	3	TR-413475	TR-417024	TR-413476	TR-413477	TR-413478	TR-413479
C4	3	TR-413480	TR-417026	TR-413481	TR-413482	TR-413483	TR-413484
C1	3	TR-413485	TR-417028	TR-413486	TR-413487	TR-413488	TR-413489
NH2	3	TR-413490	TR-417030	TR-413491	TR-413492	TR-413493	TR-413494
CN	3	TR-413495	TR-417032	TR-413496	TR-413497	TR-413498	TR-413499
Ph	3	TR-413500	TR-417034	TR-413501	TR-413502	TR-413503	TR-413504

Analytical columns 0.46 cm I.D.
TRACER EXCEL 120/5 μm

Function	μm	4 cm	5 cm	10 cm	15 cm	20 cm	25 cm
ODS-A	5	TR-016336	TR-025000	TR-016337	TR-016338	TR-016339	TR-016340
ODS-B	5	TR-016341	TR-025002	TR-016342	TR-016343	TR-016344	TR-016345
Si	5	TR-016356	TR-025004	TR-016357	TR-016358	TR-016359	TR-016360
C8	5	TR-016361	TR-025006	TR-016362	TR-016363	TR-016364	TR-016365
C4	5	TR-016366	TR-025008	TR-016367	TR-016368	TR-016369	TR-016370
C1	5	TR-016371	TR-025010	TR-016372	TR-016373	TR-016374	TR-016375
NH2	5	TR-016376	TR-025012	TR-016377	TR-016378	TR-016379	TR-016380
CN	5	TR-016381	TR-025014	TR-016382	TR-016383	TR-016384	TR-016385
Ph	5	TR-016386	TR-025016	TR-016387	TR-016388	TR-016389	TR-016390

Ultrarapid columns 0.46 cm I.D.
TRACER EXCEL 120/4 μm

Function	μm	4 cm	5 cm	10 cm	15 cm	20 cm	25 cm
ODS-A	4	TR-025018	TR-025020	TR-025022	TR-025024	TR-025026	TR-025028
ODS-B	4	TR-016351	TR-025030	TR-016352	TR-016353	TR-016354	TR-016355

Ultrarapid columns 0.4 cm I.D.
TRACER EXCEL 120/4 μm

Function	μm	4 cm	5 cm	10 cm	15 cm	20 cm	25 cm
ODS-A	4	TR-416346	TR-417036	TR-416347	TR-416348	TR-416349	TR-416350
ODS-B	4	TR-416351	TR-417038	TR-416352	TR-416353	TR-416354	TR-416355

Ultrarapid columns 0.46 cm I.D.
TRACER EXCEL 120/3 µm

Function	µm	4 cm	5 cm	10 cm	15 cm	20 cm	25 cm
ODS-A	3	TR-013415	TR-025034	TR-013416	TR-013417	TR-013418	TR-013419
ODS-B	3	TR-013420	TR-025036	TR-013421	TR-013422	TR-013423	TR-013424
Si	3	TR-013425	TR-025038	TR-013426	TR-013427	TR-013428	TR-013429
C8	3	TR-013430	TR-025040	TR-013431	TR-013432	TR-013433	TR-013434
C4	3	TR-013435	TR-025042	TR-013436	TR-013437	TR-013438	TR-013439
C1	3	TR-013440	TR-025044	TR-013441	TR-013442	TR-013443	TR-013444
NH2	3	TR-013445	TR-025046	TR-013446	TR-013447	TR-013448	TR-013449
CN	3	TR-013450	TR-025048	TR-013451	TR-013452	TR-013453	TR-013454
Ph	3	TR-013455	TR-025050	TR-013456	TR-013457	TR-013458	TR-013459

Microbore columns 0.21 cm I.D.
TRACER EXCEL 120/5 µm

Function	µm	5 cm	10 cm	15 cm	20 cm	25 cm
ODS-B	5	TR-025060	TR-021353	TR-025078	TR-021354	TR-025096
Si	5	TR-025062	TR-021395	TR-025080	TR-021364	TR-025098
C8	5	TR-025064	TR-021365	TR-025082	TR-021366	TR-025100
C4	5	TR-025066	TR-021367	TR-025084	TR-021368	TR-025102
C1	5	TR-025068	TR-021369	TR-025086	TR-021370	TR-025104
NH2	5	TR-025070	TR-021371	TR-025088	TR-021372	TR-025106
CN	5	TR-025072	TR-021373	TR-025090	TR-021374	TR-025108
Ph	5	TR-025074	TR-021375	TR-025092	TR-021376	TR-025110

Other configurations available on demand

Microbore columns 0.21 cm I.D.
TRACER EXCEL 120/3 µm

Function	µm	5 cm	10 cm	15 cm	20 cm	25 cm
ODS-A	3	TR-025114	TR-021407	TR-025134	TR-021408	TR-025154
ODS-B	3	TR-025116	TR-021409	TR-025136	TR-021410	TR-025156
Si	3	TR-025118	TR-021411	TR-025138	TR-021412	TR-025158
C8	3	TR-025120	TR-021413	TR-025140	TR-021414	TR-025160
C4	3	TR-025122	TR-021415	TR-025142	TR-021416	TR-025162
C1	3	TR-025124	TR-021417	TR-025144	TR-021418	TR-025164
NH2	3	TR-025126	TR-021419	TR-025146	TR-021420	TR-025166
CN	3	TR-025128	TR-021421	TR-025148	TR-021422	TR-025168
Ph	3	TR-025130	TR-021423	TR-025150	TR-021424	TR-025170

Other configurations available on demand

Analytical columns 0.3 cm I.D.
TRACER EXCEL 120/5 µm

| Function | µm | L e n g t h   c m | | | |
		5 cm	10 cm	15 cm	20 cm
ODS-A	5	TR-025200	TR-021355	TR-025220	TR-021356
ODS-B	5	TR-025202	TR-021357	TR-025222	TR-021358
Si	5	TR-025204	TR-021381	TR-025224	TR-021382
C8	5	TR-025206	TR-021383	TR-025226	TR-021384
C4	5	TR-025208	TR-021385	TR-025228	TR-021386
C1	5	TR-025210	TR-021387	TR-025230	TR-021388
NH2	5	TR-025212	TR-021389	TR-025232	TR-021390
CN	5	TR-025214	TR-021391	TR-025234	TR-021392
Ph	5	TR-025216	TR-021393	TR-025236	TR-021394

Other configurations available on demand

Microbore columns 0.3 cm I.D.
TRACER EXCEL 120/3 µm

| Function | µm | L e n g t h   c m | | | |
		5 cm	10 cm	15 cm	20 cm
ODS-A	3	TR-025240	TR-021425	TR-025260	TR-021426
ODS-B	3	TR-025242	TR-021427	TR-025262	TR-021428
Si	3	TR-025244	TR-021429	TR-025264	TR-021430
C8	3	TR-025246	TR-021431	TR-025266	TR-021432
C4	3	TR-025248	TR-021433	TR-025268	TR-021434
C1	3	TR-025250	TR-021435	TR-025270	TR-021436
NH2	3	TR-025252	TR-021437	TR-025272	TR-021438
CN	3	TR-025254	TR-021439	TR-025274	TR-021440
Ph	3	TR-025256	TR021441	TR-025276	TR-021442

Other configurations available on demand

Semi-preparative columns 0.78 cm I.D.
TRACER EXCEL 120/5 µm

| Function | µm | L e n g t h   c m | | | |
		5 cm	10 cm	15 cm	25 cm
ODS-A	5	TR-025280	TR-025300	TR-016167	TR-016168
ODS-B	5	TR-025282	TR-025302	TR-016171	TR-016172
Si	5	TR-025284	TR-025304	TR-016175	TR-016176
C8	5	TR-025286	TR-025306	TR-016179	TR-016180
C4	5	TR-025288	TR-025308	TR-016183	TR-016184
C1	5	TR-025290	TR-025310	TR-016187	TR-016188
NH2	5	TR-025292	TR-025312	TR-016191	TR-016192
CN	5	TR-025294	TR-025314	TR-016195	TR-016196
Ph	5	TR-025296	TR-025316	TR-016199	TR-016200

Other configurations available on demand

Semi-preparative columns 1.0 cm I.D.
TRACER EXCEL 120/5 µm

| Function | µm | L e n g t h   c m | | | |
		5 cm	10 cm	15 cm	25 cm
ODS-A	5	TR-025320	TR-025340	TR-016169	TR-016170
ODS-B	5	TR-025322	TR-025342	TR-016173	TR-016174
Si	5	TR-025324	TR-025344	TR-016177	TR-016178
C8	5	TR-025326	TR-025346	TR-016181	TR-016182
C4	5	TR-025328	TR-025348	TR-016185	TR-016186
C1	5	TR-025330	TR-025350	TR-016189	TR-016190
NH2	5	TR-025332	TR-025352	TR-016193	TR-016194
CN	5	TR-025334	TR-025354	TR-016197	TR-016198
Ph	5	TR-025336	TR-025356	TR-016201	TR-016202

Other configurations available on demand