

Analytix *Notes*



AAS and ICP Standards



SIGMA-ALDRICH

Sample Preparation for Trace Analysis: TraceSelect Ultra and TraceSelect

Ultra-pure acids, bases and salts for smelting and wet digestion in environmental, water and food analysis.



TraceSelect Ultra acids and bases are intended for the most demanding trace analysis requirements. All metals are supplied in the ppt (< 10 ng/kg) trace range. TraceSelect Ultra acids and bases are purified by sub-boiling distillation and packed in specially manufactured and cleaned Teflon PFA (fluoropolymer) bottles. Water and ortho-phosphoric acid are supplied in specially pre-leached HDPE bottles. The TraceSelect Ultra product series was recently expanded by eight new products.

The acids, bases and salts in the TraceSelect series were developed for sample preparation and analysis in the ppb ($\mu\text{g}/\text{kg}$) trace range. Purity and composition are guaranteed by careful preparation, testing and verification of the final product for metal content and ionic trace impurities using ICP-OES, ICP-MS and ion chromatography. To further guarantee purity and stability, TraceSelect products are packaged in high quality containers appropriate for the particular product.

The Sigma-Aldrich Quality Management System guarantees consistent quality and safety for all TraceSelect Ultra and TraceSelect products. They are produced and filled under clean room conditions and delivered with a Certificate of Analysis.

Table..... Product range for TraceSelectUltra reagents

Cat. No.	Brand	Product Name	Specification
02658	Fluka	Hydrofluoric acid	TraceSelectUltra for trace analysis $\geq 49\%$ (acidimetric)
02650	Fluka	Nitric acid	TraceSelectUltra for trace analysis $\sim 65\%$ (T)
07692	Fluka	Acetic acid	TraceSelectUltra for trace analysis $\geq 99.0\%$ (T)
14211	Fluka	Water	TraceSelectUltra for trace analysis
64957	Fluka	Phosphoric acid	TraceSelectUltra for trace analysis $\geq 85\%$ (T)
77239	Fluka	Sulfuric acid	TraceSelectUltra $\geq 95\%$ (T)
96208	Fluka	Hydrochloric acid	TraceSelectUltra for trace analysis $\geq 30\%$ (T)
23828	Fluka	Hydrobromic acid	TraceSelectUltra for trace analysis $\geq 44\%$ (T)
16748	Fluka	Ammonium hydroxide solution	TraceSelectUltra for trace analysis $\geq 25\%$ (T)
16911	Fluka	Hydrogen peroxide solution	TraceSelectUltra $\geq 30\%$ (RT) for trace analysis

Table..... Product range for TraceSelect reagents

Cat. No.	Brand	Product Name	Specification
45727	Fluka	Acetic acid	TraceSelect for trace analysis $\geq 99.0\%$ (T)
09857	Fluka	Ammonium hydroxide solution	TraceSelect for trace analysis $\geq 25\%$ NH ₃ in water (T)
84415	Fluka	Hydrochloric acid	TraceSelect for trace analysis fuming 37% (T)
47559	Fluka	Hydrofluoric acid	TraceSelect for trace analysis 47-51% (acidimetric)
95321	Fluka	Hydrogen peroxide solution	TraceSelect $\geq 30\%$ (RT)
84385	Fluka	Nitric acid	TraceSelect for trace analysis $\geq 69.5\%$ (T)
79614	Fluka	Phosphoric acid	TraceSelect for trace analysis $\geq 85\%$ (T)
77227	Fluka	Perchloric acid	TraceSelect for trace analysis 67-71%
84716	Fluka	Sulfuric acid	TraceSelect for trace analysis $\geq 95\%$ (T)
09725	Fluka	Hydrofluoric acid	TraceSelect for trace analysis 47-51% (acidimetric)
09979	Fluka	Ammonium sulfate	TraceSelect $\geq 99.5\%$ (T)
60347	Fluka	Potassium phosphate dibasic	TraceSelect anhydrous $\geq 99.5\%$ (T)
71629	Fluka	Hydrofluoric acid	TraceSelect for trace analysis 47-51% (acidimetric)
60348	Fluka	Potassium bisulfate	TraceSelect $\geq 99.0\%$ (T)
60371	Fluka	Potassium hydroxide hydrate	TraceSelect $\geq 65\%$ (T)
60429	Fluka	Potassium nitrate	TraceSelect $\geq 99.5\%$ (T)
71347	Fluka	Sodium carbonate (soda ash)	TraceSelect anhydrous $\geq 99.5\%$ (T)
71492	Fluka	Sodium phosphate monobasic (sodium dihydrogen phosphate, monosodium phosphate)	TraceSelect anhydrous $\geq 99.0\%$ (T)
71752	Fluka	Sodium nitrate	TraceSelect $\geq 99.0\%$ (T)
13171	Fluka	Sodium hydroxide solution	TraceSelect $\geq 30\%$ in water (T)

AAS and ICP Standards High quality ion standards and concentrates to meet the claims of accuracy and reliability for quantitative trace analysis by AAS, ICP-OES and ICP-MS.

By Friederike Jäkke
fjaekke@sial.com

The AAS and ICP single element standard solutions and the concentrates as well as the ICP multielement standard solutions are produced according to ISO 9001 using the highest purity salts and acids or bases. The ready-to-use solutions are traceable to certified reference standard solutions (EMPA/BAM or NIST). The calibration of the Instruments in our Quality Control Department is carried out using original standards of international institutions such as NIST. All calibration standards are supplied with a Certificate of Analysis stating the composition, traceability, release date and expiry date. For the ICP master solutions and concentrates, the levels of known impurities are also determined.

The range of calibration standards includes:

- AAS single element standard solutions with element concentrations of 1000 mg/kg and 10000 mg/kg
- AAS single element concentrates available with 1 g and 10 g of metal
- ICP master single element standard solutions with element concentrations of 1000 mg/kg
- ICP master single element standard concentrates containing 1 g of metal
- ICP multi-element standard solutions with element combinations and concentrations for common environmental analysis, contaminants in ground and drinking water, for the analysis of sewage sludge and for tuning instruments

AAS Single Element Standards Supplied with a Certificate of Analysis stating composition, traceability, release date and expiry date.

Table Standard Solutions (1000 mg/kg or 10 000 mg/kg)

Cat. No.	Brand	Product	Medium	Package
06154	Fluka	Aluminum	0.05 M HCl, stab. With 0.4% HCHO	100 mL, 500 mL
06155	Fluka	Aluminum	~0.5 M HNO ₃	100 mL, 500 mL
10773	Fluka	Antimony	~ 5 M HCl	100 mL, 500 mL
11082	Fluka	Arsenic	~ 0.05 M HNO ₃ + NaOH	100 mL, 500 mL
206962	Aldrich	Arsenic	2% KOH	100 mL, 500 mL
11722	Fluka	Barium	H ₂ O	100 mL, 500 mL
11723	Fluka	Barium	~ 0.5 M HNO ₃	100 mL, 500 mL
206970	Aldrich	Barium	1 wt. % HCl	100 mL, 500 mL
14205	Fluka	Beryllium	~ 0.5 M HNO ₃	100 mL, 500 mL
206989	Aldrich	Beryllium	1 wt. % HCl	100 mL, 500 mL
95375	Fluka	Bismuth	~ 0.5 M HNO ₃	100 mL, 500 mL
15579	Fluka	Boron	H ₂ O	100 mL, 500 mL
20895	Fluka	Cadmium	~ 0.5 M HNO ₃	100 mL, 500 mL
21049	Fluka	Calcium	~ 0.5 M HCl	100 mL, 500 mL
21058	Fluka	Calcium	~ 0.5 M HNO ₃	100 mL, 500 mL
22236	Fluka	Cer	~ 0.5 M HNO ₃	100 mL, 500 mL
20958	Fluka	Cesium	~ 0.5 M HNO ₃	100 mL, 500 mL
20952	Fluka	Cesium	H ₂ O	100 mL, 500 mL
27067	Fluka	Chromium (III)	~ 0.05 M HNO ₃	100 mL, 500 mL
207055	Aldrich	Chromium (III)	1 wt. % HCl	100 mL, 500 mL
27068	Fluka	Chromium (VI)	H ₂ O	100 mL, 500 mL
292044	Aldrich	Chromium (VI)	1 wt. % HCl	100 mL, 500 mL
60785	Fluka	Cobalt	~ 0.05 M HNO ₃	100 mL, 500 mL
61147	Fluka	Copper	~ 0.05 M HNO ₃	100 mL, 500 mL
207128	Aldrich	Europium	1 wt. % HNO ₃	100 mL, 500 mL
207136	Aldrich	Gadolinium	1 wt. % HNO ₃	100 mL, 500 mL
48341	Fluka	Gallium	~ 0.5 M HNO ₃	100 mL
48843	Fluka	Germanium	~ 1 M HCl	100 mL, 500 mL
50766	Fluka	Gold	~1 M HCl	100 mL
57081	Fluka	Indium	~ 0.5 M HNO ₃	100 mL
58195	Fluka	Iridium	~1 M HCl	100 mL
44903	Fluka	Iron	~ 0.05 M HNO ₃	100 mL, 500 mL
305952	Aldrich	Iron	1 wt. % HCl	100 mL, 500 mL
207225	Aldrich	Lanthanum	1 wt. % HNO ₃	100 mL, 500 mL
15314	Fluka	Lead	~ 0.5 M HNO ₃	100 mL, 500 mL
62372	Fluka	Lithium	H ₂ O	100 mL, 500 mL
62373	Fluka	Lithium	~ 0.5 M HNO ₃	100 mL, 500 mL

Cat. No.	Brand	Product	Medium	Package
207241	Aldrich	Lithium	1 wt. % HCl	100 mL, 500 mL
62701	Fluka	Lutetium	~ 0.5 M HNO ₃	100 mL
207268	Aldrich	Lutetium	1 wt. % HNO ₃	100 mL
63046	Fluka	Magnesium	~ 0.05 M HCl, stab. With 0.04% HCHO	100 mL, 500 mL
63044	Fluka	Magnesium	~ 0.5 M HNO ₃	100 mL, 500 mL
63534	Fluka	Manganese	~ 0.5 M HNO ₃	100 mL, 500 mL
83357	Fluka	Mercury	~ 0.5 M HNO ₃	100 mL, 500 mL
69859	Fluka	Molybdenum	~ 0.5 NH ₄ OH	100 mL, 500 mL
69876	Fluka	Molybdenum	~ 0.5 M HNO ₃	100 mL, 500 mL
207306	Aldrich	Molybdenum	water	100 mL, 500 mL
207314	Aldrich	Neodymium	1 wt. % HNO ₃	100 mL, 500 mL
72223	Fluka	Nickel	~ 0.05 M HNO ₃	100 mL, 500 mL
274917	Aldrich	Niobium	water	100 mL, 500 mL
75612	Fluka	Osmium	~ 1 M HCl	100 mL
207349	Aldrich	Palladium	5 % HCl	100 mL, 500 mL
76035	Fluka	Palladium.	~ 1 M HNO ₃	100 mL
207357	Aldrich	Phosphorus	water	100 mL, 500 mL
80964	Fluka	Platinum	~ 2 M HCl	100 mL
60032	Fluka	Potassium	H ₂ O	100 mL, 500 mL
60029	Fluka	Potassium	~ 0.5 M HNO ₃	100 mL, 500 mL
316946	Aldrich	Potassium	1 wt. % HCl	100 mL, 500 mL
83672	Fluka	Rhenium	~ 1 M HNO ₃	100 mL
83722	Fluka	Rhodium	~ 1 M HCl	100 mL
83955	Fluka	Rubidium	~ 0.5 M HNO ₃	100 mL, 500 mL
207438	Aldrich	Rubidium	1 wt. % HCl	100 mL, 500 mL
84033	Fluka	Ruthenium	~ 1 M HCl	100 mL, 500 mL
84615	Fluka	Scandium	~ 0.5 M HNO ₃	100 mL, 500 mL
84896	Fluka	Selenium	~ 0.5 M HNO ₃	100 mL, 500 mL
85351	Fluka	Silicium	~ 1 M HNO ₃ + 2 % HF	100 mL, 500 mL
316822	Aldrich	Silicon	2 % NaOH	100 mL, 500 mL
85137	Fluka	Silver	~ 0.5 M HNO ₃	100 mL, 500 mL
71177	Fluka	Sodium	H ₂ O	100 mL, 500 mL
71173	Fluka	Sodium	~ 0.5 M HNO ₃	100 mL, 500 mL
207500	Aldrich	Sodium	1 wt. % HCl	100 mL, 500 mL
85891	Fluka	Strontium	H ₂ O	100 mL, 500 mL
207519	Aldrich	Strontium	1 wt. % HCl	100 mL, 500 mL
333298	Aldrich	Sulfur	water	100 mL, 500 mL
86275	Fluka	Tantalum	~ 2 M HF	100 mL
305928	Aldrich	Terbium	1 wt. % HNO ₃	100 mL, 500 mL
88203	Fluka	Thallium	~ 0.5 M HNO ₃	100 mL, 500 mL
207578	Aldrich	Thorium	5% HNO ₃	100 mL, 500 mL
207586	Aldrich	Thulium	1 wt. % HNO ₃	100 mL, 500 mL
96524	Fluka	Tin	~ 5 M HCl	100 mL, 500 mL
89475	Fluka	Titanium	~ 2 M HCl	100 mL, 500 mL
274933	Aldrich	Titanium	water	100 mL, 500 mL
207624	Aldrich	Uranium	1 wt. % HNO ₃	100 mL, 500 mL
94693	Fluka	Vanadium	~ 0.05 M NH ₄ OH	100 mL, 500 mL
94695	Fluka	Vanadium	~ 0.5 M H ₂ SO ₄	100 mL, 500 mL
94694	Fluka	Vanadium	~ 0.5 M HNO ₃	100 mL, 500 mL
317608	Aldrich	Vanadium	5% HCl	100 mL, 500 mL
207640	Aldrich	Ytterbium	1 wt. % HNO ₃	100 mL, 500 mL
95802	Fluka	Yttrium	~ 0.5 M HNO ₃	100 mL, 500 mL
96457	Fluka	Zinc	~ 0.5 M HNO ₃	100 mL, 500 mL
207667	Aldrich	Zinc	1 wt. % HCl	100 mL, 500 mL
96568	Fluka	Zirconium	~ 2 M HCl	100 mL, 500 mL
02457	Fluka	Calcium*	~ 0.5 M HNO ₃	100 mL, 500 mL
02583	Fluka	Iron*	~ 0.5 M HNO ₃	100 mL, 500 mL
02398	Fluka	Magnesium*	~ 0.5 M HNO ₃	100 mL, 500 mL
02498	Fluka	Potassium*	~ 0.5 M HNO ₃	100 mL, 500 mL
02397	Fluka	Sodium*	~ 0.5 M HNO ₃	100 mL, 500 mL
02584	Fluka	Zinc*	~ 0.5 M HNO ₃	100 mL, 500 mL

(*Concentracion: 10 000 mg/kg)

Table Concentrates: Each ampoule contains 1g metal

Cat. No.	Brand	Product	Medium	Package
02781	Fluka	Aluminum	H ₂ O	1 piece
02782	Fluka	Antimony*	HCl, H ₂ O	1 piece
02783	Fluka	Arsenic	H ₂ O	1 piece
02784	Fluka	Barium	H ₂ O	1 piece
02786	Fluka	Cadmium	H ₂ O	1 piece
02672	Fluka	Calcium	HCl, H ₂ O	1 piece
02787	Fluka	Cesium	H ₂ O	1 piece
02673	Fluka	Chromium(VI)	H ₂ O	1 piece
02683	Fluka	Cobalt	Sulfuric acid, H ₂ O	1 piece
02684	Fluka	Copper	HCl, H ₂ O	1 piece
02681	Fluka	Gold	HCl, H ₂ O	1 piece
02679	Fluka	Iron*	HCl, H ₂ O	1 piece
02785	Fluka	Lead	H ₂ O	1 piece
02685	Fluka	Lithium	H ₂ O	1 piece
02656	Fluka	Magnesium	H ₂ O	1 piece
02654	Fluka	Manganese	H ₂ O	1 piece
02587	Fluka	Mercury	H ₂ O	1 piece
02653	Fluka	Molybdenum	H ₂ O	1 piece
02588	Fluka	Nickel	H ₂ O	1 piece
03366	Fluka	Phosphate	H ₂ O	1 piece
02682	Fluka	Potassium	H ₂ O	1 piece
02687	Fluka	Selenium	H ₂ O	1 piece
03793	Fluka	Silicon	H ₂ O	1 piece
02688	Fluka	Silver	Nitric solution	1 piece
02589	Fluka	Sodium	H ₂ O	1 piece
03794	Fluka	Strontium	H ₂ O	1 piece
02762	Fluka	Tin	HCl	1 piece
03796	Fluka	Titanium*	H ₂ O	1 piece
03799	Fluka	Tungsten	Sodiumhydroxide solution	1 piece
03797	Fluka	Vanadium	Sodiumhydroxide solution	1 piece
02761	Fluka	Zinc	H ₂ O	1 piece
02763	Fluka	Zirconium	Hydrochloric acid	1 piece

(* the ready-to-use solution should be acidified with 100 mL HCl conc.)

Table Concentrates: Each ampoule contains 10 g metal

Cat. No.	Brand	Product	Medium	Package
03382	Fluka	Aluminum	H ₂ O	1 piece
03381	Fluka	Antimony*	Hydrochloric solution	1 piece
03356	Fluka	Cadmium	Hydrochloric solution	1 piece
03379	Fluka	Calcium	H ₂ O	1 piece
03378	Fluka	Chloride	H ₂ O	1 piece
03377	Fluka	Chromium(VI)	H ₂ O	1 piece
03374	Fluka	Cobalt	Sulfuric solution	1 piece
03372	Fluka	Copper (CuCl ₂ ·2H ₂ O)	Hydrochloric solution	1 piece
03373	Fluka	Copper (CuSO ₄ ·5H ₂ O)	H ₂ O	1 piece
03376	Fluka	Iron*	H ₂ O	1 piece
03399	Fluka	Lead	H ₂ O	1 piece
03371	Fluka	Magnesium	H ₂ O	1 piece
03357	Fluka	Manganese	H ₂ O	1 piece
03368	Fluka	Nickel (Ni(SO ₄) ₂ ·7H ₂ O)	H ₂ O	1 piece
03369	Fluka	Nickel (NiCl ₂ ·6H ₂ O)	H ₂ O	1 piece
03367	Fluka	Phosphate	H ₂ O	1 piece
03375	Fluka	Potassium	H ₂ O	1 piece
03370	Fluka	Sodium	H ₂ O	1 piece
03364	Fluka	Sulfate	H ₂ O	1 piece
03362	Fluka	Zinc (ZnSO ₄ ·7H ₂ O)	H ₂ O	1 piece
03363	Fluka	Zinc (ZnCl ₂)	Hydrochloric solution	1 piece

(*the ready-to-use solution should be acidified with HCl or H₂SO₄)

ICP-OES/ICP-MS Single and Multi-Element Standards Supplied with a Certificate of Analysis stating composition, traceability, release date, expiry date and level of impurities.

Table Concentrates: Each ampoule contains 1 g metal

Cat. No.	Brand	Product	Medium	Package
02769	Fluka	Boron	H ₂ O	1 piece
02776	Fluka	Cobalt	Nitric solution	1 piece
02777	Fluka	Copper	Nitric solution	1 piece
02772	Fluka	Iron	Nitric solution	1 piece
02778	Fluka	Magnesium	Nitric solution	1 piece
02797	Fluka	Sodium	Nitric solution	1 piece
02696	Fluka	Zinc	Nitric solution	1 piece
02794	Fluka	Multi-Element Cd, Cr, Cu, Fe, Mn, Ni, Pb, Sb, Sn, Zn Strd Conc., 1 mg each	Nitric solution	1 piece

Table Master Standard Solutions (1000 mg/kg)

Cat. No.	Brand	Product	Medium	Package
17042	Fluka	Aluminum	~ 0.5 M HNO ₃	100 mL
17056	Fluka	Barium	H ₂ O	100 mL
17033	Fluka	Beryllium	~ 0.5 M HNO ₃	100 mL
17034	Fluka	Bismuth	~ 0.5 M HNO ₃	100 mL
17061	Fluka	Cadmium	~ 0.5 M HNO ₃	100 mL
17062	Fluka	Calcium	~ 0.5 M HNO ₃	100 mL
17069	Fluka	Cesium	~ 0.5 M HNO ₃	100 mL
17059	Fluka	Chromium	H ₂ O	100 mL
17057	Fluka	Cobalt	~ 0.5 M HNO ₃	100 mL
17068	Fluka	Copper	~ 0.5 M HNO ₃	100 mL
17067	Fluka	Gallium	~ 0.5 M HNO ₃	100 mL
17071	Fluka	Indium	~ 0.5 M HNO ₃	100 mL
17066	Fluka	Iron	~ 0.5 M HNO ₃	100 mL
17043	Fluka	Lead	~ 0.5 M HNO ₃	100 mL
17073	Fluka	Lithium	~ 0.5 M HNO ₃	100 mL
17074	Fluka	Magnesium	~ 0.5 M HNO ₃	100 mL
17075	Fluka	Manganese	~ 0.5 M HNO ₃	100 mL
17039	Fluka	Molybdenum	~ 0.5 M HNO ₃	100 mL
17054	Fluka	Nickel	~ 0.5 M HNO ₃	100 mL
17063	Fluka	Platinum	~ 2 M HCl	100 mL
17072	Fluka	Potassium	~ 0.5 M HNO ₃	100 mL
17064	Fluka	Rubidium	~ 0.5 M HNO ₃	100 mL
17038	Fluka	Sodium	~ 0.5 M HNO ₃	100 mL
17048	Fluka	Strontium	H ₂ O	100 mL
17051	Fluka	Thallium	~ 0.5 M HNO ₃	100 mL
17065	Fluka	Tin	~ 5 M HCl	100 mL
17046	Fluka	Titanium	~ 2 M HCl	100 mL
17052	Fluka	Vanadium	~ 0.5 M HNO ₃	100 mL
17053	Fluka	Zinc	~ 0.5 M HNO ₃	100 mL
17044	Fluka	Zirconium	~ 2 M HCl	100 mL

Table Multi-Element Standard Solutions (by Fluka)

	Cat. No. 70002	Cat. No. 70003	Cat. No. 70004	Cat. No. 70006	Cat. No. 70008	Cat. No. 70009	Cat. No. 70011	Cat. No. 70007
Product	I	II	III	IV	V	VI	VII	Tuning Solution
Package	100 mL	100 mL	100 mL	100 mL	100 mL	100 mL	100 mL	100 mL
Application	ICP-OES	ICP-OES	ICP-OES For analysis of drinking and waste water	ICP-OES For analysis of drinking and waste water	ICP-MS	ICP-MS	ICP-MS	ICP-MS
Element	Conc. [mg/kg] (~ 1 M HNO ₃)	Conc. [mg/kg] (~ 0.5 M HCl)	Conc. [mg/kg] (~ 5 M HNO ₃)	Conc. [mg/kg] (~ 5 M HNO ₃)	Conc. [mg/kg] (~ 5 M HNO ₃)	Conc. [mg/kg] (~ 5 M HNO ₃)	Conc. [mg/kg] (~ 7.5 M HCl)	Conc. [mg/kg] (~ 5 M HNO ₃)
Aluminium	50	-	-	40	10	-	-	-
Arsenic	-	-	-	40	-	-	-	-
Barium	10	-	-	40	10	-	-	-
Beryllium	-	10	-	10	10	-	-	10
Bismuth	100	-	-	-	10	-	-	10
Boron	50	-	-	100	-	-	-	-
Cadmium	10	-	-	10	10	-	-	-
Cesium	-	-	-	-	10	-	-	-
Calcium	10	-	2000	-	100	10	-	-
Cer	-	-	-	-	-	-	-	10
Chromium	50	-	-	20	10	-	-	-
Cobalt	10	-	-	10	10	-	-	10
Copper	10	-	-	20	10	-	-	-
Gallium	-	-	-	-	10	-	-	-
Germanium	-	50	-	-	-	-	10	-
Gold	-	-	-	-	-	-	10	-
Indium	-	-	-	-	10	-	-	10
Iron	10	-	-	100	100	10	-	-
Lithium	50	-	-	-	10	-	-	-
Lead	100	-	-	40	10	-	-	10
Magnesium	10	-	400	-	10	-	-	10
Manganese	10	-	-	10	10	-	-	-
Molybdenum	50	-	-	-	10	-	-	-
Nickel	50	-	-	20	10	-	-	-
Phosphate	-	-	-	-	-	-	-	-
Platinum	-	-	-	-	-	-	10	-
Potassium	100	-	200	-	100	10	-	-
Rubidium	-	-	-	-	10	-	-	-
Selenium	-	-	-	100	-	-	-	-
Silver	10	-	-	-	10	-	-	-
Sodium	50	-	1000	-	100	-	-	-
Strontium	10	-	-	-	10	-	-	-
Thallium	50	-	-	100	10	-	-	-
Tin	-	50	-	-	-	-	10	-
Titanium	-	10	-	-	-	-	10	-
Vanadium	-	50	-	40	10	-	-	-
Zinc	10	-	-	100	10	-	-	-
Zirconium	-	50	-	-	-	-	10	-

Your Sigma-Aldrich Service Partners

Europe

... Austria Wien

Tel. 01-605 81 10
Fax 01-605 81 20
E-mail: sigma@sigma.co.at

... Belgium/Luxembourg Bornem

Free Tel. 0800 147 47
Free Fax 0800 147 45
E-mail: becustsv@europe.sial.com

... Czech Republic Praha

Tel. 246 003 251
Fax 246 003 291
E-mail: CZECustSV@europe.sial.com

... Denmark Brøndby

Tel. 43 56 59 10
Fax 43 56 59 05
E-mail: denorder@europe.sial.com

... Finland Helsinki

Tel. 09-350 9250
Fax 09-350 92555
E-mail: finorder@europe.sial.com

... France St. Quentin Fallavier

Tél. 0800 21 1408 (appel gratuit)
Fax 0800 03 1052 (appel gratuit)
E-mail: fradvsv@europe.sial.com

... Germany Taufkirchen

Free Tel. 0800 51 55 000
Free Fax 0800 64 90 000
E-mail: deorders@europe.sial.com

... Greece Ilioupoli, Athens

Tel. 210-994 8010
Fax 210-994 3831
E-mail: GRCustSV@europe.sial.com

... Hungary Budapest

Tel. (06-1) 269-6474
Fax (06-1) 235-9068
Email: info@sigma.sial.hu

... Ireland Dublin

Tel. 01-404-1900
Fax 01-404-1910
E-mail: EICustsv@europe.sial.com

... Israel Rehovot

Tel. 08-9484-222
Fax 08-9484-200
E-mail: sigisr@sigma.co.il

... Italy Milano

Tel. 02-33417-310
Fax 02-38010-737
E-mail: itorder@europe.sial.com

... Norway Oslo

Tel. 23 17 60 00
Fax 23 17 60 10
E-mail: nororder@sial.com

... Poland Poznań

Tel. 061-829 01 00
Fax 061-829 01 20
E-mail: plcustsv@europe.sial.com

... Portugal Sintra

Tel. 800 20 21 80 (Gratuito)
Fax 800 20 21 78 (Gratuito)
E-mail: poorders@europe.sial.com

... Spain Tres Cantos, Madrid

Tel. 900 10 13 76 (Gratuito)
Fax 900 10 20 28 (Gratuito)
E-mail: esorders@europe.sial.com

... Sweden Stockholm

Tel. 020-35 05 10
Fax 020-35 25 22
E-mail: sweorder@europe.sial.com

... Switzerland Buchs

Free Tel. 0800 80 00 80
Free Fax 0800 80 00 81
E-mail: Fluka@sial.com

... The Netherlands Zwijndrecht

Free Tel. 0800 022 9088
Free Fax 0800 022 9089
Email: nlcustsv@europe.sial.com

... United Kingdom Gillingham

Free Tel. 0800 717181
Free Fax 0800 378785
E-mail: ukcustsv@europe.sial.com

America

... Canada Oakville

Free Tel. 1-800-565-1400
Free Fax 1-800-265-3858
E-mail: canada@sial.com

... USA St. Louis, MO

Toll Free 800 325 3010
Free Fax 800 325 5022
E-mail: custserv@sial.com

Oceania

... Australia Castle Hill

Free Tel. 1800 800 097
Free Fax 1800 800 096
E-mail: ausmail@sial.com

... New Zealand Castle Hill

Free Tel. 0800 936 666
Free Fax 0800 937 777
E-mail: ausmail@sial.com

Africa

... South Africa Johannesburg

Tel. 011-979 1188
Fax 011-979 1119
E-mail: rsa@sial.com

sigma-aldrich.com



The
SIGMA-ALDRICH
Family



SIGMA
Biochemicals and
Reagents for Life
Science Research



ALDRICH
Organics and
Inorganics for
Chemical Synthesis



Fluka
Speciality Chemicals
and Analytical Reagents
for Research



Riedel-de Haën
Laboratory Chemicals
and Reagents for
Research and Analysis



SUPELCO
Chromatography
Products for Analysis
and Purification