ROTI®STAR

Element Standards AAS • ICP • IC

Contents

Single Element Standards for AAS

ROTI®Star Standards for AAS and ICP

Carl ROTH has an extensive range of products which meets the highest standards of quality in the field of element standards and ion standards. The solutions and mixtures are made using materials of the highest purity, and therefore meet the requirements for instrumental analysis by AAS and ICP. All solutions are certified and can be traced to NIST standard reference materials. Solutions are produced according to **ISO 17034** in an accredited environment. The solutions are tested in a laboratory accredited to **ISO/IEC 17025** and supplied with a detailed, batch-specific certificate of analysis.

Single Element Standards for AAS

(Atomic Absorption Spectroscopy)

AAS standard solutions are made from high-quality reagents, and therefore ensure maximum precision during calibration. Accuracy and precision for reliable measurement results.

Properties:

- Concentration 1000 mg/l (1 g/l)
- Container sizes: 100 ml and 500 ml
- 24 months shelf life for unopened bottle & 12 months after the bottle has been opened

Single Element Standards for AAS 1000 mg/l (1 g/l) – ready-to-use

ready-to-use

Element	Conc.	Matrix	Art. No.	Pack Qty.
Aluminum (Al)	1 000 mg/l	2 % HNO_3	**2212.1**	100 ml
			2212.2	500 ml
Antimony (Sb)	1 000 mg/l	20 % HCl	**2223.1**	100 ml
			2223.2	500 ml
Arsenic (As)	1 000 mg/l	2 % HNO_3	**2224.1**	100 ml
			2224.2	500 ml
Barium (Ba)	1 000 mg/l	1 % HNO_3	**2225.1**	100 ml
			2225.2	500 ml
Beryllium (Be)	1 000 mg/l	2 % HNO_3 + 0,5 % HF	**2226.1**	100 ml
			2226.2	500 ml
Bismuth (Bi)	1 000 mg/l	3 % HNO_3	**2227.1**	100 ml
			2227.2	500 ml
Boron (B)	1 000 mg/l	H_2O	**2237.1**	100 ml
			2237.2	500 ml
Cadmium (Cd)	1 000 mg/l	2 % HNO_3	**2238.1**	100 ml
			2238.2	500 ml
Cesium (Cs)	1 000 mg/l	2 % HNO_3	**2239.1**	100 ml
			2239.2	500 ml
Calcium (Ca)	1 000 mg/l	2 % HNO_3	**2240.1**	100 ml
			2240.2	500 ml
Chromium (Cr)	1 000 mg/l	2 % HNO_3	**2250.1**	100 ml
			2250.2	500 ml
Cobalt (Co)	1 000 mg/l	2 % HNO_3	**2251.1**	100 ml
			2251.2	500 ml
Copper (Cu)	1 000 mg/l	2 % HNO_3	**2329.1**	100 ml
			2329.2	500 ml
Gold (Au)	1 000 mg/l	2 % HCl	**2258.1**	100 ml
			2258.2	500 ml
Indium (In)	1 000 mg/l	2 % HNO_3	**2284.1**	100 ml
Iron (Fe)	1 000 mg/l	2 % HNO_3	**2252.1**	100 ml
			2252.2	500 ml
Lead (Pb)	1 000 mg/l	2 % HNO_3	**2228.1**	100 ml
			2228.2	500 ml
Lithium (Li)	1 000 mg/l	2 % HNO_3	**2332.1**	100 ml
			2332.2	500 ml
Magnesium (Mg)	1 000 mg/l	2 % HNO_3	**2333.1**	100 ml
			2333.2	500 ml
Manganese (Mn)	1 000 mg/l	2 % HNO_3	**2334.1**	100 ml
			2334.2	500 ml
Mercury (Hg)	1 000 mg/l	10 % HNO_3	**2346.1**	100 ml
			2346.2	500 ml
Molybdenum (Mo)	1 000 mg/l	4 % NH_3	**2335.1**	100 ml
			2335.2	500 ml

Element	Conc.	Matrix	Art. No.	Pack Qty.
Nickel (Ni)	1 000 mg/l	2 % HNO_3	**2339.1**	100 ml
			2339.2	500 ml
Palladium (Pd)	1 000 mg/l	3 % HNO_3	**2340.1**	100 ml
Phosphorus (P)	1 000 mg/l	H_2O	**2599.1**	100 ml
			2599.2	500 ml
Platinum (Pt)	1 000 mg/l	10 % HCl	**2341.1**	100 ml
			2341.2	500 ml
Potassium (K)	1 000 mg/l	2 % HNO_3	**2327.1**	100 ml
			2327.2	500 ml
Scandium (Sc)	1 000 mg/l	2 % HNO_3	**2347.1**	100 ml
			2347.2	500 ml
Selenium (Se)	1 000 mg/l	2 % HNO_3	**2348.1**	100 ml
			2348.2	500 ml
Silicon (Si)	1 000 mg/l	H_2O	**2350.1**	100 ml
			2350.2	500 ml
Silicon (Si)	1 000 mg/l	0.5 % NaOH	**2351.1**	100 ml
Silver (Ag)	1 000 mg/l	2 % HNO_3	**2349.1**	100 ml
			2349.2	500 ml
Sodium (Na)	1 000 mg/l	2 % HNO_3	**2337.1**	100 ml
			2337.2	500 ml
Strontium (Sr)	1 000 mg/l	2 % HNO_3	**2352.1**	100 ml
			2352.2	500 ml
Tellurium (Te)	1 000 mg/l	2 % HNO_3	**2353.1**	100 ml
			2353.2	500 ml
Thallium (Tl)	1 000 mg/l	2 % HNO_3	**2354.1**	100 ml
			2354.2	500 ml
Tin (Sn)	1 000 mg/l	10 % HCl	**2384.1**	100 ml
			2384.2	500 ml
Titanium (Ti)	1 000 mg/l	5 % HNO_3 + 0,5 % HF	**2355.1**	100 ml
			2355.2	500 ml
Tungsten (W)	1 000 mg/l	4 % NH_3	**2361.1**	100 ml
			2361.2	500 ml
Vanadium (V)	1 000 mg/l	2 % HNO_3	**2360.1**	100 ml
			2360.2	500 ml
Yttrium (Y)	1 000 mg/l	2 % HNO_3	**2371.1**	100 ml
			2371.2	500 ml
Zinc (Zn)	1 000 mg/l	2 % HNO_3	**2383.1**	100 ml
			2383.2	500 ml
Zirconium (Zr)	1 000 mg/l	5 % HCl + 0,5 % HF	**2396.1**	100 ml
			2396.2	500 ml

For safety information and additional data, see our current catalogue or at www.carlroth.com

Graphitofen-AAS

Multi-Element Standards for Graphite Furnace AAS

This multi-element standard is produced from ultra-pure raw materials and in accordance with strict quality guidelines. The traceability and standard reference material of the NIST is documented on the comprehensive certificate of analysis. The standard is suitable for the calibration of graphite furnace AAS units.

Product name	Number of elements	Composition	Matrix	Art. No.	Pack Qty.
GF AAS Multi-Element Standard Solution XVIII	16	Ag (10), Al (100), As (100), Ba (50), Be (5), Cd (5), Co (50), Cr (20), Cu (50), Fe (20), Mn (20), Ni (50), Pb (100), Sb (100), Se (100), Tl (100)	5 % HNO_3	**9778.1**	100 ml

For safety information and additional data, see our current catalogue or at www.carlroth.com

Matrix Modifer Solutions for Graphite Furnace AAS

Matrix modifier solutions by Carl ROTH are made from high purity starting materials (≥99,999 %) and delivered with a detailed batch specific certificate of analysis. The solutions can be used either diluted or as mixtures, and are suitable for eliminating matrix effects in graphite furnace AAS.

Properties:

- Up to 70 measured trace impurities in ppm range and lower
- Guaranteed accuracy: ±1 %
- Container size: 50 ml

Product name	Concentration	Matrix	Art. No.	Pack Qty.
Ammonium dihydrogen phosphate matrix modifier solution	20 g/l	1 % HNO_3	**5150.1**	50 ml
	100 g/l	1 % HNO_3	**5148.1**	50 ml
Ammonium nitrate matrix modifier solution	50 g/l	1 % HNO_3	**5145.1**	50 ml
Magnesium nitrate matrix modifier solution	10 g/l	H_2O	**5140.1**	50 ml
	20 g/l	H_2O	**5142.1**	50 ml
Nickel nitrate matrix modifier solution	10 g/l	1 % HNO_3	**5146.1**	50 ml
Palladium nitrate matrix modifier solution	2 g/l	1 % HNO_3	**5143.1**	50 ml
	5 g/l	1 % HNO_3	**5144.1**	50 ml
	10 g/l	1 % HNO_3	**4842.1**	50 ml
Palladium nitrate & Magnesium nitrate matrix modifier solution	2 g/l & 10 g/l	1 % HNO_3	**5139.1**	50 ml

For safety information and additional data, see our current catalogue or at www.carlroth.com

Single Element Standards for ICP-OES

Single Element Standards for ICP-OES

(Inductively Coupled Plasma – Optical Emission Spectrometry)

The solutions and mixtures are made using materials of the highest purity, and therefore meet the requirements for instrumental analysis by AAS and ICP. All solutions are certified and can be traced to NIST standard reference solutions (excluded: iridium, osmium and ruthenium). Solutions are produced according to **ISO 17034** in an accredited environment. The solutions are tested in a laboratory accredited to **ISO/IEC 17025** and supplied with a detailed, batch-specific certificate of analysis. Each standard solution is made of high purity starting materials (mostly ≥99,999 %), and its content is determined gravimetrically and by ICP. High quality acids (purified by subboiling distillation) and water are used for production of the solutions. This gives you first-class reference materials of the highest purity and quality.

- Up to 70 measured trace impurities in the ppt range
- 24 months shelf life for unopened bottle & 12 months after the bottle has been opened

Element	Conc.	Matrix	Art. No.	Pack Qty.
Aluminum (Al)	1 000 mg/l	2 % HNO_3	**2397.1**	100 ml
			2397.2	500 ml
Aluminum (Al)	10 000 mg/l	2 % HNO_3	**2488.3**	30 ml
			2488.1	100 ml
			2488.2	500 ml
Antimony (Sb)	1 000 mg/l	20 % HCl	**2398.1**	100 ml
Antimony (Sb)	10 000 mg/l	20 % HCl	**2489.1**	100 ml
Arsenic (As)	1 000 mg/l	2 % HNO_3	**2399.2**	30 ml
			2399.1	100 ml
Arsenic (As)	10 000 mg/l	2 % HNO_3	**2491.1**	100 ml
Barium (Ba)	1 000 mg/l	1 % HNO_3	**2400.1**	100 ml
			2400.2	500 ml
Barium (Ba)	10 000 mg/l	1 % HNO_3	**2492.1**	100 ml
			2492.2	500 ml
Beryllium (Be)	1 000 mg/l	2–5 % HNO_3 + 0,5 % HF	**2401.2**	30 ml
			2401.1	100 ml
Beryllium (Be)	10 000 mg/l	2–5 % HNO_3 + 0,5 % HF	**2496.1**	100 ml
Bismuth (Bi)	1 000 mg/l	3 % HNO_3	**2402.1**	100 ml
Bismuth (Bi)	10 000 mg/l	3 % HNO_3	**2497.1**	100 ml
Boron (B)	1 000 mg/l	H_2O	**2404.1**	100 ml
			2404.2	500 ml
Boron (B)	10 000 mg/l	H_2O	**2500.1**	100 ml
Cadmium (Cd)	10 000 mg/l	2 % HNO_3	**2501.1**	100 ml
Cadmium (Cd)	1 000 mg/l	2 % HNO_3	**2405.1**	100 ml
Cesium (Cs)	1 000 mg/l	2 % HNO_3	**2406.1**	100 ml
Cesium (Cs)	10 000 mg/l	2 % HNO_3	**2502.1**	100 ml
Calcium (Ca)	1 000 mg/l	2 % HNO_3	**2407.1**	100 ml
			2407.3	250 ml
			2407.2	500 ml
Calcium (Ca)	10 000 mg/l	2 % HNO_3	**2503.1**	100 ml
			2503.2	500 ml
Cerium (Ce)	1 000 mg/l	2–3 % HNO_3	**2408.1**	100 ml
			2408.2	250 ml
Cerium (Ce)	10 000 mg/l	2–3 % HNO_3	**2504.1**	100 ml
Chromium (Cr)	1 000 mg/l	2–3 % HNO_3	**2409.1**	100 ml
			2409.3	250 ml
			2409.2	500 ml
Chromium (Cr)	10 000 mg/l	2–3 % HNO_3	**2505.1**	100 ml
			2505.2	500 ml
Cobalt (Co)	1 000 mg/l	2–3 % HNO_3	**2410.1**	100 ml
Cobalt (Co)	10 000 mg/l	2–3 % HNO_3	**2506.1**	100 ml
Copper (Cu)	1 000 mg/l	2–3 % HNO_3	**2426.1**	100 ml
			2426.2	250 ml
Copper (Cu)	10 000 mg/l	2–3 % HNO_3	**2520.1**	100 ml
Dysprosium (Dy)	1 000 mg/l	2–3 % HNO_3	**2411.1**	100 ml
Dysprosium (Dy)	10 000 mg/l	2–3 % HNO_3	**2507.1**	100 ml

Element	Conc.	Matrix	Art. No.	Pack Qty.
Erbium (Er)	1 000 mg/l	2–3 % HNO_3	**2413.1**	100 ml
Erbium (Er)	10 000 mg/l	2–3 % HNO_3	**2509.1**	100 ml
Europium (Eu)	1 000 mg/l	2 % HNO_3	**2414.2**	30 ml
			2414.1	100 ml
Europium (Eu)	10 000 mg/l	2 % HNO_3	**2510.1**	100 ml
Gadolinium (Gd)	1 000 mg/l	2–3 % HNO_3	**2416.2**	30 ml
			2416.1	100 ml
Gadolinium (Gd)	10 000 mg/l	2–3 % HNO_3	**2511.1**	100 ml
Gallium (Ga)	1 000 mg/l	2–3 % HNO_3	**2418.1**	100 ml
			2418.2	250 ml
Gallium (Ga)	10 000 mg/l	2–3 % HNO_3	**2512.1**	100 ml
Germanium (Ge)	1 000 mg/l	2 % HNO_3 + 0,5 % HF	**2419.1**	100 ml
Germanium (Ge)	10 000 mg/l	2 % HNO_3 + 0,5 % HF	**2513.1**	100 ml
Gold (Au)	1 000 mg/l	2–5 % HCl	**2420.1**	100 ml
			2420.2	250 ml
Gold (Au)	10 000 mg/l	2–5 % HCl	**2514.1**	100 ml
Hafnium (Hf)	1 000 mg/l	2 % HCl + 0,5 % HF 5 % HNO_3 + 0,5 % HF	**2421.1**	100 ml
Hafnium (Hf)	10 000 mg/l	2 % HCl / 0,5 % HF 5 % HNO_3 / 0,5 % HF	**2515.1**	100 ml
Holmium (Ho)	1 000 mg/l	2–3 % HNO_3	**2422.1**	100 ml
Holmium (Ho)	10 000 mg/l	2–3 % HNO_3	**2516.1**	100 ml
Indium (In)	10 000 mg/l	2–3 % HNO_3	**2517.1**	100 ml
Indium (In)	1 000 mg/l	2–3 % HNO_3	**2423.1**	100 ml
			2423.2	250 ml
Iridium (Ir)	1 000 mg/l	10 % HCl	**2424.1**	100 ml
Iridium (Ir)	10 000 mg/l	10 % HCl	**2518.1**	100 ml
Iron (Fe)	1 000 mg/l	2–4 % HNO_3	**2412.1**	100 ml
			2412.3	250 ml
			2412.2	500 ml
Iron (Fe)	10 000 mg/l	2–4 % HNO_3	**2508.1**	100 ml
			2508.2	500 ml
Iron (Fe)	30 000 mg/l	5 % HNO_3	**1LE6.1**	1 l
Lanthanum (La)	1 000 mg/l	2–3 % HNO_3	**2427.1**	100 ml
			2427.2	250 ml
Lanthanum (La)	10 000 mg/l	2–3 % HNO_3	**2521.1**	100 ml
Lead (Pb)	1 000 mg/l	2–3 % HNO_3	**2403.1**	100 ml
Lead (Pb)	10 000 mg/l	2–3 % HNO_3	**2499.1**	100 ml
Lithium (Li)	1 000 mg/l	2–3 % HNO_3	**2428.1**	100 ml
			2428.2	250 ml
Lithium (Li)	10 000 mg/l	2–3 % HNO_3	**2522.1**	100 ml
Lutetium (Lu)	1 000 mg/l	2–3 % HNO_3	**2429.1**	100 ml
Lutetium (Lu)	10 000 mg/l	2–3 % HNO_3	**2523.1**	100 ml
Magnesium (Mg)	1 000 mg/l	2 % HNO_3	**2430.1**	100 ml
			2430.2	500 ml
Magnesium (Mg)	10 000 mg/l	2 % HNO_3	**2524.1**	100 ml
			2524.2	500 ml

Single Element Standards for ICP-OES

Element	Conc.	Matrix	Art. No.	Pack Qty.
Manganese (Mn)	1 000 mg/l	2–3 % HNO_3	**2437.1**	100 ml
			2437.3	250 ml
			2437.2	500 ml
Manganese (Mn)	10 000 mg/l	2–3 % HNO_3	**2525.1**	100 ml
Mercury (Hg)	1 000 mg/l	10 % HNO_3	**2453.1**	100 ml
Mercury (Hg)	10 000 mg/l	10 % HNO_3	**2537.1**	100 ml
Molybdenum (Mo)	1 000 mg/l	4 % NH_3	**2438.1**	100 ml
Molybdenum (Mo)	10 000 mg/l	4 % NH_3	**2526.1**	100 ml
Neodymium (Nd)	1 000 mg/l	2–3 % HNO_3	**2443.1**	100 ml
			2443.2	250 ml
Neodymium (Nd)	10 000 mg/l	2–3 % HNO_3	**2528.1**	100 ml
Nickel (Ni)	1 000 mg/l	2–3 % HNO_3	**2444.1**	100 ml
			2444.2	250 ml
Nickel (Ni)	10 000 mg/l	2–3 % HNO_3	**2529.1**	100 ml
Niobium (Nb)	1 000 mg/l	2–5 % HNO_3 + 0,5 % HF	**2445.1**	100 ml
Niobium (Nb)	10 000 mg/l	2–5 % HNO_3 + 0,5 % HF	**2531.1**	100 ml
Osmium (Os)	1 000 mg/l	2 % HCl	**2446.2**	30 ml
			2446.1	100 ml
Palladium (Pd)	1 000 mg/l	3–4 % HNO_3	**2447.3**	30 ml
			2447.1	100 ml
			2447.2	250 ml
Palladium (Pd)	10 000 mg/l	3–4 % HNO_3	**2532.1**	100 ml
Phosphorus (P)	1 000 mg/l	H_2O	**2451.1**	100 ml
			2451.2	250 ml
Phosphorus (P)	10 000 mg/l	H_2O	**2534.1**	100 ml
Platinum (Pt)	1 000 mg/l	10 % HCl	**2448.3**	30 ml
			2448.1	100 ml
			2448.2	250 ml
Platinum (Pt)	10 000 mg/l	10 % HCl	**2533.1**	100 ml
Potassium (K)	1 000 mg/l	2 % HNO_3	**2425.1**	100 ml
			2425.3	250 ml
			2425.2	500 ml
Potassium (K)	10 000 mg/l	2 % HNO_3	**2519.1**	100 ml
			2519.2	500 ml
Praseodymium (Pr)	1 000 mg/l	2–3 % HNO_3	**2452.1**	100 ml
Praseodymium (Pr)	10 000 mg/l	2–3 % HNO_3	**2536.1**	100 ml
Rhenium (Re)	1 000 mg/l	2 % HNO_3	**2454.2**	30 ml
			2454.1	100 ml
Rhenium (Re)	10 000 mg/l	5 % HCl	**2538.1**	100 ml
Rhodium (Rh)	1 000 mg/l	5 % HCl	**2455.2**	30 ml
			2455.1	100 ml
Rubidium (Rb)	1 000 mg/l	2 % HNO_3	**2456.1**	100 ml
Rubidium (Rb)	10 000 mg/l	2 % HNO_3	**2539.1**	100 ml
Ruthenium (Ru)	1 000 mg/l	5 % HCl	**2457.1**	100 ml
			2457.2	250 ml
Ruthenium (Ru)	10 000 mg/l	5–10 % HNO_3	**2540.1**	100 ml
Samarium (Sm)	1 000 mg/l	2 % HNO_3	**2458.2**	30 ml
			2458.1	100 ml
Samarium (Sm)	10 000 mg/l	2 % HNO_3	**2541.1**	100 ml
Scandium (Sc)	1 000 mg/l	2 % HNO_3	**2459.1**	100 ml
			2459.2	250 ml
Selenium (Se)	1 000 mg/l	2–3 % HNO_3	**2461.1**	100 ml
Selenium (Se)	10 000 mg/l	2–3 % HNO_3	**2543.1**	100 ml
Silicon (Si)	1 000 mg/l	H_2O	**2469.1**	100 ml
			2469.2	250 ml
			2469.3	500 ml
Silicon (Si)	10 000 mg/l	H_2O	**2546.1**	100 ml
Silver (Ag)	100 mg/l	10 % HNO_3	**20CH.1**	100 ml
			20CH.2	250 ml
			20CH.3	500 ml
Silver (Ag)	1 000 mg/l	2–4 % HNO_3	**2468.1**	100 ml
			2468.2	250 ml
Silver (Ag)	10 000 mg/l	2–4 % HNO_3	**2544.1**	100 ml

Element	Conc.	Matrix	Art. No.	Pack Qty.
Sodium (Na)	1 000 mg/l	2 % HNO_3	**2439.1**	100 ml
			2439.3	250 ml
			2439.2	500 ml
Sodium (Na)	10 000 mg/l	2 % HNO_3	**2527.1**	100 ml
			2527.2	500 ml
Strontium (Sr)	1 000 mg/l	2 % HNO_3	**2470.1**	100 ml
			2470.2	500 ml
Strontium (Sr)	10 000 mg/l	2 % HNO_3	**2547.1**	100 ml
Sulfur (S)	1 000 mg/l	H_2O	**2460.1**	100 ml
Sulfur (S)	10 000 mg/l	H_2O	**2542.1**	100 ml
Tantalum (Ta)	1 000 mg/l	1 % HNO_3 + 0,5 % HF	**2471.1**	100 ml
Tantalum (Ta)	10 000 mg/l	1 % HNO_3 + 0,5 % HF	**2548.1**	100 ml
Tellurium (Te)	1 000 mg/l	2 % HNO_3	**2472.1**	100 ml
Tellurium (Te)	10 000 mg/l	2 % HNO_3	**2549.1**	100 ml
Terbium (Tb)	1 000 mg/l	2–3 % HNO_3	**2476.1**	100 ml
Terbium (Tb)	10 000 mg/l	2–3 % HNO_3	**2550.1**	100 ml
Thallium (Tl)	1 000 mg/l	2–5 % HNO_3	**2477.1**	100 ml
Thallium (Tl)	10 000 mg/l	2–5 % HNO_3	**2552.1**	100 ml
Thorium (Th)	1 000 mg/l	2 % HNO_3	**20CE.1**	30 ml
			20CE.2	100 ml
			20CE.3	250 ml
			20CE.4	500 ml
Thulium (Tm)	1 000 mg/l	2–5 % HNO_3	**2478.1**	100 ml
Tin (Sn)	1 000 mg/l	20 % HCl	**2486.1**	100 ml
			2486.2	250 ml
Tin (Sn)	10 000 mg/l	10 % HCl	**2583.1**	100 ml
Titanium (Ti)	1 000 mg/l	5 % HNO_3 + 0,5 % HF	**2479.3**	30 ml
			2479.1	100 ml
			2479.2	250 ml
Titanium (Ti)	10 000 mg/l	2 % HNO_3 + 0,5 % HF	**2561.1**	100 ml
Tungsten (W)	1 000 mg/l	1 % HNO3 + 2 % HF	**25KK.1**	30 ml
			25KK.2	100 ml
			25KK.3	250 ml
Tungsten (W)	1 000 mg/l	4–10 % NH_3	**2482.1**	100 ml
			2482.2	250 ml
Tungsten (W)	10 000 mg/l	4–10 % NH_3	**2571.1**	100 ml
Uranium (U)	1 000 mg/l	2 % HNO_3	**1Y20.1**	30 ml
			1Y20.2	100 ml
			1Y20.3	250 ml
			1Y20.4	500 ml
Vanadium (V)	1 000 mg/l	2–3 % HNO_3	**2480.1**	100 ml
Vanadium (V)	10 000 mg/l	2–3 % HNO_3	**2567.1**	100 ml
Ytterbium (Yb)	1 000 mg/l	2–3 % HNO_3	**2483.1**	100 ml
Ytterbium (Yb)	10 000 mg/l	2–3 % HNO_3	**2572.1**	100 ml
Yttrium (Y)	1 000 mg/l	2–3 % HNO_3	**2484.1**	100 ml
			2484.2	250 ml
Yttrium (Y)	10 000 mg/l	2–3 % HNO_3	**2574.1**	100 ml
Zinc (Zn)	1 000 mg/l	2–3 % HNO_3	**2485.1**	100 ml
			2485.3	250 ml
			2485.2	500 ml
Zinc (Zn)	10 000 mg/l	5 % HNO_3	**2576.1**	100 ml
			2576.2	500 ml
Zirconium (Zr)	1 000 mg/l	5 % HCl + 0,5 % HF	**2487.1**	100 ml
			2487.2	250 ml
Zirconium (Zr)	10 000 mg/l	5 % HCl + 0,5 % HF	**2584.1**	100 ml

For safety information and additional data, see our current catalogue or at www.carlroth.com

Metallo-organic single element standards

Metallo-organic single element standards

ROTI®Star

- Certified and traceable to NIST standard reference materials
- Manufactured in accordance with **ISO 17034** in an accredited environment
- Tested in a laboratory accredited to **ISO/IEC 17025**
- Detailed, batch-specific certificate of analysis is available online

Properties:

- Metallo-organic compounds in 75 cSt hydrocarbon oil
- Trace metal concentrations determined by ICP-OES
- Suitable for use with ASTM D4927, D4951, D5185, D5708, D6443, D6481, D6595 and other standard test methods for elemental analysis
- Many of these standards are sulfonate-based and thus contain high levels of sulfur
- Excellent for AAS, ICP, RDE, XRF and other elemental analysis techniques
- 12 months shelf life for unopened bottle

Metallo-organic single element standards

Element	Conc.	Matrix	Art. No.	Pack Qty.
Aluminum (Al)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PN8.1**	50 g
Antimony (Sb)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PLN.1**	50 g
Arsenic (As)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PN7.1**	50 g
Barium (Ba)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PLP.1**	50 g
Beryllium (Be)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PLL.1**	50 g
Bismuth (Bi)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PNC.1**	50 g
Boron (B)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PN2.1**	50 g
Cadmium (Cd)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PP1.1**	50 g
Calcium (Ca)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PNK.1**	50 g
Cerium (Ce)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PN1.1**	50 g
Chromium (Cr)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PNN.1**	50 g
Cobalt (Co)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PNX.1**	50 g
Copper (Cu)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PLC.1**	50 g
Iron (Fe)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PLA.1**	50 g
Lanthanum (La)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PNP.1**	50 g
Lead (Pb)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PLH.1**	50 g
Lithium (Li)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PP3.1**	50 g
Magnesium (Mg)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PNA.1**	50 g
Manganese (Mn)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PN0.1**	50 g
Mercury (Hg)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PLK.1**	50 g
Molybdenum (Mo)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PNH.1**	50 g
Nickel (Ni)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PL9.1**	50 g
Phosphorus (P)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PLX.1**	50 g
Potassium (K)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PNY.1**	50 g
Scandium (Sc)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PL8.1**	50 g
Selenium (Se)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PN3.1**	50 g
Silicon (Si)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PN6.1**	50 g
Silver (Ag)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PL7.1**	50 g
Sodium (Na)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PP2.1**	50 g
Strontium (Sr)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PLY.1**	50 g
Sulfur (S)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PNT.1**	50 g
Thallium (Tl)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PN4.1**	50 g
Tin (Sn)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PN9.1**	50 g
Titanium (Ti)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PN5.1**	50 g
Tungsten (W)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PNE.1**	50 g
Vanadium (V)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PP0.1**	50 g
Yttrium (Y)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PLT.1**	50 g
Zinc (Zn)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PNL.1**	50 g
Zirconium (Zr)	1 000 µg/g	75 cSt Hydrocarbon Oil	**1PLE.1**	50 g
Neodymium (Nd)	1 000 µg/g	75 cSt Hydrocarbon Oil	**25TA.1**	50 g

For safety information and additional data, see our current catalogue or at www.carlroth.com

Multi Element Standards for ICP-OES

Multi Element Standards for ICP-OES

(Inductively Coupled Plasma – Optical Emission Spectrometry)

All solutions are certified and can be traced to NIST standard reference solutions. Solutions are produced according to **ISO 17034** in an accredited environment. The solutions are tested in a laboratory accredited to **ISO/IEC 17025** and supplied with a detailed, batch-specific certificate of analysis. A series of mixtures of different element combinations and concentrations for standard environmental analyses.

Properties:

- Quality control standards
- Surface water analysis (Art.No. 2642)
- Sewage sludge analysis (Art.No. 2643)

Product name	No. of elements	Composition	Conc. info	Matrix	Art. No.	Pack Qty.
Multi-Element ICP Standard Solution I	19	Ag (50), Al (100), B (15), Ba (5), Be (1), Bi (200), Cd (20), Co (20), Cr (25), Cu (20), Fe (15), Ga 150), In (200), Mn (5), Ni (50), Pb (200), Sr (1), Tl (400), Zn (20)	conc. in mg/l	5 % HNO_3	**2636.1**	100 ml
Multi-Element ICP Standard Solution III	4	Ba, Ca, Mg, Sr	1 000 mg/l	2 % HNO_3	**2637.1**	100 ml
Multi-Element ICP Standard Solution IV	23	Ag, Al, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn, Na, Ni, Pb, Sr, Tl, Zn	1 000 mg/l	2 % HNO_3	**2638.1**	100 ml
Multi-Element ICP Standard Solution VIII	24	Al, B, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, K, Li, Mg, Mn, Na, Ni, Pb, Se, Sr, Te, Tl, Zn	100 mg/l	2 % HNO_3	**2639.1**	100 ml
Multi-Element ICP Standard Solution IX	9	As, Be, Pb, Cd, Cr, Ni, Hg, Se, Tl	100 mg/l	2 % HNO_3	**2640.1**	100 ml
Multi-Element ICP Standard Solution X	23	Ca (35000), Mg (15000), Na (8000), K (3000), B (100), Fe (100), Mo (100), Sr (100), As (50), Ba (50), Ni (50), V (50), Zn (50), Mn (30), Co (25), Pb (25), Be (20), Cd (20), Cr (20), Cu (20), Bi (10), Se (10), Tl (10)	conc. in µg/l	2 % HNO_3	**2642.1**	100 ml
Multi-Element ICP Standard Solution XI	7	Cd (10), Cr (900), Cu (800), Hg (8), Ni (200), Pb (900), Zn (2500)	conc. in mg/l	2 % HNO_3	**2643.1**	100 ml
Multi-Element ICP Standard Solution XIII	15	Al (500), As (100), Be (100), Cd (25), Co (100), Cr (100), Cu (100), Fe (100), Hg (5), Mn (100), Ni (100), Pb (100), Se (25), V (250), Zn (100)	conc. in mg/l	2 % HNO_3	**2644.1**	100 ml
Multi-Element ICP Standard Solution XVI	21	As, Be, Ca, Cd, Co, Cr, Cu, Fe, Li, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sr, Ti, Tl, V, Zn	100 mg/l	2 % HNO_3	**2645.1**	100 ml
Multi-Element ICP Standard Solution XVII	7	Hf, Ir, Sb, Sn, Ta, Ti, Zr	100 mg/l	15 % HCl	**2646.1**	100 ml
Multi-Element ICP Standard Solution A	24	Al (1000), As (100), B (500), Ba (500), Ca (1000), Cd (100), Co (500), Cr (500), Cu (500), Fe (1000), Hg (10), K (1000), Li (100), Mg (1000), Mn (500), Na (1000), Ni (500), Pb (500), Rb (500), Sr (500), Te (500), Ti (500), V (500), Zn (500)	conc. in mg/l	5 % HNO_3	**8248.1**	100 ml
Multi-Element ICP Standard Solution B	25	Al (200), As (5), B (20), Ba (50), Ca (500), Cd (5), Co (20), Cr (40), Cu (20), Fe (100), Hg (0,5), K (100), Li (10), Mg (500), Mn (10), Na (100), Ni (40), P (40), Pb (10), Rb (10), Sr (100), Te (10), Ti (10), V (40), Zn (50)	conc. in mg/l	5 % HNO_3	**8249.1**	100 ml
Multi-Element ICP Standard Solution	5	Ca, K, Mg, Na, P	1 000 mg/l	2 % HNO_3	**1HP0.1**	100 ml
	9	As, Cd, Cr, Cu, Mo, Ni, Sb, Se, Zn	1 000 mg/l	5 % HNO_3	**9987.1**	100 ml
	22	As, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, Li, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sr, Ti, Tl, V, Zn	1 mg/l	5 % HNO_3	**2647.1**	100 ml
	22	As, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, Li, Mg, Mn, Mo, Ni, Pb, Sb, Se, Sr, Ti, Tl, V, Zn	100 mg/l	5 % HNO_3	**2648.1**	100 ml
	28	Al, Ag, As, B, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sr, Ti, Tl, V, Zn	1 mg/l	5 % HNO_3	**2649.1**	100 ml
	28	Al, Ag, As, B, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sr, Ti, Tl, V, Zn	100 mg/l	5 % HNO_3	**2650.1**	100 ml
Multi-Element ICP Standard Solution CR-01	17	Ag (25), Al (25), As (10), Ba (25), Ca (25), Cd (2), Cr (25), Cu (25), Fe (25), K (25), Mg (25), Mn (25), Na (25), Ni (25), Pb (25), Ti (25), Zn (25)	conc. in mg/l	5 % HNO_3	**1K38.1**	100 ml
					1K38.2	250 ml
Multi-Element ICP Standard Solution CR-02	15	Ag (250), Al (250), As (75), Ba (250), Ca (250), Cd (20), Cr (250), Cu (250), Fe (250), K (250), Na (250), Ni (250), Pb (250), Ti (250), Zn (250)	conc. in mg/l	5 % HNO_3	**1K39.1**	100 ml
					1K39.2	250 ml
Multi-Element ICP Standard Solution CR-03	2	P (75), S (1000)	conc. in mg/l	H_2O	**1K3C.1**	100 ml
					1K3C.2	250 ml
Multi-Element ICP Standard Solution CR-04	18	As (100), Ca (500), Cd (25), Co (100), Cr (100), Cu (100), K (100), Li (100), Mg (100), Mn (100), Mo (500), Na (500), Ni (100), Pb (100), Sb (20), Se (25), Sr (100), Zn (100)	conc. in mg/l	5 % HNO_3	**1L18.1**	100 ml
Multi-Element ICP Standard Solution CR-05	19	Al (500), As (500), B (500), Ba (500), Ca (5000), Cd (500), Co (500), Cr (500), Cu (500), Fe (500), K (5000), Li (500), Mg (5000), Mn (500), Na (5000), Ni (500), Pb (500), Sr (500), Zn (500)	conc. in mg/l	5 % HNO_3	**1LHP.1**	100 ml
Multi-Element ICP Standard Solution CR-06	20	Al (500), As (15), B (25), Ca (4000), Cd (1), Co (5), Cr (5), Cu (100), Fe (1000), K (350), Mg (1000), Mn (100), Mo (1,5), Na (1000), Ni (15), Pb (50), PO_4 (1000), Si (500), V (10), Zn (50)	conc. in mg/l	2 % HNO_3	**1LP4.1**	100 ml
Multi-Element ICP Standard Solution CR-07	8	Ag, Al, Cd, Cr, Cu, Fe, Mg, Mn	100 mg/l	3 % HNO_3	**1LXN.1**	250 ml
Multi-Element ICP Standard Solution CR-08	9	Bi, Co, Ga, In, Se, Sn, Te, Ti, Zn	100 mg/l	3 % HNO_3/3 HCl	**1LXL.1**	250 ml
Multi-Element ICP Standard Solution CR-09	8	As, Ni, Pb, Sb, Si, Tl, W, Zr	100 mg/l	3 % HNO_3	**1LXC.1**	250 ml
Multi-Element ICP Standard Solution CR-10	6	Au, Ir, Pd, Pt, Rh, Ru	100 mg/l	3 % HNO_3/3 HCl	**1LXT.1**	250 ml
Multi-Element ICP Standard Solution CR-11	7	Al, Cd, Cr, Cu, Fe, Mg, Mn	100 mg/l	3 % HNO_3	**1LXK.1**	250 ml
Multi-Element ICP Standard Solution CR-12	5	Ni, Sb, Se, Te, Ti	100 mg/l	3 % HNO_3	**1LXE.1**	250 ml
Multi-Element ICP Standard Solution CR-13	8	As, Bi, Co, Pb, Pt, Si, Sn, Zn	100 mg/l	3 % HNO_3/3 HCl	**1LXP.1**	250 ml
Multi-Element ICP Standard Solution CR-14	6	Ga, Ge, Hg, In, Pd, Tl	100 mg/l	3 % HNO_3	**1LXX.1**	250 ml
Multi-Element ICP Standard Solution CR-15	8	Al, Au, Cr, Fe, Mg, Ni, Pt, Sn	100 mg/l	3 % HNO_3/3 HCl	**1LXH.1**	250 ml
Multi-Element ICP Standard Solution CR-16	12	Al, Ba, Co, Cr, Cu, Fe, Mn, Mo, Ni, Ti, V, Zn	10 mg/l	2 % HNO_3	**1NY5.1**	250 ml
Multi-Element ICP Standard Solution CR-17	6	Cu, Cr, Fe, K, Mn, Pb	1 000 mg/l	5 % HNO_3	**1P7E.1**	250 ml
Multi-Element ICP Standard Solution CR-18	16	Ag, As, Ba, Cd, Co, Cr, Cu, Fe, Li, Mo, Ni, Pb, Se, Tl, V, Zn	100 mg/l	5 % HNO_3	**1T52.1**	100 ml
Multi-Element ICP Standard Solution CR-19	10	Au, Hg, Ir, Os, Pd, Pt, Rh, Ru, Sb, Sn	100 mg/l	5 % HCl	**1T51.1**	100 ml

Multi Element Standards for ICP-OES

Product name	No. of elements	Composition	Conc. info	Matrix	Art. No.	Pack Qty.
Multi-Element ICP Standard Solution CR-20	15	Ca (1000), K (1000), Mg (1000), P (1000), S (1000), Na (1000), Mn (100), Cu (100), Fe (100), Zn (100), B (100mg)	conc. in mg/l	5 % HNO_3	**1Y11.1**	100 ml
					1Y11.2	250 ml
					1Y11.3	500 ml
Multi-Element ICP Standard Solution CR-21	19	Al (50), As (10), Ca (50), Cd (10), Co (10), Cr (10), Cu (10), Fe (50), Hg (10), K (100), Mg (50), Mn (10), Mo (10), Na (100), Ni (10), P (100), Pb (10), S (100), Zn (10)	conc. in mg/l	5 % HNO_3	**1YP0.1**	100 ml
					1YP0.2	250 ml
Multi-Element ICP Standard Solution CR-22	6	Al (2000), Ca (10000), Fe (2000), K (1000), Mg (4000), Na (1000)	conc. in mg/l	5 % HNO_3	**1YKL.1**	100 ml
					1YKL.2	250 ml
Multi-Element ICP Standard Solution CR-23	21	Al, As, Ba, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Na, Ni, Pb, Sb, Se, Sr, Ti, Zn	1000 mg/l	5 % HNO_3	**1YL5.1**	100 ml
					1YL5.2	250 ml
					1YL5.3	500 ml
Multi-Element ICP Standard Solution CR-24	2	P, S	1000 mg/l	H_2O	**1YLE.1**	100 ml
					1YLE.2	500 ml
Multi-Element ICP Standard Solution CR-25	22	Al (100 mg/l), As (100 mg/l), Ba (100 mg/l), Be (100 mg/l), Ca (100 mg/l), Cd (100 mg/l), Co (100 mg/l), Cu (100 mg/l), Hg (100 mg/l), K (1000 mg/l), Li (100 mg/l), Mg (100 mg/l), Ni (100 mg/l), P (1000 mg/l), Pb (100 mg/l), S (1000 mg/l), Sb (100 mg/l), Se (100 mg/l), Si (100 mg/l), Sr (100 mg/l), V (100 mg/l), Zn (100 mg/l)	conc. in mg/l	5 % HNO_3	**1YTH.1**	100 ml
Multi-Element ICP Standard Solution CR-26	21	Al (50), Ca (50), Ce (300), Co (500), Cr (50), Cu (50), Dy (500), Fe (5000), Gd (50), Ga (50), Ho (50), La (50), Mg (50), Mn (50), Ni (50), Nd (2000), Pr (500), Sm (50), Tb (100), Y (50), Zn (50)	conc. in mg/l	5 % HNO_3	**204X.1**	100 ml
					204X.2	500 ml
Multi-Element ICP Standard Solution CR-27	5	B (100), Nb (50), Si (50), Sn (50), Zr (50)	conc. in mg/l	2 % HNO_3	**204Y.1**	100 ml
					204Y.2	500 ml
Multi-Element ICP Standard Solution CR-28	20	Ag, Al, As, Ba, Bi, Ca, Cd, Co, Cr, Fe, Hg, K, Li, Mg, Mn, Na, Pb, Se, Tl, V	200 mg/l	5 % HNO_3	**20CK.1**	100 ml
					20CK.2	250 ml
					20CK.3	500 ml
Multi-Element ICP Standard Solution CR-29	9	Mo, Nb, Si, Sb, Sn, Ta, Ti, W, Zr	200 mg/l	5 % HNO_3 + 0.2 % HF	**20CL.1**	100 ml
					20CL.2	250 ml
					20CL.3	500 ml
Multi-Element ICP Standard Solution CR-30	16	Al (100), Ca (10), Co (10), Cr (10), Cu (10), Fe (10), Ge (10), Hf (10), K (10), Li (10), Mg (10), Mn (10), Na (10), Ni (10), V (10), Zn (10)	conc. in mg/l	2 % HNO_3	**20LP.1**	100 ml
					20LP.2	250 ml
					20LP.3	500 ml
Multi-Element ICP Standard Solution CR-31	10	Ce, Dy, Er, Eu, Gd, La, Lu, Nd, Th, Yb	100 mg/l	5 % HNO_3	**20XC.1**	100 ml
					20XC.2	250 ml
					20XC.3	500 ml
Multi-Element ICP Standard Solution CR-32	5	Hf, Si, Ta, W, Zr	100 mg/l	5 % HNO_3 + 0.5 % HF	**224H.1**	100 ml
					224H.2	250 ml
Multi-Element ICP Standard Solution CR-33	15	Al (10), Ba (10), Ca (1000), Cd (10), Co (10), Cr (10), Cu (10), Fe (1000), K (1000), Mg (1000), Mn (10), Na (1000), Ni (10), Pb (10), Zn (10)	conc. in mg/l	5 % HNO_3	**225H.1**	100 ml
					225H.2	250 ml
					225H.3	500 ml
Multi-Element ICP Standard Solution CR-34	29	Ag, Al, As, B, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn, Na, Ni, P, Pb, Sn, Sr, V, Y, Zn	100 mg/l	5 % HNO_3	**22H7.1**	100 ml
					22H7.2	250 ml
					22H7.3	500 ml
Multi-Element ICP Standard Solution CR-35	13	Au, Ge, Ir, Mo, Nb, Pd, Pt, Ru, Sb, Ta, Ti, W, Zr	100 mg/l	10 % HCl	**22H8.1**	100 ml
					22H8.2	250 ml
					22H8.3	500 ml
Multi-Element ICP Standard Solution CR-36	8	Al, Ca, Fe, K, Mg, Mn, Na, Zn	100 mg/l	5 % HNO_3	**23EN.1**	100 ml
Multi-Element ICP Standard Solution CR-37	6	Cr, Cu, Mn, Ni, Sb, Zn	5000 mg/l	5 % HNO_3	**23T0.1**	100 ml
Multi-Element ICP Standard Solution CR-38	9	Au, Ga, Ge, In, Pd, Pt, Re, Rh, Ru	100 mg/l	5 % HNO_3 + 10 % HCl	**23TN.1**	100 ml
					23TN.2	250 ml
Multi-Element ICP Standard Solution CR-39	9	Ca (400), Cu (20), Fe (80), K (400), Mg (300), Mn (80), Na (100), P (160), Zn (40)	conc. in mg/l	1 mol/l HNO_3	**23TP.1**	100 ml
					23TP.2	500 ml
Multi-Element ICP Standard Solution CR-40	6	Cd (0,5), Cr (10), Cu (10), Ni (2), Pb (10), Zn (30	conc. in mg/l	1 mol/l HNO_3	**23TT.1**	100 ml
Multi-Element ICP Standard Solution CR-41	13	K, Li, Mg, Mn, Na, Ni, Pb, Rb, Se, Sr, Ti, V, Zn	1000 mg/l	5 % HNO_3	**23X9.1**	100 ml
					23X9.2	500 ml
Multi-Element ICP Standard Solution CR-42	15	Ag, Al, As, B, Ba, Bi, Ca, Cd, Co, Cr, Cs, Cu, Fe, Ga, In	1000 mg/l	5 % HNO_3	**23XA.1**	100 ml
					23XA.2	500 ml
Multi-Element ICP Standard Solution CR-43	18	Al, B, Be, Ca, Cd, Ce, Cr, Cu, Fe, Ga, Ni, P, Pb, Sn, Sr, Ti, Zn, Zr	100 mg/l	2 % HNO_3	**23XC.1**	100 ml
					23XC.2	500 ml
Multi-Element ICP Standard Solution CR-44	19	Al (20), B (100), Ba (10), Ca (5000), Cd (1), Co (1), Cr (2), Cu (200), Fe (20), K (1000), Li (5), Mg (1000), Mn (5), Na (5000), Ni (2), Pb (1), Sr (50), Zn (250), S (5000)	conc. in mg/l	5 % HNO_3	**251H.1**	100 ml
					251H.2	250 ml
Multi-Element ICP Standard Solution CR-45	22	Be (2), Ca (1), Ce (10), Cu (10), Eu (10), Fe (10), In (10), K (10), Li (2), Mn (5), Mo (5), Na (5), Ni (10), P (10), S (50), Sc (5), Si (10), Sr (2), Ti (10), V (10), Y (10), Zr (10)	conc. in mg/l	2 % HCl + 2 % HNO_3 + tr% HF	**25AH.1**	100 ml
Multi-Element ICP Standard Solution CR-46	6	Cd (0,6), Cr (20), Cu (20), Ni (9), Pb (20), Zn (80)	conc. in mg/l	5 % HNO_3	**25AK.1**	100 ml
Multi-Element ICP Standard Solution CR-47	27	Al, As, B, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn, Na, Ni, Pb, Se, Sr, Te, Tl, V, Zn	100 mg/l	1 mol/l HNO_3	**25EN.1**	100 ml
					25EN.2	250 ml
Multi-Element ICP Standard Solution CR-48	9	Ge, Mo, P, S, Sb, Sn, Ti, W, Zr	100 mg/l	15 % HCl	**25EP.1**	100 ml
					25EP.2	250 ml
Multi-Element ICP Standard Solution CR-49	12	Ce, Dy, Er, Eu, Gd, La, Nd, Sm, Th, U, Y, Yb	100 mg/l	2 % HNO_3	**25HE.1**	100 ml
					25HE.2	250 ml
Multi-Element ICP-OES Standard Solution for wavelength calibration	15	Al (50), As (50), Ba (50), Cd (50), Co (50), Cr (50), Cu (50), Mn (50), Mo (50), Ni (50), Pb (50), Se (50), Sr (50), Zn (50), K (500)	concentration in mg/l	5 % HNO_3	**1X09.1**	100 ml
					1X09.2	500 ml

For safety information and additional data, see our current catalogue or at www.carlroth.com

Single Element Standards for ICP-MS

Multi Element Standards for MISA-ICP-OES

in support of the MISA programme

MISA (Metals and Inorganics Sectoral Approach) is a collaborative programme launched by ECHA and Eurometaux, the European non-ferrous metals association, to further develop open technical and scientific questions specific to the metals and inorganics sectors, while continuing to improve registration dossiers in these sectors.

Product name	No. of elements	Composition	Conc. info	Matrix	Art. No.	Pack Qty.
MISA ICP-OES Standard 1-Rare Earth Metals	18	Ce, Dy, Er, Eu, Gd, Ho, La, Lu, Nd, Pr, Sc, Sm, Tb, Th, Tm, U, Y, Yb	100 mg/l	5 % HNO_3	**1YP2.1**	100 ml
MISA ICP-OES Standard 2-Precious Metals	6	Au, Ir, Pd, Pt, Rh, Ru	100 mg/l	10 % HCl	**1YP3.1**	100 ml
MISA ICP-OES Standard 3-Alkali, Alkaline Earth, Non-Transition Group	16	Al, As, Ba, Bi, Be, Ca, Cs, Ga, In, K, Li, Mg, Na, Rb, Se, Sr	100 mg/l	10 % HNO_3	**1YT2.1**	100 ml
MISA ICP-OES Standard 4-Fluoride soluble group	15	B, Ge, Hf, Mo, Nb, P, Re, S, Sb, Si, Sn, Ta, Ti, W, Zr	100 mg/l	5 % HNO_3 + tr% HF	**24Y8.1**	100 ml
MISA ICP-OES Standard 5-Transition metals	13	Ag, Cd, Co, Cr, Cu, Fe, Hg, Mn, Ni, Pb Tl, V, Zn	100 mg/l	10 % HNO_3	**24Y9.1**	100 ml

For safety information and additional data, see our current catalogue or at www.carlroth.com

Single Element Standards for ICP-MS

(Inductively Coupled Plasma – Mass spectrometry)

The solutions and mixtures are made using materials of the highest purity, and therefore meet the requirements for instrumental analysis by AAS and ICP. All solutions are certified and can be traced to NIST standard reference solutions (excluded: iridium, osmium and ruthenium). Solutions are produced according to **ISO 17034** in an accredited environment. The solutions are tested in a laboratory accredited to **ISO/IEC 17025** and supplied with a detailed, batch-specific certificate of analysis. Each standard solution is made of high purity starting materials (mostly ≥99,999 %), and its content is determined gravimetrically and by ICP. High quality acids (purified by subboiling distillation) and water are used for production of the solutions. This gives you first-class reference materials of the highest purity and quality.

- Concentration: 10 mg/l and 100 mg/l
- Up to 70 measured trace impurities in the ppt range
- Up to 36 months shelf life on the unopened bottles

Element	Concentration	Matrix	Art. No.	Pack Qty.
Mercury (Hg)	10 mg/l	5 % HNO_3	**5017.1**	100 ml
Rhodium (Rh)	100 mg/l	2 % HCl	**22HC.1**	100 ml
Yttrium (Y)	100 mg/l	2 % HNO_3	**25KL.1**	100 ml

For safety information and additional data, see our current catalogue or at www.carlroth.com

Multi Element Standards for ICP-MS

Multi Element Standards for ICP-MS
(Inductively Coupled Plasma – Mass spectrometry)

The standard solutions are manufactured from high-purity starting material (usually ≥99,999 %) under clean room conditions. Acids (purified by means of sub-boiling distillation) and water of highest quality are used to manufacture the solutions.

The solutions are certified and can be traced to NIST standard reference solutions. Solutions are produced according to **ISO 17034** in an accredited environment. The solutions are tested in a laboratory accredited to **ISO/IEC 17025** and supplied with a detailed, batch-specific certificate of analysis.

The range encompasses different multi-element standards in various compositions for tuning, calibration and interference tests.

Product name	No. of elements	Composition	Conc. info	Matrix	Art. No.	Pack Qty.
Multi-Element ICP-MS Standard Solution	3	Cr (4), Fe (20), Sr (4)	conc. in mg/l	2 % HNO_3	**0381.1**	100 ml
					0381.2	500 ml
	4	Ca, K, Mg, Na	1000 mg/l	2 % HNO_3	**6803.1**	100 ml
	4	Mo, Sb, Sn, Ti	10 mg/l	2 % HNO_3 + 0,1 % HF	**6807.1**	100 ml
	8	As (2), Cd (2), Cr (3), Cu (10), Fe (4), Ni (2), Pb (5), Zn (10)	conc. in mg/l	2 % HNO_3	**6814.1**	100 ml
	10	Au, Hf, Ir, Pd, Pt, Rh, Ru, Sb, Sn, Te	10 mg/l	10 % HCl + 1 % HNO_3	**0429.1**	100 ml
	10	Mo (50), Pd (40), Pt (40), Rh (40), Sb (80), Si (40), Sn (80), Te (40), W (40), Zr (40)	conc. in mg/l	2 % HCl	**6815.1**	100 ml
	12	As (2,5), Ba (2,5), Cd (0,5), Cr (5), Cu (5), Hg (0,2), Mo (3), Ni (5), Pb (5), Sb (0,5), Se (0,7), Zn (5)	conc. in mg/l	2 % HNO_3	**6810.1**	100 ml
	16	As, Be, Co, Cr, Cs, Cu, Li, Mn, Ni, Pb, Rb, Sc, Se, Sr, V, Zn	10 mg/l	5 % HNO_3	**0416.1**	100 ml
					0416.2	500 ml
	21	Al, Ag, As, Ba, Be, Cd, Co, Cr, Cu, Fe, K, Mn, Mo, Ni, Pb, Sb, Se, Sn, Tl, V, Zn	100 mg/l	5 % HNO_3	**6811.1**	100 ml
	22	Ag (5), Al (30), As (10), B (30), Ba (10), Be (3), Cd (3), Co (5), Cr (10), Cu (10), Mn (5), Mo (3), Ni (10), Pb (5), Se (5), Sn (10), Sr (100), Te (10), Ti (3), Tl (2), V (10), Zn (100)	conc. in mg/l	2 % HNO_3	**0383.1**	100 ml
					0383.2	500 ml
	27	Ag (50), Al (80), As (80), B (40), Ba (50), Be (40), Ca (80), Cd (40), Co (50), Cr (50), Cu (50), Fe (50), In (40), K (80), Li (40), Mg (80), Mn (50), Na (80), Ni (50), P (200), Pb (80), Se (40), Sr (50), Ti (40), Tl (40), V (50), Zn (50)	conc. in mg/l	2 % HNO_3	**6813.1**	100 ml
	27	Ag (10), Al (10), As (100), B (100), Ba (10), Be (100), Bi (10), Ca (1000), Cd (10), Co (10), Cr (10), Cu (10), Fe (100), Ga (10), K (10), Li (10), Mg (10), Mn (10), Mo (10), Na (10), Ni (10), Pb (10), Rb (10), Se (100), Sr (10), Te (10), Tl (10), U (10), V (10), Zn (100)	conc. in mg/l	2 % HNO_3	**1LC5.1**	100 ml
					1LC5.2	250 ml
	28	Ag, Al, As, Ba, Be, Bi, Ca, Cd, Co, Cr, Cs, Cu, Fe, Ga, In, K, Li, Mg, Mn, Na, Ni, Pb, Rb, Se, Sr, Tl, V, Zn	10 mg/l	5 % HNO_3	**6802.1**	100 ml
Multi-Element ICP-MS Standard Solution VI	30	Ag (10), Al (10), As (100), B (100), Ba (10), Be (100), Bi (10), Ca (1000), Cd (10), Co (10), Cr (10), Cu (10), Fe (100), Ga (10), K (10), Li (10), Mg (10), Mn (10), Mo (10), Na (10), Ni (10), Pb (10), Rb (10), Se (100), Sr (10), Te (10), Tl (10), U (10), V (10), Zn (100)	conc. in mg/l	2 % HNO_3	**1L4K.1**	100 ml
Multi-Element ICP-MS Standard Solution CR-01	23	Ag, Al, As, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Zn	100 mg/l	5 % HNO_3	**1N3X.1**	100 ml
Multi-Element ICP-MS Standard Solution CR-02	4	Ca (10000), K (1000), Na (1000), Mg (1000)	conc. in mg/l	5 % HNO_3	**1NC8.1**	100 ml
Multi-Element ICP-MS Standard Solution CR-03	32	Ag (10), Al (10), As (100), B (100), Ba (10), Be (100), Bi (10), Ca (1000), Cd (10), Co (10), Cr (10), Cu (10), Fe (100), Ga (10), Gd (100), K (10), Li (10), Mg (10), Mn (10), Mo (10), Na (10), Ni (10), Pb (10), Rb (10), Sb (100), Se (100), Sr (10), Te (10), Tl (10), U (10), V (10), Zn (100)	conc. in mg/l	5 % HNO_3	**1P5T.1**	100 ml
Multi-Element ICP-MS Standard Solution CR-04	9	As (10), Cd (3), Cr (10), Cu (100), Ni (10), Pb (5), Sb (5), Se (10), U (10)	conc. in mg/l	5 % HNO_3	**238L.1**	100 ml
Multi-Element ICP-MS Standard Solution CR-05	9	Al (25), Ca (50), Fe (40), K (15), Mg (20), Mn (10), Na (15), P (20), S (10)	conc. in mg/l	1 % HNO_3	**238P.1**	100 ml
					238P.2	250 ml
Multi-Element ICP-MS Standard Solution CR-06	12	As (100), Ba (1000), Cd (100), Cr (1000), Cu (1000), Mo (1000), Ni (1000), Pb (1000), Sb (200), Se (300), Tl (3), Zn (1000)	conc. in µg/l	2 % HNO_3	**257L.1**	100 ml
					257L.2	250 ml
Multi-Element ICP-MS Standard Solution CR-07	24	Al (100), As (1), B (100), Ba (10), Be (1), Cd (1), Co (1), Cr (10), Cu (10), Fe (100), Mn (10), Mo (1), Ni (10), Pb (10), Sb (1), Se (1), Sn (1), Sr (10), Te (1), Ti (10), Tl (1), U (1), V (1), Zn (10)	conc. in mg/l	2 % HNO_3	**25EK.1**	100 ml
					25EK.2	250 ml
Multi-Element ICP-MS Standard Solution CR-08	6	Al, Co, Cr, Mo, Ti, V	15 mg/l	2 % HNO_3	**25N6.1**	100 ml
					25N6.2	500 ml
Multi-Element ICP-MS Standard Solution CR-09	6	Al, Co, Cr, Mo, Ti, V	0.05 mg/l	2 % HNO_3	**25N7.1**	100 ml
					25N7.2	500 ml
ICP-MS Calibration Standard Solution	5	Ca, Fe, K, Mg, Na	1000 mg/l	2 % HNO_3	**0409.1**	100 ml
	8	Ge, Hf, Mo, Sb, Sn, Te, W, Zr	10 mg/l	2 % HNO_3 + 0,1 % HF	**6816.1**	100 ml
					6816.2	500 ml
ICP-MS Tuning Solution	5	Ce, Co, Li, Tl, Y	10 mg/l	2 % HNO_3	**6819.1**	100 ml
	6	Ce, Co, Li, Mg, Tl, Y	1 µg/l	2 % HNO_3	**6806.1**	100 ml
					6806.2	500 ml
ICP-MS Tuning Solution A	6	Be (10), Bi (2), Ce (2), Co (5), In (2), Mn (5)	conc. in µg/l	1 % HNO_3	**0900.2**	250 ml
ICP-MS Tuning Solution B	6	Be (1000), Bi (200), Ce (200), Co (500), In (200), Mn (500)	conc. in µg/l	1 % HNO_3	**0902.1**	100 ml
ICP-MS Interference Check Solution A – 6020	12	Cl^- (20000), Ca (3000), Fe (2500), Na (2500), C (2000), Al (1000), Mg (1000), P (1000), K (1000), S (1000), Mo (20), Ti (20)	conc. in µg/l	5 % HNO_3	**6808.1**	100 ml

For safety information and additional data, see our current catalogue or at www.carlroth.com

Calibrating Solutions for AAS, ICP-OES and ICP-MS

ROTI®Star Nitric Acid Blanks

The diluted high purity nitric acids are excellent for performing blank value determinations in AAS, ICP-OES and ICP-MS. They can also be used to dilute the samples.

Properties:

- produced by subboiling distillation
- water used with a conductivity of max. 0.055 µS/cm at 25 °C, at the time of manufacturing
- filtered through 0.2 µm membrane

Nitric acid

ROTI®Star 5 %

For blank value measurement and dilution of samples in AAS, ICP-OES and ICP-MS.

HNO_3 · M 63,01 g/mol

UN no. 2031 · ADR 8 II · WGK 1

Danger H290-H314-EUH071

Art. No.	Pack Qty.	Pack.
23PX.1	500 ml	LDPE
23PX.2	1 l	LDPE

Nitric acid

ROTI®Star 0,5 %

For blank value measurement and dilution of samples in AAS, ICP-OES and ICP-MS.

HNO_3 · M 63,01 g/mol

Art. No.	Pack Qty.	Pack.
23PY.1	500 ml	LDPE
23PY.2	1 l	LDPE

ROTI®Star Mineral Oil Blanks

For mixing and preparing calibration standards for the spectrometric analysis of metals in hydrocarbon/petrochemical samples.

Mineral oil Blank

ROTI®Star 75 cSt

For blank value measurement and dilution of samples in AAS, ICP-OES and ICP-MS.

WGK 1

Danger H304

Art. No.	Pack Qty.	Pack.
25T6.1	500 ml	plastic

Mineral oil Blank

ROTI®Star 20 cSt

For blank value measurement and dilution of samples in AAS, ICP-OES and ICP-MS.

WGK 1

Danger H304

Art. No.	Pack Qty.	Pack.
25T7.1	500 ml	plastic

Compounds for the Preparation of AAS and ICP Standards

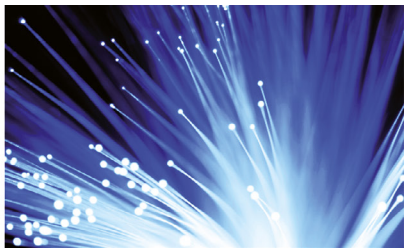
ROTI®METIC (Metal Inorganic Compounds)

Ultra Pure Metals and Inorganic Compounds

The ROTI®METIC product range comprises more than 180 high purity inorganic metals and metal compounds with purity levels ranging from 99,9 % (3N) to 99,9999 % (6N). Modern production technology as well as high quality and safety standards make it possible to achieve these high purity levels of metal traces from 100 ppm to 1 ppm. Up to 60 trace metal compounds are analysed by HR-ICP, ICP-OES, AAS, GD-MS and documented in the batch specific certificate of analysis supplied with the product. Our ultra high purity metals and metal compounds are ideal for the following applications:

- Instrumental analytics
- Chemical analyses & syntheses
- Crystal growth technology
- Nanotechnology
- Laser and Photovoltaic technology
- Optical fibres
- Photonics
- Fuel cells
- Catalysis

Our mission is to offer the quality and service you require in research & development and in production. Excellent value for money and the option of ordering in semi-bulk are strong arguments in favour of the ROTI®METIC product range.

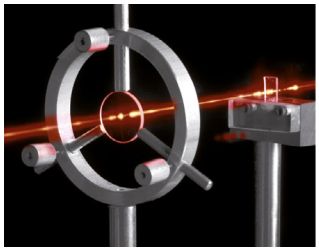


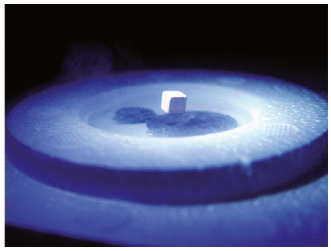
Product name	Purity	Art. No.	Pack Qty.
Aluminium chloride hexahydrate	99,9999 % (6N)	**5368.1**	25 g
		5368.2	100 g
Ammonium chloride	99,999 % (5N)	**5050.1**	50 g
		5050.2	100 g
Ammonium dihydrogen phosphate	99,999 % (5N)	**5580.1**	25 g
		5580.2	100 g
Ammonium molybdate(VI)	99,99 % (4N)	**5591.1**	5 g
		5591.2	25 g
Ammonium sulphate	99,999 % (5N)	**5606.1**	10 g
		5606.2	50 g
Barium carbonate	99,999 % (5N)	**5321.1**	25 g
		5321.2	100 g
Barium chloride	99,999 % (5N), anhydrous	**5051.1**	25 g
Boric acid	99,999 % (5N)	**5614.1**	25 g
		5614.2	100 g
Copper(II) sulphate pentahydrate	99,999 % (5N)	**1L53.1**	5 g
		1L53.2	25 g
Hydrogen tetrachloroaurate(III) hydrate	99,999 % (5N)	**5628.1**	1 g
Indium(III) bromide	99,999 % (5N)	**5322.1**	5 g
		5322.2	25 g
Indium(III) oxide	99,999 % (5N)	**5630.1**	5 g
		5630.2	25 g
Iodine(V) oxide	99,99 % (4N)	**5364.1**	5 g
		5364.2	25 g

Product name	Purity	Art. No.	Pack Qty.
Iron granules	99,99 % (4N)	**5631.1**	5 g
		5631.2	25 g
Iron(III) nitrate nonahydrate	99,999 % (5N)	**5632.1**	5 g
		5632.2	25 g
Iron(III) oxide	99,98 % (3N8)	**5634.1**	5 g
		5634.2	25 g
Palladium(II) chloride	99,999 % (5N)	**5653.1**	1 g
		5653.2	5 g
Potassium hydroxide	99,98 % (3N8)	**5658.1**	100 g
Potassium iodide	99,999 % (5N)	**5067.1**	25 g
Silicon dioxide	99,998 % (4N8)	**5738.1**	5 g
		5738.2	25 g
Sodium chloride	99,999 % (5N)	**5741.1**	5 g
		5741.2	25 g
		5741.3	100 g
Sodium fluoride	99,995 % (4N5)	**4503.1**	10 g
		4503.2	50 g
Vanadium(V) oxide	99,995 % (4N5)	**5370.1**	5 g
		5370.2	25 g
Zinc shot	99,999 % (5N)	**5345.1**	25 g
		5345.2	100 g

For safety information and additional data, see our current catalogue or at www.carlroth.com

Accessories for the Preparation of AAS and ICP Standards



Platinum crucible

Material: platinum / gold 95/5.
Temperature stable up to +1200 °C, up to max. 1300 °C for a short time.

Instructions for use: Normal analytical operations, but especially for coking and melting samples for XRF (X-ray fluorescence analysis).

Note: we reserve the right to adjust prices at short notice due to fluctuations in the price of materials quoted on the stock exchange. Further sizes available on request.

Platinum crucible

Ögussa.

Vol. (ml)	Ø Inner upper (mm)	Height (mm)	Weight (g)	Art. No.	Pack Qty.
5	20	23	3,7	**254E.1**	1 unit(s)
10	26	30	7,7	**254H.1**	1 unit(s)
25	35	37	21	**254K.1**	1 unit(s)
50	45	50	38	**254L.1**	1 unit(s)
100	55	60	65	**254N.1**	1 unit(s)

Lid for platinum crucible

Ögussa.

Height (mm)	Suitable for	Weight (g)	Art. No.	Pack Qty.
2.8	Crucible Ø 20 mm	2	**254P.1**	1 unit(s)
3.1	Crucible Ø 26 mm	2,6	**254T.1**	1 unit(s)
4.1	Crucible Ø 35 mm	4,7	**254X.1**	1 unit(s)
4.5	Crucible Ø 45 mm	6,6	**254Y.1**	1 unit(s)
5.1	Crucible Ø 55 mm	10,5	**255A.1**	1 unit(s)

Acids and Alkaline Solutions for AAS, ICP and IC

ROTIPURAN® Ultra/Supra

Acids, Alkaline Solutions and Water for trace analysis via ICP-OES, ICP-MS, AAS and IC

Carl ROTH provides two high quality product lines, ROTIPURAN® Ultra & Supra specially for research, trace analysis and electronics. These ultrapure reagents are produced using a technologically complex distillation process (subboiling distillation) and are filled only into specially selected, suitable containers under clean room conditions. Very extensive production and quality controls guarantee extremely high quality.

ROTIPURAN® Ultra

This ultrapure product line is characterised for its especially high purity (**ppt-quality**) and fulfils the highest purity requirements. The metal content of these products is below 100 ppt [parts per trillion=10^{-12}] while key metals are under 10 ppt. These products are used in ultra trace analysis (via ICP-OES, ICP-MS, AAS, IC) and for applications in the electronics industry. The reagents are bottled and offered in high class fluoropolymer plastic bottles (FEP). The certificates of analysis are available online.

Features:

- Specified metal content: less than 100 ppt
- Preponderant metals are under 10 ppt
- More than 65 analysed metals
- Produced and bottled under clean room conditions
- Continuous process control for highest product purity
- Bottled exclusively in purified fluoropolymer bottles
- Highest purity and maximum product safety

Product name	Brand/Purity	Thread	Pack.	Art. No.	Pack Qty.
Ammonia solution	ROTIPURAN®Ultra 20 %	38–430	HDPE	**HN66.2**	250 ml
				HN66.1	500 ml
				HN66.3	1 l
Hydrobromic acid	ROTIPURAN®Ultra 48 %	38–430	plastic (FEP)	**HN67.3**	250 ml
				HN67.1	500 ml
				HN67.2	1 l
				HN67.4	2 l
Hydrochloric acid	ROTIPURAN®Ultra 34 %	38–430	plastic (FEP)	**HN63.1**	250 ml
				HN63.2	500 ml
				HN63.3	1 l
				HN63.4	2 l
Hydrofluoric acid	ROTIPURAN®Ultra 48 %	38–430	plastic (FEP)	**HN64.2**	250 ml
				HN64.1	500 ml
				HN64.3	1 l
Hydrogen peroxide	ROTIPURAN®Ultra 31 %	38–430	plastic (FEP)	**HN69.1**	500 ml
Nitric acid	ROTIPURAN®Ultra 69 %	38–430	plastic (FEP)	**HN60.1**	250 ml
				HN60.2	500 ml
				HN60.3	1 l
				HN60.4	2 l
Perchloric acid	ROTIPURAN®Ultra 70 %	38–430	plastic (FEP)	**HN61.2**	250 ml
				HN61.1	500 ml
				HN61.3	1 l
Sulphuric acid	ROTIPURAN®Ultra 95 %	38–430	plastic (FEP)	**HN62.1**	250 ml
				HN62.2	500 ml
				HN62.3	1 l
				HN62.4	2 l
Water	ROTIPURAN®Ultra	38–430	LDPE	**HN68.1**	500 ml
				HN68.2	1 l
				HN68.3	2 l

For safety information and additional data, see our current catalogue or at www.carlroth.com

Acids and Alkaline Solutions for AAS, ICP and IC

ROTIPURAN® Supra

ppb Quality

This supra quality line (**ppb-quality**) is perfectly suitable for sample preparation in trace analysis (e.g. via ICP-OES, AAS, IC, etc.). Over 60 elements are specified and their content is below 1 ppb [parts per billion =10^{-9}]. Bottled and delivered in special plastic bottles. The certificates of analysis are available online.

Features:

- Maximum metal contamination: <1 ppb
- 60 specified metals
- Produced and filled under clean room conditions
- Bottled in special lightweight bottles for greater safety and easier handling. 2,5 liter bottles have got a handle
- HF is delivered with additional drop spout for safe handling
- Extremely economical purity for most analytic applications

Product name	Brand/Purity	Thread	Pack.	Art. No.	Pack Qty.
Acetic acid	ROTIPURAN®Supra 100 %	GL 45	HDPE	**HN55.1**	500 ml
				HN55.3	1 l
				HN55.4	2.5 l
		38–430		**HN55.5**	4 l
Ammonia solution	ROTIPURAN®Supra 20 %	38–430	HDPE	**HN56.1**	500 ml
				HN56.3	4 l
Hydrochloric acid	ROTIPURAN®Supra 35 %	GL 45	HDPE	**HN53.1**	500 ml
				HN53.2	1 l
				HN53.3	2.5 l
		38–430		**HN53.4**	4 l
	ROTIPURAN®Supra 30 %	GL 45	HDPE	**NE57.2**	1 l
				NE57.3	2.5 l
Hydrofluoric acid	ROTIPURAN®Supra 48 %	38–430	LDPE	**HN54.1**	500 ml
Nitric acid	ROTIPURAN®Supra 69 %	GL 45	HDPE	**HN50.1**	500 ml
				HN50.2	1 l
				HN50.3	2.5 l
	ROTIPURAN®Supra 65 %	GL 45	HDPE	**1YLN.1**	1 l
				1YLN.2	2.5 l
Perchloric acid	ROTIPURAN®Supra 70 %	GL 45	HDPE	**HN51.1**	500 ml
				HN51.3	1 l
				HN51.4	2.5 l
Sulphuric acid	ROTIPURAN®Supra 95 %	GL 45	HDPE	**HN52.1**	500 ml
				HN52.2	1 l
				HN52.5	2.5 l
Water	ROTIPURAN®Supra	GL 45	HDPE	**21A2.1**	1 l
				21A2.2	2.5 l
	ROTIPURAN® Low organic	38–430	glass	**HN57.1**	1 l
				HN57.2	4 l

For safety information and additional data, see our current catalogue or at www.carlroth.com

Accessories for AAS and ICP

Dispenser Ultra / Ultra HF

For dispensing highly pure acids and alkalis.
Suitable for use in ultra trace analysis.

General features of all models:

- **Free of metals**
- Made of high quality and highly pure plastics (PTFE, TFM and PFA)
- Calibrated and mechanically tested for precision and accuracy
- 38-430 thread (fits ROTIPURAN® Ultra products)

When using bottles with a GL 45 thread, please order fastening for dispenser KK11.1 separately.

Dispenser Ultra

ROTH SELECTION.

Properties:

- Acid cleansed
- Manufactured in cleanroom (class 100)

Volume (ml)	Graduation (ml)	Tolerance (ml)	Art. No.	Pack Qty.
0,5–5	0,5	±0,02	**KK97.1**	1 unit(s)

Dispenser Ultra HF

ROTH SELECTION.

Properties:

- Specially for dispensing hydrofluoric acids
- Also suitable for analytical acids

Volume (ml)	Graduation (ml)	Tolerance (ml)	Art. No.	Pack Qty.
0,5–5	0,5	±0,02	**KK98.1**	1 unit(s)

Accessories for Ultra/Ultra HF dispensers

Bottle holder for Ultra/Ultra HF dispensers

ROTH SELECTION.

Stabilises bottles when using a dispenser. The four-screw system is suitable for both square bottles and round bottles. The bottle holder is designed for ROTIPURAN® Supra and Ultra bottles with capacities from 250 ml to 2 litres.

Also suitable for bottles with a diameter from approx. 7.0 cm to 11.5 cm.

Version	Art. No.	Pack Qty.
Bottle holder	**KK99.1**	1 unit(s)

Adapter to GL 45 for Ultra/Ultra HF dispensers

ROTH SELECTION. Material: PTFE.

For bottles with GL 45 thread, specially for the use of ROTIPURAN® Supra products with Ultra and Ultra HF dispensers.

Version	Art. No.	Pack Qty.
Adapter	**KK11.1**	1 unit(s)

Bottles ROTIPURAN®Ultra for AAS and ICP

ready-to-use

Material: FEP, cleaned by High Purity acids.
All bottles are cleaned by a leaching process with ROTIPURAN®Ultra acids.

Vol.	Version	Thread	Art. No.	Pack Qty.
30 ml	with Screw Cap	20–415	**1Y28.1**	1 unit(s)
	with Dropper Cap		**1Y29.1**	1 unit(s)
125 ml	with Screw Cap	38–430	**1Y2A.1**	1 unit(s)
250 ml			**1Y2C.1**	1 unit(s)
500 ml			**1Y2E.1**	1 unit(s)
1,000 ml			**1Y2H.1**	1 unit(s)
2,000 ml			**1Y2K.1**	1 unit(s)

For safety information and additional data, see our current catalogue or at www.carlroth.com

Ion Chromatography

ROTI®Star Standards for IC

Carl ROTH has an extensive range of products which meets the highest standards of quality in the field of ion standards. The solutions and mixtures are made using materials of the highest purity, and therefore meet the requirements for instrumental analysis by IC. All solutions are certified and can be traced to NIST or BAM standard reference solutions. Solutions are produced according to **ISO 17034** in an accredited environment. The solutions are tested in a laboratory accredited to **ISO/IEC 17025** and supplied with a detailed, batch-specific certificate of analysis.

Ion Standards for IC

Each standard solution is made of high-purity starting materials, and its content is determined gravimetrically and by ion chromatography. They come with certificates of analysis and an ion chromatogram.

- Single and multi-element-standards
- Anion and cation multi-element-standards

Anionic Standards for IC 1000 mg/l (1 g/l)

ready-to-use

Product name	Ion	Matrix	Art. No.	Pack Qty.
Acetate IC Standard Solution	CH_3COO^-	H_2O	**1989.1**	100 ml
			1989.2	500 ml
Butyrate IC Standard Solution	$C_6H_5COO^-$	H_2O	**1T7A.1**	100 ml
			1T7A.2	250 ml
			1T7A.3	500 ml
Benzoate IC Standard Solution	$C_6H_5COO^-$	H_2O	**8168.1**	100 ml
			8168.2	500 ml
Bromate IC Standard Solution	BrO_3^-	H_2O	**8170.1**	100 ml
			8170.2	500 ml
Bromide IC Standard Solution	Br^-	H_2O	**2655.1**	100 ml
			2655.2	500 ml
Chlorate IC Standard Solution	ClO_3^-	H_2O	**8171.1**	100 ml
			8171.2	500 ml
Chloride IC Standard Solution	Cl^-	H_2O	**23LN.1**	100 ml
			23LN.2	250 ml
			23LN.3	500 ml
	Cl^-	H_2O	**2656.1**	100 ml
			2656.2	500 ml
Chlorite IC Standard Solution	ClO_2^-	0.1% NaOH	**8172.1**	100 ml
Chromate IC Standard Solution	CrO_4^{2-}	H_2O	**2657.1**	100 ml
			2657.2	500 ml
Citrate IC Standard Solution	$C_3H_4(OH)(COO)_3^{3-}$	H_2O	**8173.1**	100 ml
			8173.2	500 ml
Cyanide IC Standard Solution	CN^-	0,1 % KOH	**2658.1**	100 ml
			2658.2	500 ml
	CN^-	0,1 % KOH	**1L7A.1**	100 ml
			1L7A.2	250 ml
			1L7A.3	500 ml
Fluoride IC Standard Solution	F^-	H_2O	**2659.1**	100 ml
			2659.2	500 ml
Formate IC Standard Solution	$HCOO^-$	H_2O	**1999.1**	100 ml
			1999.2	500 ml
Iodate IC Standard Solution	IO_3^-	H_2O	**8174.1**	100 ml
			8174.2	500 ml
Iodide IC Standard Solution	I^-	H_2O	**2660.1**	100 ml
			2660.2	500 ml

Ion Standards for IC

Anionic Standards for IC 1000 mg/l (1 g/l)

Product name	Ion	Matrix	Art. No.	Pack Qty.
Lactate IC Standard Solution	$C_2H_4(OH)COO^-$	H_2O	**8176.1**	100 ml
			8176.2	500 ml
Maleate IC Standard Solution	$C_2H_2(COO)_2^{2-}$	H_2O	**8181.1**	100 ml
			8181.2	500 ml
Nitrate IC Standard Solution	NO_3^-	H_2O	**2661.1**	100 ml
			2661.2	500 ml
Nitrate as N IC Standard Solution	NO_3^--N	H_2O	**1PTN.1**	100 ml
			1PTN.2	250 ml
			1PTN.3	500 ml
Nitrite IC Standard Solution	NO_2^-	H_2O	**2664.1**	100 ml
			2664.2	500 ml
Nitrite as N IC Standard Solution	NO_2^-	H_2O	**1T79.1**	100 ml
			1T79.2	250 ml
			1T79.3	500 ml
Oxalate IC Standard Solution	$C_2O_4^{2-}$	H_2O	**2008.1**	100 ml
			2008.2	500 ml
Perchlorate IC Standard Solution	ClO_4^-	H_2O	**8186.1**	100 ml
			8186.2	500 ml
Phosphate IC Standard Solution	PO_4^{3-}	H_2O	**2665.1**	100 ml
			2665.2	500 ml
Phosphate as P IC Standard Solution	PO_4^{3-}	H_2O	**1T5P.1**	100 ml
			1T5P.2	250 ml
			1T5P.3	500 ml
Propionate IC Standard Solution	$C_2H_5COO^-$	H_2O	**8183.1**	100 ml
			8183.2	500 ml
Succinate IC Standard Solution	$C_2H_4(COO)_2^{2-}$	H_2O	**8187.1**	100 ml
			8187.2	500 ml
Sulphate IC Standard Solution	SO_4^{2-}	H_2O	**2666.1**	100 ml
			2666.2	500 ml
Sulphite IC Standard Solution	SO_3^{2-}	H_2O	**8192.1**	100 ml
			8192.2	500 ml
Tartrate IC Standard Solution	$C_2H_4O_2(COO)_2^{2-}$	H_2O	**8201.1**	100 ml
			8201.2	500 ml
Thiocyanate IC Standard Solution	SCN^-	H_2O	**8205.1**	100 ml
			8205.2	500 ml
Thiosulphate IC Standard Solution	$S_2O_3^{2-}$	0,1 % $C_5H_{12}O$ (pentan-1-ol)	**8207.1**	100 ml
			8207.2	500 ml
Ammonium as N IC Standard Solution	NH^{4+}	H_2O	**1T5N.2**	250 ml
			1T5N.3	500 ml

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Cationic Standards for IC 1000 mg/l (1 g/l)

ready-to-use

Product name	Ion	Matrix	Art. No.	Pack Qty.
Ammonium IC Standard Solution	NH^{4+}	H_2O	**2654.1**	100 ml
			2654.2	500 ml
Ammonium as N IC Standard Solution	NH^{4+}	H_2O	**1T5N.1**	100 ml
			1T5N.2	250 ml
			1T5N.3	500 ml
Barium IC Standard Solution	Ba^{2+}	H_2O	**8167.1**	100 ml
			8167.2	500 ml
Caesium IC Standard Solution	Cs^+	H_2O	**8166.1**	100 ml
Calcium IC Standard Solution	Ca^{2+}	H_2O	**1986.1**	100 ml
			1986.2	500 ml
Lithium IC Standard Solution	Li^+	H_2O	**8158.1**	100 ml
			8158.2	500 ml
Magnesium IC Standard Solution	Mg^{2+}	H_2O	**1987.1**	100 ml
			1987.2	500 ml
Potassium IC Standard Solution	K^+	H_2O	**1985.1**	100 ml
			1985.2	500 ml
Sodium IC Standard Solution	Na^+	H_2O	**1984.1**	100 ml
			1984.2	500 ml
Strontium IC Standard Solution	Sr^{2+}	H_2O	**1988.1**	100 ml
			1988.2	500 ml

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Ion Multi-Element Standards for IC

Ion Multi-Element Standards for IC

Product name	Composition	Matrix	Art. No.	Pack Qty.
Anion Multi-Element IC Standard Solution	Cl^- (5000), SO_4^{2-} (10000)	H_2O	**240X.1**	100 ml
			240X.2	250 ml
			240X.3	500 ml
	Cl^-, NO_3^-, SO_4^{2-}	H_2O	**2026.1**	100 ml
			2026.2	500 ml
	F^-, Br^-, PO_4^{3-}	H_2O	**2029.1**	100 ml
			2029.2	500 ml
	ClO_3^- (10), ClO_2^- (2), BrO_3^- (2)	H_2O	**1T15.1**	100 ml
			1T15.2	250 ml
			1T15.3	500 ml
	Acetate (CH_3COO^-), Oxalate ($C_2O_4^{2-}$), Formiate ($HCOO^-$), Propionate ($C_2H_5COO^-$)	H_2O	**22HA.1**	100 ml
			22HA.2	250 ml
			22HA.3	500 ml
	Cl^- (20), NO_2^- (0.31), NO_3^- (4.5), PO_4^{3-} (0.33), SO_4^{2-} (50)	H_2O	**1YKY.1**	100 ml
			1YKY.2	250 ml
			1YKY.3	500 ml
	Cl^- (100), NO_2^- (2.3), NO_3^- (22.6), PO_4^{3-} (6.5), SO_4^{2-} (150)	H_2O	**1YL0.1**	100 ml
			1YL0.2	250 ml
			1YL0.3	500 ml
	Cl^- (1000), F^- (200), NO_2^--N (1000), NO_3^--N (200), SO_4^{2-} (1000)	H_2O	**255H.1**	100 ml
			255H.2	250 ml
			255H.3	500 ml
	F^-, Cl^-, Br^-, NO_3^-, PO_4^{3-}, SO_4^{2-}	H_2O	**2030.1**	100 ml
			2030.2	500 ml
	F^-, Cl^-, NO_2^-, Br^-, NO_3^-, PO_4^{3-}, SO_4^{2-}	H_2O	**22H9.1**	100 ml
			22H9.2	250 ml
	F^-, Cl^-, NO_2^-, Br^-, NO_3^-, PO_4^{3-}, SO_4^{2-}	H_2O	**1N7P.1**	100 ml
			1N7P.2	250 ml
			1N7P.3	500 ml
			1N7P.4	1,000 ml
	F^- (5), Cl^- (10), NO_2^- (15), Br^- (25), NO_3^- (25), PO_4^{3-} (40), SO_4^{2-} (30)	H_2O	**2668.1**	100 ml
			2668.2	500 ml
	F^- (20), Cl^- (80), NO_2^- (10), Br^- (10), NO_3^- (40), PO_4^{3-} (20), SO_4^{2-} (120)	H_2O	**1LYE.1**	100 ml
			1LYE.2	250 ml
			1LYE.3	500 ml
			1LYE.4	1,000 ml
	F^- (100), Cl^- (1000), NO_2^- (100), Br^- (100), NO_3^- (1000), PO_4^{3-} (100), SO_4^{2-} (1000)	H_2O	**1T14.1**	100 ml
			1T14.2	250 ml
			1T14.3	500 ml
	F^- (10), Cl^- (100), NO_2^- (10), Br^- (10), NO_3^- (10), PO_4^{3-} (10), SO_4^{2-} (100)	H_2O	**1T6X.1**	100 ml
			1T6X.2	250 ml
			1T6X.3	500 ml
			1T6X.4	1,000 ml
	F^- (10), Cl^- (50), Br^- (50), NO_2^- (20), NO_3^- (50), PO_4^{3-} (50), SO_4^{2-} (100)	H_2O	**240Y.1**	100 ml
			240Y.2	250 ml
			240Y.3	500 ml
	F^- (15), Cl^- (1000), NO_2^- (5), Br^- (10), NO_3^- (500), PO_4^{3-} (100), SO_4^{2-} (1000)	H_2O	**251K.1**	100 ml
			251K.2	250 ml
			251K.3	500 ml
	F^- (1000), Cl^- (1000), Br^- (200), $N(NO_2^-)$ (1000), $N(NO_3^-)$ (200), $P(PO_4^{3-})$ (1000), SO_4^{2-} (1000)	H_2O	**1NPC.1**	100 ml
			1NPC.2	250 ml
			1NPC.3	500 ml
Cation Multi-Element IC Standard Solution	Na^+, K^+, Mg^{2+}, Ca^{2+}	H_2O	**2032.1**	100 ml
			2032.2	500 ml
	NH^{4+} (3.88), Ca^{2+} (10), K^+ (5), Mg^{2+} (5), Na^+ (20)	H_2O	**1YKT.1**	100 ml
			1YKT.3	100 ml
			1YKT.2	250 ml
	NH^{4+} (38,83), Ca^{2+} (75), K^+ (50), Mg^{2+} (50), Na^+ (100)	H_2O	**1YKX.1**	100 ml
			1YKX.2	250 ml
			1YKX.3	500 ml
	NH^{4+} (40), Ca^{2+} (40), K^+ (20), Li^+ (10), Mg^{2+} (20), Na^+ (20)	0,1 % HNO_3	**2669.1**	100 ml
			2669.2	500 ml
	NH_4^+, Ba^{2+}, Ca^{2+}, K^+, Li^+, Mg^{2+}, Mn^{2+}, Na^+, Sr^{2+}	0,1 % HNO_3	**1YKN.1**	100 ml

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Dear Customer,

We are offering you our **ROTI®Star multi-element standard solutions** as custom-made special products in all common container sizes.

Our multi-element standard solutions are certified and **traceable to NIST** standard reference materials and are delivered with a comprehensive, batch-specific certificate of analysis.

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Is something missing or do you have any questions?

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