

Trace Analysis Arium® Mini Essential Extend

Elements	Detection Threshold	Calculated Concentration Arium® Ultrapure Water	Unit	Procedure
Aluminium, Al	0.5	1.1	ng/L (ppt)	ICP-MS
Antimony, Sb	0.005	0.02	ng/L (ppt)	ICP-MS
Arsenic, As	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Barium, Ba	0.02	0.3775	ng/L (ppt)	ICP-MS
Beryllium, Be	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Bismuth, Bi	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Boron, B	0.5	0.625	ng/L (ppt)	ICP-MS
Bromine, Br	5	Under detection threshold	ng/L (ppt)	ICP-MS
Cadmium, Cd	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Calcium, Ca	5	12.25	ng/L (ppt)	ICP-MS
Cerium, Ce	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Cesium, Cs	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Chromium, Cr	0.02	0.0275	ng/L (ppt)	ICP-MS
Cobalt, Co	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Copper, Cu	0.1	0.195	ng/L (ppt)	ICP-MS
Dysprosium, Dy	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Erbium, Er	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Europium, Eu	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Gadolinium, Gd	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Gallium, Ga	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Germanium, Ge	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Gold, Au	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Hafnium, Hf	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Holmium, Ho	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Iodine, I	0.2	Under detection threshold	ng/L (ppt)	ICP-MS
Iridium, Ir	0.001	Under detection threshold	ng/L (ppt)	ICP-MS
Iron, Fe	0.2	0.2575	ng/L (ppt)	ICP-MS
Lanthanum, La	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Lead, Pb	0.01	0.0425	ng/L (ppt)	ICP-MS
Lithium, Li	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Lutetium, Lu	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Magnesium, Mg	0.1	0.12	ng/L (ppt)	ICP-MS

Execution and Analysis Procedure

The water analysis was executed by ALS Scandinavia AB, an internationally recognized testing laboratory for special analytics, based on the ICP-SMS (HR-ICP-MS) after 50-fold preconcentration by sub-boiling distillation. The trace elements are determined using 18 scans over the mass range, resulting in total measurement time of 300 s. All concentrations are within $\pm 30\%$ of the reported value. This may not apply to Br and I. The tests were performed with an Arium® Mini Essential Extend, without final filter, fed with DI water.

Elements	Detection Threshold	Calculated Concentration Arium® Ultrapure Water	Unit	Procedure
Manganese, Mn	0.05	0.0275	ng/L (ppt)	ICP-MS
Mercury, Hg	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Molybdenum, Mo	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Neodymium, Nd	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Nickel, Ni	0.1	0.1725	ng/L (ppt)	ICP-MS
Niobium, Nb	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Osmium, Os	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Palladium, Pd	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Phosphorus, P	0.4	0.475	ng/L (ppt)	ICP-MS
Platinum, Pt	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Potassium, K	5	14.5	ng/L (ppt)	ICP-MS
Praseodymium, Pr	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Rhenium, Re	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Rhodium, Rh	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Rubidium, Rb	0.01	0.0225	ng/L (ppt)	ICP-MS
Ruthenium, Ru	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Samarium, Sm	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Scandium, Sc	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Selenium, Se	0.05	Under detection threshold	ng/L (ppt)	ICP-MS
Silicon, Si	30	Under detection threshold	ng/L (ppt)	ICP-MS
Silver, Ag	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Sodium, Na	10	16.45	ng/L (ppt)	ICP-MS
Strontium, Sr	0.01	0.0275	ng/L (ppt)	ICP-MS
Sulphur, S	10	Under detection threshold	ng/L (ppt)	ICP-MS
Tantalum, Ta	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Tellurium, Te	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Terbium, Tb	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Thallium, Tl	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Thorium, Th	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Thulium, Tm	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Tin, Sn	0.02	0.0725	ng/L (ppt)	ICP-MS
Titanium, Ti	0.1	Under detection threshold	ng/L (ppt)	ICP-MS
Tungsten, W	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Uranium, U	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Vanadium, V	0.01	Under detection threshold	ng/L (ppt)	ICP-MS
Ytterbium, Yb	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Yttrium, Y	0.005	Under detection threshold	ng/L (ppt)	ICP-MS
Zinc, Zn	0.2	0.36	ng/L (ppt)	ICP-MS
Zirconium, Zr	0.005	Under detection threshold	ng/L (ppt)	ICP-MS

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