

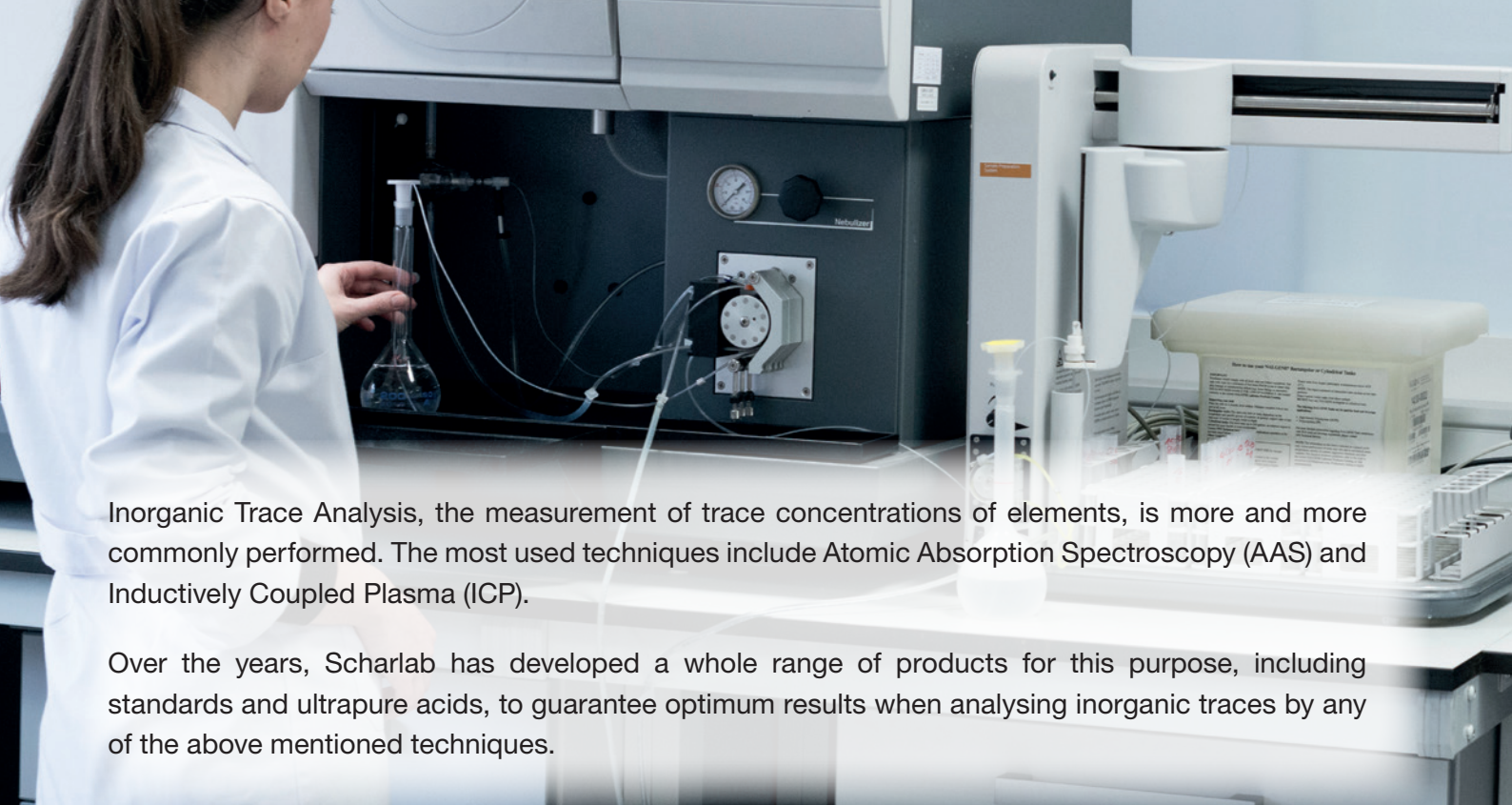


The wise choice

Inorganic Trace Analysis

Pure confidence





Inorganic Trace Analysis, the measurement of trace concentrations of elements, is more and more commonly performed. The most used techniques include Atomic Absorption Spectroscopy (AAS) and Inductively Coupled Plasma (ICP).

Over the years, Scharlab has developed a whole range of products for this purpose, including standards and ultrapure acids, to guarantee optimum results when analysing inorganic traces by any of the above mentioned techniques.

ICP

ICP is a technique used for elemental analysis which atomises and ionises the elements of a sample and combines with Optical Emission Spectrometry (ICP-OES) or Mass Spectrometry (ICP-MS) for its detection.

Unlike atomic absorption spectroscopy, which usually measures one single element at a time, ICP has the capacity to scan for various elements simultaneously.

ICP-OES

Inductively coupled plasma optical emission spectrometry (ICP-OES) is a type of emission spectroscopy that uses an argon plasma to atomise and ionise the sample. Once dissociated, the atoms are excited and emit light of a characteristic wavelength. The intensity of this emission is used to calculate the concentration of the element in the sample.

Typical detection limits for this technique are around 1-10 ppb.

ICP-MS

This technique also uses argon plasma to dissociate the sample into atoms and ions, but in this case the mass spectrometer detects the actual ions instead of the light they emit. Once extracted from the plasma, the ions continue to the mass spectrometer, where they are separated according to their atomic mass-charge ratio.

In this case, detection limits are usually around 1-10 ppt.

Atomic Absorption Spectrometry (AAS)

AAS uses absorption spectrometry to assess the concentration of an analyte in a sample and requires standards with known analyte content to establish the relationship between the measured absorbance and the analyte concentration. Depending on the atomizer used (flame or graphite tube) AAS can be:

Flame Atomic Absorption Spectrometry (FAAS)

FAAS uses a flame to dissociate the sample into free atoms. After dissociation, light from a hollow cathode lamp passes through the cloud of atoms and those of interest absorb it at a characteristic wavelength. The amount of light absorbed will be directly proportional to the concentration of the element in the original sample.

The typical detection limits for this technique are around 10-100 ppb.

Graphite Furnace Atomic Absorption Spectrometry (GFAAS)

In GFAAS, the flame has been replaced by a graphite tube, which is heated to remove the solvents and matrix and dissociate the sample. Once it is totally atomized, the atoms are retained in the tube for a longer period of time, which makes this technique's sensitivity significantly higher than that of flame AAS. In this case, the detection limits are usually around 10-100 ppt.

Depending on the technique used, the standards and the quality of acids needed for optimum results will be different.

Ultratrace® Ultrapure Acids

Ultrapure reagents are needed in the digestion of solid samples prior to analysis using atomic spectroscopy methods such as ICP or AAS. These techniques have very low detection limits: parts per billion (ppb) or parts per trillion (ppt). It is crucial that the ultrapure acids are free of metal traces.

Scharlab offers **Ultratrace®**, a wide range of ppb-grade and ppt-grade ultrapure reagents for inorganic trace analysis. Ultratrace® comprises extremely pure acids and reagents in two grades:

Ultratrace® ppb grade

Ultratrace® ppt grade

- ◆ Outstanding low metal content, purest acids available.
- ◆ Analytical results for more than 60 metals, determined using ICP-MS.
- ◆ Ultratrace® undergo a proprietary purification process.
- ◆ Products and bottles are manufactured under trace metal clean conditions.



Ultratrace® ppb grade

Our ppb grade comprises acids and ammonia, for optimum result when analysing inorganic traces.

- ◆ All of them certified at maximum element impurity levels of 1 part per billion (ppb).
- ◆ Available in 500ml and 1l bottles, and hydrochloric and nitric acid also in 2,5l bottles.
- ◆ All packed in PE bottles with the exception of perchloric acid, which is packed in glass bottles.
- ◆ The PE bottles are lighter, safer and more suitable as they do not transfer any metallic impurities into the acids.

Ultratrace® ppt grade

Our ppt grade line includes acids, ammonia, hydrogen peroxide and water.

- ◆ All of them certified at maximum element impurity levels of 100 part per trillion (ppt).
- ◆ All packaged in PTFE, PFA and FEP fluoropolymer bottles with the exception of ammonia and water, which are packed in PE bottles.
- ◆ Available in 250ml and 500ml bottles, and water in 1l bottles.
- ◆ The PTFE, PFA and FEP fluoropolymer containers are optimum for maintaining the product in excellent condition during its shelf life.

Description	Art. No.
Acetic acid glacial Ultratrace®, ppb-trace analysis	AC0358
Ammonia, solution 20-22% Ultratrace®, ppb-trace analysis	AM0269
Hydrochloric acid, 37% Ultratrace®, ppb-trace analysis	AC0780
Hydrofluoric acid, 48% Ultratrace®, ppb-trace analysis	AC1061
Nitric acid, 69% Ultratrace®, ppb-trace analysis	AC1617
Perchloric acid, 70% Ultratrace®, ppb-trace analysis	AC1761
Sulfuric acid, 96% Ultratrace®, ppb-trace analysis	AC2114

Description	Art. No.
Acetic acid glacial Ultratrace®, ppt-trace analysis	AC0359
Ammonia, solution 20-22% Ultratrace®, ppt-trace analysis	AM0272
Hydrochloric acid, 35% Ultratrace®, ppt-trace analysis	AC0781
Hydrofluoric acid, 48% Ultratrace®, ppt-trace analysis	AC1062
Hydrogen peroxide, solution 30% w/w (110 vol) Ultratrace®, ppt-trace analysis	HI0143
Nitric acid, 69% Ultratrace®, ppt-trace analysis	AC1618
Sulfuric acid, 96% Ultratrace®, ppt-trace analysis	AC2115
Water Ultratrace®, ppt-trace analysis	AG0016



Scharlau ICP Standards

Used as external standards for the calibration of ICP equipment. Due to its higher sensitivity the ICP technique requires standards of extremely high purity:

- ◆ Manufactured with ultra high purity elements and acids, Scharlau ICP standards guarantee optimum performance and reliable results.
- ◆ Our ICP standards are prepared starting from metals having a minimum purity of 99.99%, dissolved in ultrapure acids.
- ◆ All directly traceable to the NIST.
- ◆ Produced in an accredited ISO 17025 and ISO Guide 34 laboratory.
- ◆ Wide range of single element standards and also multi-element mixtures on demand.
- ◆ Packed in 100ml HDPE bottles, previously leached with acid, to ensure the absence of impurities.
- ◆ Translucent bottles: the remaining value product is always visible.
- ◆ The Certificate of Analysis always supplied with the product.
- ◆ Tested by gravimetric, volumetric or ICP methods.

All our ICP standards are made in aqueous matrix.

ICP, just like AAS, is not an absolute technique, so it needs standards of a known concentration of the element/s to be able to determine the concentration of the element present in the original sample.

**ISO 17025
COMPLIANCE**

ICP Standards Single Element

Description	Art. No.
Aluminium, standard solution 1000 mg/l for ICP	AL0754
Antimony, standard solution 1000 mg/l for ICP	AN0445
Arsenic, standard solution 1000 mg/l for ICP	AR0156
Barium, standard solution 1000 mg/l for ICP	BA0016
Beryllium, standard solution 1000 mg/l for ICP	BE0346
Bismuth, standard solution 1000 mg/l for ICP	BI0136
Boron, standard solution 1000 mg/l for ICP	BO0018
Cadmium, standard solution 1000 mg/l for ICP	CA0045
Calcium, standard solution 1000 mg/l for ICP	CA0181
Cerium, standard solution 1000 mg/l for ICP	CE0038
Cesium, standard solution 1000 mg/l for ICP	CE0108
Chromium, standard solution 1000 mg/l for ICP	CR0227
Cobalt, standard solution 1000 mg/l for ICP	CO0014
Copper, standard solution 1000 mg/l for ICP	CO0081
Dysprosium, standard solution 1000 mg/l for ICP	DI1301
Erbium, standard solution 1000 mg/l for ICP	ER0031
Europium, standard solution 1000 mg/l for ICP	EU0052
Gadolinium, standard solution 1000 mg/l for ICP	GA0011
Gallium, standard solution 1000 mg/l for ICP	GA0036
Germanium, standard solution 1000 mg/l for ICP	GE0072
Gold, standard solution 1000 mg/l for ICP	OR0063
Hafnium, standard solution 1000 mg/l for ICP	HA0011
Indium, standard solution 1000 mg/l for ICP	IN0088
Iridium, standard solution 1000 mg/l for ICP	IR0011
Iron, standard solution 1000 mg/l for ICP	HI0291
Lanthanum, standard solution 1000 mg/l for ICP	LA0081
Lead, standard solution 1000 mg/l for ICP	PL0108
Lithium, standard solution 1000 mg/l for ICP	LI0064
Lutetium, standard solution 1000 mg/l for ICP	LU0016
Magnesium, standard solution 1000 mg/l for ICP	MA0016
Manganese, standard solution 1000 mg/l for ICP	MA0116
Mercury, standard solution 1000 mg/l for ICP	ME0116

Description	Art. No.
Molybdenum, standard solution 1000 mg/l for ICP	MO0024
Neodymium, standard solution 1000 mg/l for ICP	NE0064
Nickel, standard solution 1000 mg/l for ICP	NI0126
Niobium, standard solution 1000 mg/l for ICP	NI0071
Osmium, standard solution 1000 mg/l for ICP	OS0056
Palladium, standard solution 1000 mg/l for ICP	PA0066
Phosphorus, standard solution 1000 mg/l for ICP	FO0036
Platinum, standard solution 1000 mg/l for ICP	PT0006
Potassium, standard solution 1000 mg/l for ICP	PO0111
Rhenium, standard solution 1000 mg/l for ICP	RE0078
Rhodium, standard solution 1000 mg/l for ICP	RO0023
Rubidium, standard solution 1000 mg/l for ICP	RU0021
Ruthenium, standard solution 1000 mg/l for ICP	RU0063
Samarium, standard solution 1000 mg/l for ICP	SA0211
Scandium, standard solution 1000 mg/l for ICP	ES0021
Selenium, standard solution 1000 mg/l for ICP	SE0016
Silicon, standard solution 1000 mg/l for ICP	SI0016
Silver, standard solution 1000 mg/l for ICP	PL0008
Sodium, standard solution 1000 mg/l for ICP	SO0009
Strontium, standard solution 1000 mg/l for ICP	ES0181
Sulfur, standard solution 1000 mg/l for ICP	SU0102
Tantalum, standard solution 1000 mg/l for ICP	TA0201
Tellurium, standard solution 1000 mg/l for ICP	TE0023
Thallium, standard solution 1000 mg/l for ICP	TA0031
Tin, standard solution 1000 mg/l for ICP	ES0066
Titanium, standard solution 1000 mg/l for ICP	TI0366
Tungsten, standard solution 1000 mg/l for ICP	TU0016
Vanadium, standard solution 1000 mg/l for ICP	VA0076
Ytterbium, standard solution 1000 mg/l for ICP	IT0004
Yttrium, standard solution 1000 mg/l for ICP	IT0011
Zinc, standard solution 1000 mg/l for ICP	CI0129
Zirconium, standard solution 1000 mg/l for ICP	CI0256

ICP Multielement Standards

ISO 17025
COMPLIANCE

Description	Art. No.
ICP multielement calibration standard solution, 26 elements	MU0111
ICP multielement calibration standard solution, 9 elements	MU0112
ICP multielement calibration standard solution, 16 elements	MU0113
ICP multielement calibration standard solution, 4 elements	MU0114

Please do not hesitate to contact us if you require a special mixture.

Scharlau Reagent grade Acids

This is the routinely used grade for laboratory analytical work and comprises high quality chemicals for laboratory and specialized industrial use. Analytical reagents are in most cases labelled ISO ACS.

Scharlau reagent grade acids are a competitive choice for inorganic trace analysis by FAAS.

- ◆ With up to 34 elements analysed.
- ◆ Available in 1 and 2,5l glass bottles and HDPE bottles, and the more concentrated acids are also in safe plastic-coated bottles.

Description	Art. No.
Acetic acid glacial, reagent grade, ACS ISO	AC0353
Hydrochloric acid, 37%, reagent grade, ACS, ISO	AC0741
Nitric acid 65%, reagent grade, ISO Ph Eur	AC1601
Nitric acid 69,5%, reagent grade, ACS ISO	AC1600
Sulfuric acid 95-97%, reagent grade, ISO	AC2067

Scharlau Reagent grade Acids with low mercury content

Mercury, a highly toxic contaminant enters the human food chain through river and sea water. Mercury analysis of fish is performed by means of CVAAS (Cold Vapour Atomic Absorption Spectroscopy). Before the analysis, the samples are digested in mineral acids, which must be mercury-free.

Our low mercury content acids have a guaranteed maximum of 5 ppb Hg, which is optimum for the determination of mercury.

- ◆ Up to 34 elements analysed, each of them has a guaranteed maximum of 500 ppb per element, most of them at levels between 10 and 50 ppb.
- ◆ Available in 1 and 2,5l glass bottles.
- ◆ Comply with ACS and ISO.

Description	Art. No.
Hydrochloric acid, 37%, reagent grade, ACS, ISO	AC0730
Nitric acid, min. 69,5%, reagent grade, ACS, ISO	AC1607
Nitric acid, solution min. 65% w/w, reagent grade, ISO	AC1605
Sulfuric acid, 95 - 98%, reagent grade, ACS, ISO	AC2097



Scharlau AAS Standards

Used as external standards to calibrate AAS equipment, these must have a very accurate concentration.

Our AAS standards are manufactured using high purity elements and acids to guarantee optimum performance and reliable results. They all have a concentration of 1000 ppm of the element.

- ◆ Available in 100 and 500ml HDPE bottles, with the exception of gold, which is available in glass bottles.
- ◆ All traceable to NIST and the number of the standard they are traceable to is available on each certificate of analysis.
- ◆ The Certificate of Analysis always supplied with the product.
- ◆ Tested by gravimetric, volumetric or ICP methods.

Each standard contains the element dissolved in the most suitable matrix.



**ISO 17025
COMPLIANCE**

Description	Art. No.
Aluminium, standard solution 1000 mg/l Al for AA	AL0751
Antimony, standard solution 1000 mg/l Sb for AA	AN0440
Arsenic, standard solution 1000 mg/l As for AA	AR0151
Barium, standard solution 1000 mg/l Ba for AA	BA0010
Bismuth, standard solution 1000 mg/l Bi for AA	BI0130
Boron, standard solution 1000 mg/l B for AA	BO0013
Cadmium, standard solution 1000 mg/l Cd for AA	CA0041
Calcium, standard solution 1000 mg/l Ca for AA	CA0176
Chromium, standard solution 1000 mg/l Cr for AA	CR0222
Cobalt, standard solution 1000 mg/l Co for AA	CO0012
Copper, standard solution 1000 mg/l Cu for AA	CO0085
Gold, standard solution 1000 mg/l Au for AA	OR0057
Iron, standard solution 1000 mg/l Fe for AA	HI0302
Lead, standard solution 1000 mg/l Pb for AA	PL0105
Lithium, standard solution 1000 mg/l Li for AA	LI0060
Magnesium, standard solution 1000 mg/l Mg for AA	MA0011
Manganese, standard solution 1000 mg/l Mn for AA	MA0111
Mercury, standard solution 1000 mg/l Hg for AA	ME0111
Molybdenum, standard solution 1000 mg/l Mo for AA	MO0021
Nickel, standard solution 1000 mg/l Ni for AA	NI0121
Potassium, standard solution 1000 mg/l K for AA	PO0105
Selenium, standard solution 1000 mg/l Se for AA	SE0011
Silicon, standard solution 1000 mg/l Si for AA	SI0012
Silver, standard solution 1000 mg/l Ag for AA	PL0005
Sodium, standard solution 1000 mg/l Na for AA	SO0005
Strontium, standard solution 1000 mg/l Sr for AA	ES0177
Tin, standard solution 1000 mg/l Sn for AA	ES0061
Titanium, standard solution 1000 mg/l Ti for AA	TI0360
Tungsten, standard solution 1000 mg/l W for AA	TU0011
Vanadium, standard solution 1000 mg/l V for AA	VA0071
Zinc, standard solution 1000 mg/l Zn for AA	CI0126

Description	Art. No.
Aluminium, standard solution 1000 mg/l Al for AA	AL0755
Antimony, standard solution 1000 mg/l Sb for AA	AN0442
Arsenic, standard solution 1000 mg/l As for AA	AR0152
Barium, standard solution 1000 mg/l Ba for AA	BA0011
Bismuth, standard solution 1000 mg/l Bi for AA	BI0131
Boron, standard solution 1000 mg/l B for AA	BO0014
Cadmium, standard solution 1000 mg/l Cd for AA	CA0042
Calcium, standard solution 1000 mg/l Ca for AA	CA0177
Chromium, standard solution 1000 mg/l Cr for AA	CR0223
Cobalt, standard solution 1000 mg/l Co for AA	CO0016
Copper, standard solution 1000 mg/l Cu for AA	CO0086
Gold, standard solution 1000 mg/l Au for AA	OR0058
Iron, standard solution 1000 mg/l Fe for AA	HI0305
Lead, standard solution 1000 mg/l Pb for AA	PL0106
Lithium, standard solution 1000 mg/l Li for AA	LI0061
Magnesium, standard solution 1000 mg/l Mg for AA	MA0012
Manganese, standard solution 1000 mg/l Mn for AA	MA0112
Mercury, standard solution 1000 mg/l Hg for AA	ME0112
Molybdenum, standard solution 1000 mg/l Mo for AA	MO0022
Nickel, standard solution 1000 mg/l Ni for AA	NI0122
Potassium, standard solution 1000 mg/l K for AA	PO0106
Selenium, standard solution 1000 mg/l Se for AA	SE0012
Silicon, standard solution 1000 mg/l Si for AA	SI0013
Silver, standard solution 1000 mg/l Ag for AA	PL0006
Sodium, standard solution 1000 mg/l Na for AA	SO0006
Strontium, standard solution 1000 mg/l Sr for AA	ES0178
Tin, standard solution 1000 mg/l Sn for AA	ES0062
Titanium, standard solution 1000 mg/l Ti for AA	TI0365
Tungsten, standard solution 1000 mg/l W for AA	TU0012
Vanadium, standard solution 1000 mg/l V for AA	VA0072
Zinc, standard solution 1000 mg/l Zn for AA	CI0127

Scharlab Acid grades for Inorganic Trace Analysis

	AC1618 Nitric acid 69% Ultrace® ppt	AC1617 Nitric acid 69% Ultrace® ppb	AC1600 Nitric acid, min. 69,5% Reagent grade ACS ISO	AC1607 Nitric acid, min. 69,5% Reagent grade ACS ISO Max. 0,000005% Hg
Assay (acidimetric)	67-70%	67-70%	Min. 69,5%	Min. 69,5%
Colour (Hazen)	-	Max. 10	Max. 10	-
Chlorides (Cl)	-	Max. 200 ppb	Max. 0,5 ppm	Max. 0,5 ppm
Fluorides (F)	-	-	Max. 1 ppm	Max. 1 ppm
Total Phosphorus (P)	-	Max. 10 ppb	-	-
Total Sulfur (S)	-	Max. 300 ppb	-	-
Phosphates (PO ₄)	-	-	Max. 0,5 ppm	Max. 0,5 ppm
Sulfates (SO ₄)	-	-	Max. 0,5 ppm	Max. 0,5 ppm
Aluminium (Al)	Max. 20 ppt	Max. 1 ppb	Max. 0,05 ppm	Max. 0,05 ppm
Antimony (Sb)	Max. 10 ppt	Max. 0,5 ppb	-	-
Arsenic (As)	Max. 20 ppt	Max. 0,5 ppb	Max. 0,01 ppm	Max. 0,01 ppm
Barium (Ba)	Max. 10 ppt	Max. 0,1 ppb	Max. 0,01 ppm	Max. 0,01 ppm
Beryllium (Be)	Max. 10 ppt	Max. 0,1 ppb	Max. 0,01 ppm	Max. 0,01 ppm
Bismuth (Bi)	Max. 10 ppt	Max. 0,1 ppb	Max. 0,1 ppm	Max. 0,1 ppm
Boron (B)	Max. 10 ppt	Max. 1 ppb	-	-
Cadmium (Cd)	Max. 10 ppt	Max. 0,5 ppb	Max. 0,01 ppm	Max. 0,01 ppm
Calcium (Ca)	Max. 10 ppt	Max. 1 ppb	Max. 0,1 ppm	Max. 0,5 ppm
Cerium (Ce)	Max. 10 ppt	Max. 0,1 ppb	-	-
Cesium (Cs)	Max. 10 ppt	Max. 0,1 ppb	-	-
Chromium (Cr)	Max. 10 ppt	Max. 1 ppb	Max. 0,02 ppm	Max. 0,1 ppm
Cobalt (Co)	Max. 10 ppt	Max. 0,5 ppb	Max. 0,01 ppm	Max. 0,01 ppm
Copper (Cu)	Max. 10 ppt	Max. 0,5 ppb	Max. 0,01 ppm	Max. 0,01 ppm
Dysprosium (Dy)	Max. 1 ppt	Max. 0,1 ppb	-	-
Erbium (Er)	Max. 1 ppt	Max. 0,1 ppb	-	-
Europium (Eu)	Max. 1 ppt	Max. 0,1 ppb	-	-
Gadolinium (Gd)	Max. 1 ppt	Max. 0,1 ppb	-	-
Gallium (Ga)	Max. 10 ppt	Max. 0,1 ppb	-	-
Germanium (Ge)	Max. 10 ppt	Max. 0,1 ppb	Max. 0,05 ppm	Max. 0,05 ppm
Gold (Au)	Max. 20 ppt	Max. 0,1 ppb	-	-
Hafnium (Hf)	Max. 10 ppt	Max. 0,1 ppb	-	-
Holmium (Ho)	Max. 1 ppt	Max. 0,1 ppb	-	-
Indium (In)	Max. 1 ppt	Max. 0,1 ppb	-	-
Iron (Fe)	Max. 10 ppt	Max. 1 ppb	Max. 0,1 ppm	Max. 0,2 ppm
Lanthanum (La)	Max. 1 ppt	Max. 0,1 ppb	-	-
Lead (Pb)	Max. 10 ppt	Max. 0,1 ppb	Max. 0,01 ppm	Max. 0,01 ppm
Lithium (Li)	Max. 10 ppt	Max. 0,1 ppb	Max. 0,01 ppm	Max. 0,01 ppm
Lutetium (Lu)	Max. 1 ppt	Max. 0,1 ppb	-	-
Magnesium (Mg)	Max. 10 ppt	Max. 1 ppb	Max. 0,1 ppm	Max. 0,1 ppm
Manganese (Mn)	Max. 10 ppt	Max. 0,1 ppb	Max. 0,01 ppm	Max. 0,01 ppm
Mercury (Hg)	Max. 50 ppt	Max. 0,1 ppb	-	Max. 5 ppb
Molybdenum (Mo)	Max. 10 ppt	Max. 0,1 ppb	Max. 0,02 ppm	Max. 0,02 ppm
Neodymium (Nd)	Max. 1 ppt	Max. 0,1 ppb	-	-
Nickel (Ni)	Max. 20 ppt	Max. 0,5 ppb	Max. 0,02 ppm	Max. 0,05
Niobium (Nb)	Max. 1 ppt	Max. 0,1 ppb	-	-
Palladium (Pd)	Max. 20 ppt	Max. 0,5 ppb	-	-
Platinum (Pt)	Max. 20 ppt	Max. 0,5 ppb	-	-
Potassium (K)	Max. 10 ppt	Max. 1 ppb	Max. 0,1 ppm	Max. 0,1 ppm
Praseodymium (Pr)	Max. 1 ppt	Max. 0,1 ppb	-	-
Rhenium (Re)	Max. 10 ppt	Max. 0,1 ppb	-	-
Rhodium (Rh)	Max. 10 ppt	Max. 0,5 ppb	-	-
Rubidium (Rb)	Max. 10 ppt	Max. 0,1 ppb	-	-
Ruthenium (Ru)	Max. 20 ppt	Max. 0,5 ppb	-	-
Samarium (Sm)	Max. 1 ppt	Max. 0,1 ppb	-	-
Scandium (Sc)	Max. 10 ppt	Max. 0,1 ppb	-	-
Selenium (Se)	-	Max. 1 ppb	-	-
Silver (Ag)	Max. 10 ppt	Max. 0,1 ppb	Max. 0,01 ppm	Max. 0,01 ppm
Sodium (Na)	Max. 10 ppt	Max. 1 ppb	Max. 0,5 ppm	Max. 0,5 ppm
Strontium (Sr)	Max. 10 ppt	Max. 0,1 ppb	Max. 0,01 ppm	Max. 0,01 ppm
Tellurium (Te)	Max. 1 ppt	Max. 0,1 ppb	-	-
Terbium (Tb)	Max. 1 ppt	Max. 0,1 ppb	-	-
Thallium (Tl)	Max. 10 ppt	Max. 0,1 ppb	Max. 0,05 ppm	Max. 0,05 ppm
Thorium (Th)	Max. 1 ppt	Max. 0,1 ppb	-	-
Thulium (Tm)	Max. 1 ppt	Max. 0,1 ppb	-	-
Tin (Sn)	Max. 20 ppt	Max. 0,5 ppb	-	-
Titanium (Ti)	Max. 10 ppt	Max. 0,5 ppb	Max. 0,1 ppm	Max. 0,1 ppm
Tungsten (W)	Max. 10 ppt	Max. 0,1 ppb	-	-
Uranium (U)	Max. 1 ppt	Max. 0,1 ppb	-	-
Vanadium (V)	Max. 10 ppt	Max. 0,5 ppb	Max. 0,01 ppm	Max. 0,01 ppm
Ytterbium (Yb)	Max. 1 ppt	Max. 0,1 ppb	-	-
Yttrium (Y)	Max. 1 ppt	Max. 0,1 ppb	-	-
Zinc (Zn)	Max. 10 ppt	Max. 0,5 ppb	Max. 0,05 ppm	Max. 0,05 ppm
Zirconium (Zr)	Max. 10 ppt	Max. 0,1 ppb	Max. 0,1 ppm	Max. 0,1 ppm
Heavy Metals (as Pb)	-	-	Max. 0,2 ppm	Max. 0,2 ppm
Calcination Residue (as SO ₄)	-	-	Max. 5 ppm	Max. 5 ppm

Ultrapure Acids: Ordering information

Ultrapure®	Description	Size	Art. No.	
ppb	Acetic acid glacial Ultrapure®, ppb-trace analysis	500 ml	AC03580500	
	Ammonia, solution 20 - 22% Ultrapure®, ppb-trace analysis	500 ml	AM02690500	
	Hydrochloric acid, 37% Ultrapure®, ppb-trace analysis	500 ml	AC07800500	
		1 l	AC07801000	
	Hydrofluoric acid, 48% Ultrapure®, ppb-trace analysis	2,5 l	AC07802500	
		500 ml	AC10610500	
	Nitric acid, 69% Ultrapure®, ppb-trace analysis	500 ml	AC16170500	
		1 l	AC16171000	
	Perchloric acid, 70% Ultrapure®, ppb-trace analysis	2,5 l	AC16172500	
		500 ml	AC17610500	
	Sulfuric acid, 96% Ultrapure®, ppb-trace analysis	1 l	AC21141000	
	ppt	Acetic acid glacial Ultrapure®, ppt-trace analysis	250 ml	AC03590250
		Ammonia, solution 20 - 22% Ultrapure®, ppt-trace analysis	250 ml	AM02720250
		Hydrochloric acid, 35% Ultrapure®, ppt-trace analysis	250 ml	AC07810250
			500 ml	AC07810500
		Hydrofluoric acid, 48% Ultrapure®, ppt-trace analysis	250 ml	AC10620250
Hydrogen peroxide, solution 30% w/w (110 vol) Ultrapure®, ppt-trace analysis		500 ml	HI01430500	
Nitric acid, 69% Ultrapure®, ppt-trace analysis		250 ml	AC16180250	
		500 ml	AC16180500	
Sulfuric acid, 96% Ultrapure®, ppt-trace analysis		250 ml	AC21150250	
	500 ml	AC21150500		
Water Ultrapure®, ppt-trace analysis	1 l	AG00161000		

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