

Certificate of Analysis

Aluminum ICP-MS Standard, 1000 ppm Al in 3% HNO₃

Lot Number: 4403N51

Product Number: MSAL1KN

Manufacture Date: MAR 21, 2024

Expiration Date: SEP 2025

The certified value for this product is confirmed in independent testing by a second qualified chemist.

The final solution concentration is confirmed by AA, ICP, or ICP-MS, and is traceable to NIST Standard Reference Material 3101. All trace level elements were determined by ICP or ICP-MS.

Name	CAS#	Grade
Water	7732-18-5	
Nitric Acid	7697-37-2	
Aluminum Nitrate Nonahydrate	7784-27-2	

Test	Specification	Result	NIST SRM#
Appearance	Colorless liquid	Passed	
Assay (vs. EDTA/Dithizone)	995-1005 ppm Al	1000 ppm Al	915

I=Spectral Interference N=Not Tested

Trace Elements by ICP or ICP - MS

All values reported in mg/L (ppm)

Antimony (Sb)	< 0.0001 ppm	Lutetium (Lu)	< 0.0003 ppm	Terbium (Tb)	0.000 ppm
Arsenic (As)	I	Magnesium (Mg)	< 0.0007 ppm	Thallium (Tl)	I
Barium (Ba)	< 0.0001 ppm	Manganese (Mn)	< 0.00002 ppm	Thorium (Th)	0.006 ppm
Beryllium (Be)	< 0.0001 ppm	Mercury (Hg)	< 0.03 ppm	Thulium (Tm)	N
Bismuth (Bi)	0.007 ppm	Molybdenum (Mo)	0.027 ppm	Tin (Sn)	< 0.0002 ppm
Boron (B)	< 0.00005 ppm	Neodymium (Nd)	0.001 ppm	Titanium (Ti)	I
Cadmium (Cd)	< 0.00007 ppm	Nickel (Ni)	< 0.0001 ppm	Tungsten (W)	I
Calcium (Ca)	I	Niobium (Nb)	0.011 ppm	Uranium (U)	0.000 ppm
Cerium (Ce)	< 0.00003 ppm	Osmium (Os)	< 0.003 ppm	Vanadium (V)	< 0.00004 ppm
Cesium (Cs)	0.097 ppm	Palladium (Pd)	0.004 ppm	Ytterbium (Yb)	< 0.001 ppm
Chromium (Cr)	I	Phosphorus (P)	I	Yttrium (Y)	0.001 ppm
Cobalt (Co)	< 0.00002 ppm	Platinum (Pt)	0.001 ppm	Zinc (Zn)	< 0.0003 ppm
Copper (Cu)	N	Potassium (K)	< 0.00002 ppm	Zirconium (Zr)	< 0.002 ppm
Dysprosium (Dy)	0.000 ppm	Praseodymium (Pr)	N		
Erbium (Er)	< 0.00007 ppm	Rhenium (Re)	< 0.00003 ppm		
Europium (Eu)	< 0.00008 ppm	Rhodium (Rh)	< 0.00003 ppm		
Gadolinium (Gd)	0.000 ppm	Rubidium (Rb)	< 0.00004 ppm		
Gallium (Ga)	N	Ruthenium (Ru)	0.000 ppm		
Germanium (Ge)	< 0.0003 ppm	Samarium (Sm)	< 0.002 ppm		
Gold (Au)	I	Scandium (Sc)	0.009 ppm		
Hafnium (Hf)	0.011 ppm	Selenium (Se)	I		
Holmium (Ho)	< 0.0001 ppm	Silicon (Si)	I		
Indium (In)	< 0.00003 ppm	Silver (Ag)	0.009 ppm		
Iridium (Ir)	< 0.00007 ppm	Sodium (Na)	I		
Iron (Fe)	N	Strontium (Sr)	< 0.00006 ppm		
Lanthanum (La)	N	Sulfur (S)	I		
Lead (Pb)	< 0.00003 ppm	Tantalum (Ta)	0.059 ppm		
Lithium (Li)	< 0.03 ppm	Tellurium (Te)	0.103 ppm		

Specification	Reference
---------------	-----------

Aluminum Standard, 1000 ppm	EPA (200.8)
-----------------------------	-------------

Volumetric glassware complies with Class A tolerance requirements of ASTM E 288 and NIST Circular 434; it is calibrated before first use and recalibrated regularly in accordance with ASTM E 542 and NIST Procedure NBSIR 74-461. Balances are calibrated regularly with weights certified traceable to the NIST national mass standard. Thermometers and temperature probes are calibrated before first use and recalibrated regularly with a thermometer traceable to NIST standards. All products are prepared according to master documents that assure manufacture according to validated methods. Batch records document raw material traceability and production and testing history for each lot manufactured.

Part Number	Size / Package Type	Shelf Life (Unopened Container)
-------------	---------------------	---------------------------------

MSAL1KN-100	100 mL natural LDPE	18 months
-------------	---------------------	-----------

Recommended Storage: 15°C - 30°C (59°F - 86°F)



Paul Brandon (03/21/2024)

Production Manager

This document is designed to comply with ISO Guide 31 "Reference Materials -- Contents of Certificates and Labels."

This test report shall not be reproduced, except in full, without the written approval of Ricca Chemical Company.