



Certificate of Analysis

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Thermo Fisher Scientific's Quality System has been found to conform to Quality Management System
Standard ISO9001:2015 by SAI Global Certificate Number CERT – 0120632

This is to certify that units of the lot number below were tested and found to comply with the specifications of the grade listed. Certain data have been supplied by third parties. Thermo Fisher Scientific expressly disclaims all warranties, expressed or implied, including the implied warranties of merchantability and fitness for a particular purpose. Products are for research use or further manufacturing. Not for direct administration to humans or animals. It is the responsibility of the final formulator and end user to determine suitability based on the intended use of the end project. Products are tested to meet the analytical requirements of the noted grade. The following information is the actual analytical results obtained.

Catalog Number	A509	Mfg. Date	09/19/2019
Lot Number	1119090	Sample Id	N/A
Product Description	Nitric Acid (TRACEMETAL GRADE)		
Chemical Origin	Inorganic		
BSE/TSE Comment:	No animal products are used as starting raw material ingredients, or used in processing, including lubricants, processing aids, or any other material that might migrate to the finished product.		

Country Origin	Canada
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Result Name	Units	Specifications	Test Value
Expiry Date	mm/dd/yyyy	2 yrs	09/19/2021
Assay (HNO ₃ , w/w)	% by w/w	67 - 70%	69%
Color	APHA	<= 10	< 7
Aluminum (Al)	ppb	<= 1	< 0.5
Antimony (Sb)	ppb	<= 0.5	< 0.1
Arsenic (As)	ppb	<= 0.5	< 0.1
Barium (Ba)	ppb	<= 0.1	< 0.1
Beryllium (Be)	ppb	<= 0.1	< 0.1
Bismuth (Bi)	ppb	<= 0.1	< 0.1
Boron (B)	ppb	<= 1	< 1
Cadmium (Cd)	ppb	<= 0.5	< 0.1
Calcium (Ca)	ppb	<= 1	< 0.5
Cerium (Ce)	ppb	<= 0.1	< 0.1
Cesium (Cs)	ppb	<= 0.1	< 0.1
Chromium (Cr)	ppb	<= 1	< 0.5
Cobalt (Co)	ppb	<= 0.5	< 0.1
Copper (Cu)	ppb	<= 0.5	< 0.2
Dysprosium (Dy)	ppb	<= 0.1	< 0.1
Erbium (Er)	ppb	<= 0.1	< 0.1
Europium (Eu)	ppb	<= 0.1	< 0.1
Gadolinium (Gd)	ppb	<= 0.1	< 0.1
Gallium (Ga)	ppb	<= 0.1	< 0.1
Germanium (Ge)	ppb	<= 0.1	< 0.1
Gold (Au)	ppb	<= 0.1	< 0.1
Hafnium (Hf)	ppb	<= 0.1	< 0.1
Holmium (Ho)	ppb	<= 0.1	< 0.1
Indium (In)	ppb	<= 0.1	< 0.1
Iron (Fe)	ppb	<= 1	< 0.5
Lanthanum (La)	ppb	<= 0.1	< 0.1
Lead (Pb)	ppb	<= 0.1	< 0.1

Lithium (Li)	ppb	<= 0.1	< 0.1
Lutetium (Lu)	ppb	<= 0.1	< 0.1
Magnesium (Mg)	ppb	<= 1	< 0.2
Manganese (Mn)	ppb	<= 0.1	< 0.1
Mercury (Hg)	ppb	<= 0.1	< 0.02
Molybdenum (Mo)	ppb	<= 0.1	< 0.1
Neodymium (Nd)	ppb	<= 0.1	< 0.1
Nickel (Ni)	ppb	<= 0.5	< 0.2
Niobium (Nb)	ppb	<= 0.1	< 0.1
Palladium (Pd)	ppb	<= 0.5	< 0.1
Platinum (Pt)	ppb	<= 0.5	< 0.1
Potassium (K)	ppb	<= 1	< 0.1
Praseodymium (Pr)	ppb	<= 0.1	< 0.1
Rhenium (Re)	ppb	<= 0.1	< 0.1
Rhodium (Rh)	ppb	<= 0.5	< 0.1
Rubidium (Rb)	ppb	<= 0.1	< 0.1
Ruthenium (Ru)	ppb	<= 0.5	< 0.1
Samarium (Sm)	ppb	<= 0.1	< 0.1
Scandium (Sc)	ppb	<= 0.1	< 0.1
Selenium (Se)	ppb	<= 1	< 0.2
Silver (Ag)	ppb	<= 0.1	< 0.1
Sodium (Na)	ppb	<= 1	< 0.5
Strontium (Sr)	ppb	<= 0.1	< 0.1
Tantalum (Ta)	ppb	Information Only	< 0.1
Tellurium (Te)	ppb	<= 0.1	< 0.1
Terbium (Tb)	ppb	<= 0.1	< 0.1
Thallium (Tl)	ppb	<= 0.1	< 0.1
Thorium (Th)	ppb	<= 0.1	< 0.1
Thulium (Tm)	ppb	<= 0.1	< 0.1
Tin (Sn)	ppb	<= 0.5	< 0.1
Titanium (Ti)	ppb	<= 0.5	< 0.1
Tungsten (W)	ppb	<= 0.1	< 0.1
Uranium (U)	ppb	<= 0.1	< 0.1
Vanadium (V)	ppb	<= 0.5	< 0.1
Ytterbium (Yb)	ppb	<= 0.1	< 0.1
Yttrium (Y)	ppb	<= 0.1	< 0.1
Zinc (Zn)	ppb	<= 0.5	< 0.5
Zirconium (Zr)	ppb	<= 0.1	< 0.1
Chloride (Cl ⁻)	ppm	<= 0.2	< 0.2
Total Phosphorus (P)	ppm	<= 0.01	< 0.01
Total Sulfur (S)	ppm	<= 0.3	< 0.3

Jerusa Bailey-Wyche

Quality Assurance Specialist - Certificate of Analysis

Note: The data listed is valid for all package sizes of this lot of this product, expressed as an extension of this catalog number listed above. If there are any questions with this certificate, please call at (800) 227-6701.

*Based on suggested storage condition.