

## Certificate of Analysis

Date of Testing: 2022-09-09 13:41:46  
 Date of Next Testing: 2026-09-08 13:41:46  
 Product Name: **Mannitol**  
 CAS Number: 69-65-8  
 Specifications & Purity:  $\geq 99.9999\%$  metals basis  
 Lot #: J1829049  
 SKU #: **M108830**  
**Analysis: 132826**

Parameter	Limit Values	Result
Bismuth(Bi)	0-0.01 (ppm)	0.00 ppm
Aurum(Au)	0-0.01 (ppm)	0.00 ppm
Rb	0-0.01 (ppm)	0.00 ppm
Yb	0-0.01 (ppm)	0.01 ppm
Cadmium(Cd)	0-0.01 (ppm)	0.01 ppm
Gallium(Ga)	0-0.01 (ppm)	0.00 ppm
Phospate(PO4)	0-1000 (ppb)	522.00 ppb
Rhodium (Rh)	0-0.01 (ppm)	0.01 ppm
Silver (Ag)	0-0.01 (ppm)	0.00 ppm
Germanium (Ge)	0-0.01 (ppb)	0.00 ppb
Purity(Based On Trace Metals Analysis)	99.9999-100 (%)	100.00 %
Mercury(Hg)	0-0.001 ( $\mu\text{g}/\text{kg}$ OR $\text{ng}/\text{g}$ )	0.00 $\mu\text{g}/\text{kg}$ OR $\text{ng}/\text{g}$
Beryllium(Be)	0-0.01 (ppm)	0.01 ppm
Hafnium(Hf)	0-0.01 (ppm)	0.00 ppm
Gadolinium (Gd)	0-0.01 (ppm)	0.01 ppm
Lu	0-0.01 (ppm)	0.00 ppm
Re	0-0.01 (ppm)	0.00 ppm
Cerium(Ce)	0-0.01 (ppm)	0.01 ppm
Osmium(Os)	0-0.01 (ppm)	0.01 ppm
Dysprosium(Dy)	0-0.01 (ppm)	0.00 ppm
Stannum(Sn)	0-0.01 (ppm)	0.00 ppm
Samarium(Sm)	0-0.01 (ppm)	0.01 ppm
Erbium(Er)	0-0.01 (ppm)	0.00 ppm
Cesium (Cs)	0-0.01 (ppm)	0.00 ppm
Lanthanum(La)	0-0.01 (ppm)	0.00 ppm
Nickel(Ni)	0-0.01 (ppm)	0.00 ppm
Iron(Fe)	0-0.05 (ppm)	0.03 ppm

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Parameter	Limit Values	Result
Chloride (Cl-)	0-1000 (ppb)	466.00 ppb
Titanium(Ti)	0-0.05 (ppm)	0.03 ppm
assay(total isomers) (HPLC)	99-100 (%)	99.11 %
(Pb)Lead	0-0.01 (ppm)	0.00 ppm
Sulfate(SO42-)	0-1000 (ppb)	663.00 ppb
Chromium(Cr)	0-0.01 (ppm)	0.00 ppm
Niobium(Nb)	0-0.01 (ppm)	0.00 ppm
Indium (In)	0-0.01 (ppm)	0.00 ppm
Platinum(Pt)	0-0.01 (ppm)	0.00 ppm
Calcium(Ca)	0-0.2 (ppm)	0.11 ppm
Aluminum(Al)	0-0.05 (ppm)	0.03 ppm
Tungsten(W)	0-0.01 (ppm)	0.00 ppm
Vanadium(V)	0-0.01 (ppm)	0.00 ppm
Te	0-0.01 (ppm)	0.00 ppm
(Br)Bromide	0-1000 (ppb)	552.00 ppb
(NO2)Nitrate	0-1000 (ppb)	538.00 ppb
Molybdenum(Mo)	0-0.01 (ppm)	0.00 ppm
Potassium(K)	0-0.1 (ppm)	0.05 ppm
Copper(Cu)	0-0.01 (ppm)	0.01 ppm
Palladium(Pd)	0-0.01 (ppm)	0.01 ppm
Manganese(Mn)	0-0.01 (ppm)	0.01 ppm
Magnesium(Mg)	0-0.05 (ppm)	0.02 ppm
Selenium(Se)	0-0.01 (ppm)	0.01 ppm
Application test:Suitable as an indicator in complexometry	0-0.01 (ppm)	0.01 ppm
Barium(Ba)	0-0.05 (ppm)	0.02 ppm
uranium(U)	0-0.01 (ppm)	0.00 ppm
Zinc(Zn)	0-0.01 (ppm)	0.00 ppm
Specific Rotation[a]25/D(c=1 in 1%acidified Molybdate&H2SO4	137-145 (°)	141.00 °
Strontium(Sr)	0-0.01 (ppm)	0.00 ppm
Praseodymium(Pr)	0-0.01 (ppm)	0.00 ppm
Sb	0-0.01 (ppm)	0.00 ppm
Lithium(Li)	0-0.01 (ppm)	0.00 ppm
Th	0-0.01 (ppm)	0.01 ppm
(NO3)Nitrate	0-1000 (ppb)	624.00 ppb
Sc	0-0.05 (ppm)	0.03 ppm
Boron(B)	0-0.05 (ppm)	0.03 ppm
Europium(Eu)	0-0.01 (ppm)	0.01 ppm
Iridium(Ir)	0-0.01 (ppm)	0.01 ppm
Ta	0-0.01 (ppm)	0.01 ppm

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Parameter	Limit Values	Result
Holmium(Ho)	0-0.01 (ppm)	0.00 ppm
Sodium(Na)	0-0.5 (ppm)	0.18 ppm
Ruthenium (Ru)	0-0.01 (ppm)	0.00 ppm
Terbium(Tb)	0-0.01 (ppm)	0.00 ppm
(As)Arsenic	0-0.01 (ppm)	0.00 ppm
Cobalt(Co)	0-0.01 (ppm)	0.00 ppm
Yttrium(Y)	0-0.01 (ppm)	0.00 ppm
Fluoride (F-)	0-1000 (ppb)	447.00 ppb
Appearance (M108830)	White Powder or Crystals	White Powder or Crystals
Infrared spectrum	Conforms to Structure	Conforms to Structure



John Su  
QA & QC Manager