

ALADDIN SCIENTIFIC CORPORATION

14078 Meridian Parkway, Riverside, CA. 92518

## Certificate of Analysis

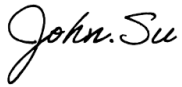
Date of Testing: 2023-12-29 09:07:27  
 Date of Next Testing: 2027-12-28 09:07:27  
 Product Name: **Diethanolamine**  
 CAS Number: 111-42-2  
 Specifications & Purity: Ultra pure grade, ≥99.5%  
 Lot #: L2311147  
 SKU #: **D112357**  
**Analysis:** **298815**  
 Storage Temperature: Room temperature, Desiccated

Parameter	Limit Values	Result
Aluminum(Al)	0-1 (ppm)	0.00 ppm
Purity(GC)	99.5-100 (%)	99.72 %
Copper(Cu)	0-1 (ppm)	0.36 ppm
Chromium(Cr)	0-1 (ppm)	0.00 ppm
Magnesium(Mg)	0-1 (ppm)	0.00 ppm
Strontium(Sr)	0-1 (ppm)	0.00 ppm
(As)Arsenic	0-0.1 (ppm)	0.03 ppm
PH(25 °C, 1 M in Water)	11-12	11.41
UV Absorbance 280nm	0-0.02	0.01
Iron(Fe)	0-1 (ppm)	0.00 ppm
Lead(Pb)	0-1 (ppm)	0.00 ppm
Refractive index n <sub>20</sub> /D	1.474-1.479	1.48
UV Absorbance 260nm	0-0.04	0.03
Lithium(Li)	0-1 (ppm)	0.00 ppm
Nickel(Ni)	0-1 (ppm)	0.00 ppm
Potassium(K)	0-20 (ppm)	0.00 ppm
Cobalt(Co)	0-1 (ppm)	0.00 ppm
Bismuth(Bi)	0-1 (ppm)	0.00 ppm
Water by Karl Fischer	0-0.2 (%)	0.11 %
Manganese(Mn)	0-1 (ppm)	0.06 ppm
Barium(Ba)	0-1 (ppm)	0.00 ppm
Zinc(Zn)	0-1 (ppm)	0.00 ppm
Cadmium(Cd)	0-1 (ppm)	0.04 ppm
Calcium(Ca)	0-5 (ppm)	0.00 ppm
Sodium(Na)	0-20 (ppm)	0.00 ppm
Carbonate(CO <sub>3</sub> )	0-0.2 (%)	0.01 %

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Parameter	Limit Values	Result
Molybdenum(Mo)	0-1 (ppm)	0.00 ppm
Appearance (D112357)	colorless viscous liquid	colorless viscous liquid
Insoluble matter	pass	Pass
Solubility in H <sub>2</sub> O , soluble , 1M , 20°C, clear, colorless	pass	Pass
λ,1 M in H <sub>2</sub> O	Pass	Pass

A handwritten signature in black ink that reads "John Su".

John Su  
QA & QC Manager