

Shanghai Aladdin Biochemical Technology Co., LTD  
809 Chuhua Branch Road, Fengxian District, Shanghai 201400, China

## Certificate of Analysis

Date of Testing: 2023-05-19 14:47:19  
Date of Next Testing: 2024-05-18 14:47:19  
Product Name: **1-Methyl-2-pyrrolidinone**  
CAS Number: 872-50-4  
Specifications & Purity: electronic grade,99.9%  
Lot #: E2312865  
SKU #: **M103246**  
Analysis: **218210**

| Parameter                               | Limit Values | Result       |
|-----------------------------------------|--------------|--------------|
| Water by Karl Fischer                   | 0-0.03 (%)   | 0.02860 %    |
| Refractive index n <sub>20</sub> /D     | 1.468-1.472  | 1.47080      |
| Hazen                                   | 0-25         | 15.00000     |
| Sodium(Na)                              | 0-10 (ppb)   | 0.00000 ppb  |
| Molybdenum(Mo)                          | 0-10 (ppb)   | 0.00000 ppb  |
| Phosphate(PO <sub>4</sub> )             | 0-0.05 (ppm) | 0.00000 ppm  |
| Iron(Fe)                                | 0-10 (ppb)   | 0.00000 ppb  |
| Calcium(Ca)                             | 0-5 (ppm)    | 0.00000 ppm  |
| total diol                              | 0-20 (ppm)   | 10.00000 ppm |
| Cadmium(Cd)                             | 0-10 (ppb)   | 0.00000 ppb  |
| Purity(GC)                              | 99.9-100 (%) | 99.92500 %   |
| Lithium(Li)                             | 0-10 (ppb)   | 0.00000 ppb  |
| Potassium(K)                            | 0-10 (ppb)   | 0.00000 ppb  |
| Magnesium(Mg)                           | 0-10 (ppb)   | 0.00000 ppb  |
| Sulfate(SO <sub>4</sub> <sup>2-</sup> ) | 0-0.05 (%)   | 0.00000 %    |
| Zinc(Zn)                                | 0-10 (ppb)   | 0.00000 ppb  |
| Nickel(Ni)                              | 0-10 (ppb)   | 0.00000 ppb  |
| (NO <sub>3</sub> )Nitrate               | 0-0.05 (ppm) | 0.00000 ppm  |
| Copper(Cu)                              | 0-10 (ppb)   | 0.00000 ppb  |
| Cobalt(Co)                              | 0-10 (ppb)   | 0.00000 ppb  |
| Aluminum(Al)                            | 0-10 (ppb)   | 0.00000 ppb  |
| Manganese(Mn)                           | 0-10 (ppb)   | 0.00000 ppb  |
| Chloride(Cl <sup>-</sup> )              | 0-0.05 (ppm) | 0.01000 ppm  |
| Silver (Ag)                             | 0-10 (ppb)   | 0.00000 ppb  |
| Total Amine                             | 0-20 (ppm)   | 15.00000 ppm |
| Chromium(Cr)                            | 0-10 (ppb)   | 0.00000 ppb  |
| Lead(Pb)                                | 0-10 (ppb)   | 0.00000 ppb  |

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| Parameter            | Limit Values                     | Result                           |
|----------------------|----------------------------------|----------------------------------|
| Appearance (M103246) | Colorless to light yellow liquid | Colorless to light yellow liquid |
| Infrared spectrum    | Conforms to Structure            | Conforms to Structure            |

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

John Su  
QA & QC Manager