

# Certificate of Analysis

Product Name: **N-METHYL-2-PYRROLIDONE**

CAS No.: 872-50-4

Date of Issue: Mar. 25, 2014

Origin: China

Molecular Formula: C<sub>5</sub>H<sub>9</sub>NO

| Grade              | Spec.  | Result of test      |                     |                     |                     |
|--------------------|--------|---------------------|---------------------|---------------------|---------------------|
| Batch No.          |        | 002-20140609<br>001 | 002-20140610<br>001 | 002-20140611<br>001 | 002-20140612<br>001 |
| Purity (%)         | ≥99.80 | 99.9117             | 99.9136             | 99.9146             | 99.9128             |
| Butyrolactone (%)  | ≤0.02  | 0.0188              | 0.0178              | 0.0165              | 0.0172              |
| Total diols (ppm)  | ≤20    | 13                  | 15                  | 14                  | 13                  |
| Total amines (ppm) | ≤50    | 0                   | 0                   | 0                   | 0                   |
| Water (%)          | ≤0.02  | 0.0095              | 0.0092              | 0.0105              | 0.0098              |
| Color (APHA)       | ≤20    | 10                  | 10                  | 10                  | 10                  |
| Chloride (ppm)     | ≤0.50  | 0.25                | 0.25                | 0.25                | 0.25                |
| Phosphate (ppm)    | ≤0.50  | 0.25                | 0.25                | 0.25                | 0.25                |
| Sulfate (ppm)      | ≤0.50  | 0.25                | 0.25                | 0.25                | 0.25                |
| Nitrate (ppm)      | ≤0.50  | 0.25                | 0.25                | 0.25                | 0.25                |
| Quantities (kgs)   |        | 1                   | 1                   | 1                   | 1                   |

Conclusion: Conform with the specification.