

# Certificate of Analysis

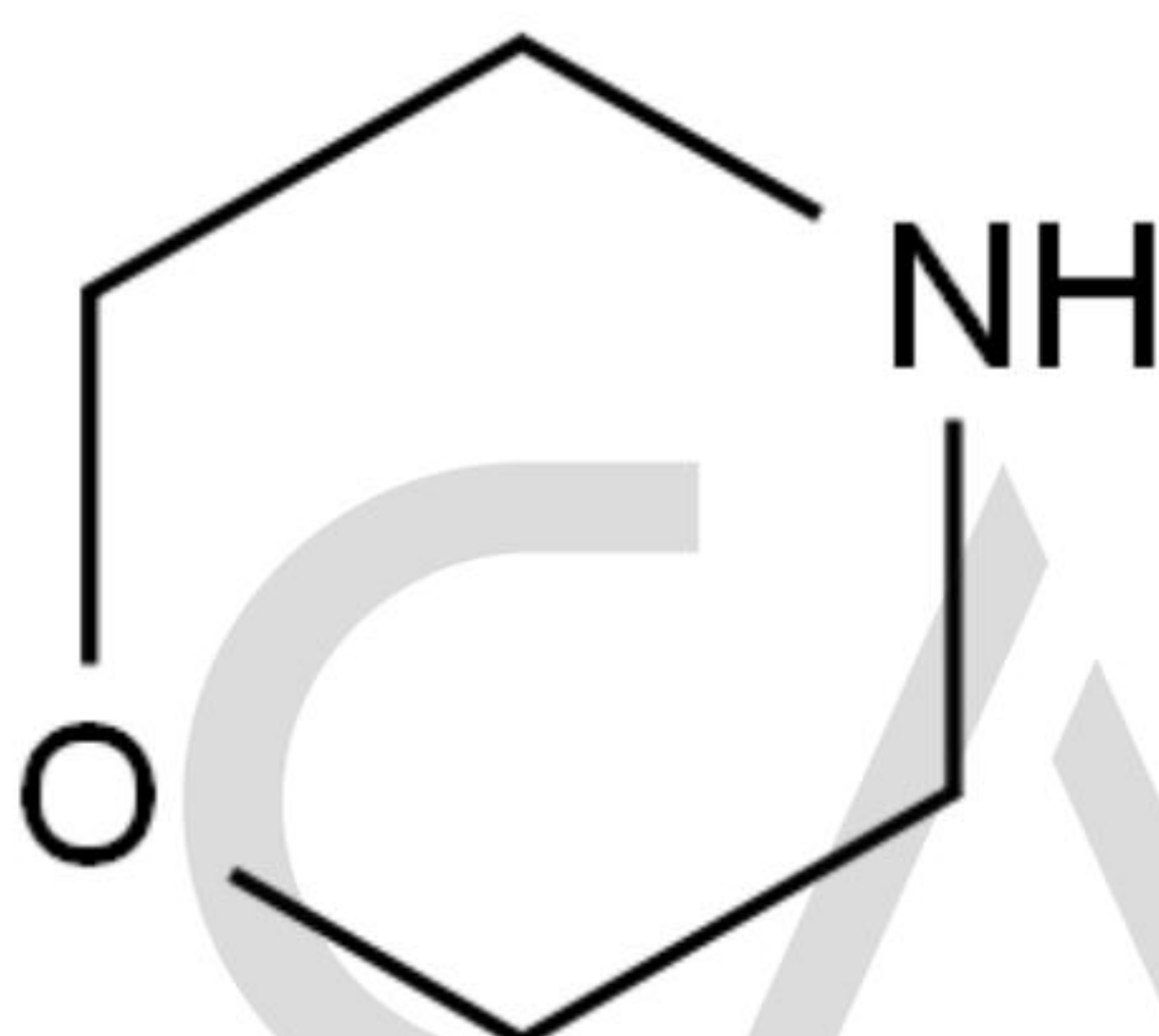
## Reference Material & Standard

|                    |                                  |                     |                                           |
|--------------------|----------------------------------|---------------------|-------------------------------------------|
| Product Name:      | Morpholine                       | Catalogue Number:   | CCHM702066                                |
| Synonyms:          | N/A                              | Lot Number:         | 0228-RD-0026                              |
| CAS Number:        | 110-91-8                         | Expiry Date:        | Sep 05, 2028                              |
| Molecular Formula: | C <sub>4</sub> H <sub>9</sub> NO | Storage:            | 2°C ~ 8°C Protected from light and Sealed |
| Molecular Weight:  | 87.12                            | Shipping Condition: | Shipping at Room Temperature              |

Warning:



Chemical Structure:



| Test Items     | Method            | Results           |
|----------------|-------------------|-------------------|
| Appearance     | Visual inspection | Colourless Liquid |
| Identification | GCMS&HNMR         | Confirmed         |
| Purity         | GC                | 99.905%           |
| Water Content  | Karl Fischer      | 0.3641%           |
| Assay          |                   | 99.5%             |
| Uncertainty    |                   | ±0.2%             |

## Comment:

1. The calculation of the mass balance method follows the formula (calculated on the non-dried basis):

$$\text{Assay (\%)} = (100\% - \text{Water Content}) * \text{Purity GC (\%)} / 100\%$$

Water Content is considered as absolute effect, GC purity is considered as relative effect.

2. The uncertainty values are the expanded uncertainty and represent an estimated standard deviation equal to the positive square root of the total variation of the uncertainty of components. A normal distribution is assumed and a coverage factor of K=2 is chosen using approximately a 95% confidence level.

Signature:

Prepared by:

*Lisa*

Reviewed by:

*Hinlam*

Approved by General Manager:

*David*

Date: Aug 01, 2025

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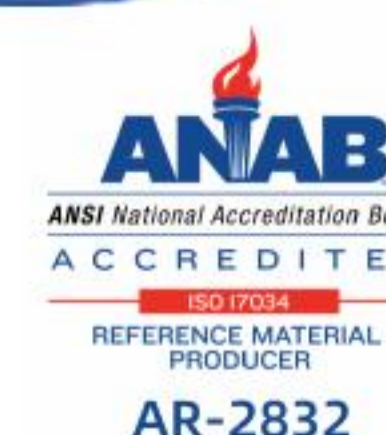
Add: 3rd Floor, Building B, No.179, Guangpu Rd East, Huangpu District, Guangzhou, China

Tel: +86-20-81960175

Email: supports@cato-chem.com

Web: <https://www.cato-chem.com>

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