

CERTIFICATE of ANALYSIS



Dihydromorphine (hydrate) (exempt preparation)

(5 α ,6 α)-4,5-epoxy-17-methyl-morphinan-3,6-diol, monohydrate

Item No.: 22881
Batch No.: 0702330
CAS Number: 65943-40-0
Molecular Formula: C₁₇H₂₁NO₃ • H₂O
Formula Weight: 305.36886
Purity Specification: \geq 98%

Expiry date: 06FEB2026 (valid from date of certification)

Storage: Unopened at -20°C
Safety: Refer to Safety Data Sheet

Intended Use: For analytical testing purposes only, not intended for human or animal use.
Instruction for Use: Once opened this material should be minimally exposed to ambient conditions and returned to recommended storage conditions immediately after use. Ongoing stability testing supports a negligible decrease in purity over a series of thaw-refreeze cycles. It is recommended that laboratories perform periodic testing to verify the material remains fit for the intended use.

Cayman Chemical certifies that this standard meets the specifications stated in this certificate and warrants this product to meet the stated acceptance criteria through the expiration date when stored unopened as recommended.

WARNING

THIS PRODUCT IS FOR RESEARCH USE - NOT FOR HUMAN OR VETERINARY DIAGNOSTIC OR THERAPEUTIC USE. IT IS THE RESPONSIBILITY OF THE PURCHASER TO DETERMINE SUITABILITY FOR OTHER APPLICATIONS.

SAFETY DATA

This material should be considered hazardous until further information becomes available. Do not ingest, inhale, get in eyes, on skin, or on clothing. Wash thoroughly after handling. Before use, the user must review the complete Safety Data Sheet, which has been sent via email to your institution.

WARRANTY AND LIMITATION OF REMEDY

Buyer agrees to purchase the material subject to Cayman's Terms and Conditions. Complete Terms and Conditions including Warranty and Limitation of Liability information can be found on our website.

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CAYMAN CHEMICAL

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WWW.CAYMANCHEM.COM

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Overview

| Tests | Results |
|-----------|-----------------------------|
| HPLC | Purity: 98.8 % \pm 0,12 % |
| IR | Conforms |
| Mass spec | MH+: 288.2 |
| NMR | Conforms |

Measurement Uncertainty

All measurement uncertainties are expressed as expanded uncertainties in accordance with ISO standards for Testing Laboratories and Reference Material Producers at the approximate 95% confidence interval using an appropriate coverage factor. Where applicable, optical rotation, chiral purity, and/or isotopic purity testing are performed to support the identification of the reference material, therefore the uncertainty is considered null.

Reviewed and approved by: Libby Perry

A handwritten signature in black ink that reads "Libby Perry".

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Revision History

| Revision No. | Date | Reason for Revision |
|--------------|-----------|---------------------|
| 01 | 06FEB2021 | Initial version |

Disclaimers

Material Safety Data

This material should be considered hazardous until information to the contrary becomes available. Do not ingest, swallow, or inhale. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. This information contains some but not all of the information required for the safe and proper use of this material. Before use, review the complete Safety Data Sheet, which has been sent via email to your institution.

Warranty and Limitation of Remedy

Cayman Chemical Company makes no warranty or guarantee of any kind, whether written or oral, expressed or implied, including without limitation, any warranty of fitness for a particular purpose, suitability and merchantability, which extends beyond the description of the chemicals hereof. Cayman warrants only to the original customer that the material will meet our specifications at the time of delivery.

Cayman will carry out its delivery obligations with due care and skill. Thus, in no event will Cayman have any obligation or liability, whether in tort (including negligence) or in contract, for any direct, indirect, incidental or consequential damages, even if Cayman is informed about their possible existence.

This limitation of liability does not apply in the case of intentional acts or negligence of Cayman, its directors or its employees.

Buyer's exclusive remedy and Cayman's sole liability hereunder shall be limited to a refund of the purchase price, or at Cayman's option, the replacement, at no cost to Buyer, of all material that does not meet our specification.

Said refund or replacement is conditioned on Buyer giving written notice to Cayman within thirty (30) days after arrival of the material at its destination. Failure of Buyer to give said notice within thirty (30) days shall constitute a waiver of Buyer of all claims hereunder with respect to said material.

For further details, please refer to our Warranty and Limitations of Remedy located on our website and in our catalog.

This Certificate shall not be reproduced except in full, without written approval from the Cayman Chemical ISO Quality Manager. ISO CRT

SD02 v 4.2

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