Certificate of Analysis
Reference Material

Lipomed Document QC-CA-622
Version: 007-05.Jul.2019 Supersedes: 006-24.Nov.2014

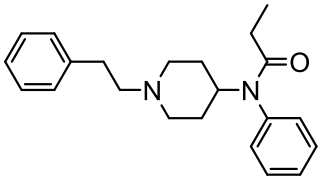
Chemical name: **Fentanyl**
1-Phenethyl-4-N-propionylanilinopiperidine

Lot No: 622.2B27.1
Art. No: FEN-622-FB

Release date: September 14, 2016
Last testing date: March 18, 2021
Retest date: **September 2026**

Chemical formula: $C_{22}H_{28}N_2O$ Molwt: 336.48

CAS Registry No: 437-38-7



TEST	SPECIFICATIONS	RESULTS
1. Appearance	white to off-white crystalline powder	conforms
2. Purity	HPLC > 98.5 %	99.907 ± 0.002 %
	The purity is calculated from the distribution of 6 HPLC analyses with a 95% level of confidence.	
3. Optical rotation	N/A (no chiral center)	N/A
4. Water content	Karl Fischer ≤ 5.0 %	0.2 %
5. Identity	IR	IR corresponds
	UV: in methanol λ_{max} = 204.0 ± 1.0 nm ε_{mol} = 24000 ± 3000	UV: in methanol λ_{max} = 204.4 nm ε_{mol} = 24985

FOR ANALYTICAL PURPOSES ONLY: NOT FOR HUMAN OR ANIMAL USE!

Storage conditions: For maximum stability store air-tight at 2 - 8 °C in a dark location.

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

Issued by Dr. L. Prévot

Date sign: Arlesheim,

March 19, 2021

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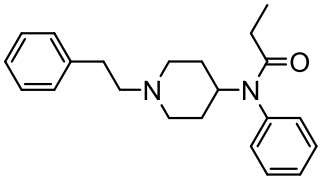

TEST	SPECIFICATIONS	RESULTS
	Melting point: 85 ± 3 °C	86 - 87 °C
	Proton NMR	corresponds to structure
	Mass Spectroscopy (ESI^+)	MH^+ corresponds

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GENERAL INFORMATION

Quality Documentation:

This certificate is designed in accordance with ISO Guide 31 (Reference Materials – Contents of Certificates and Labels) and ISO Guide 35 (Reference Materials – General and Statistical Principles for Certification).

Quality Standards for Arlesheim production site:

ISO 9001	Quality Management System. Manufacturing, analysis, packaging and distribution of Analytical Reference Materials and Pharmaceuticals. IQNet/SQS Certification: 37199
ISO/IEC 17025	General requirements for the competence of Testing Analytical Reference Standards. ANAB Certificate number: AT-1760
ISO 17034	General requirements for the competence of Reference Material Producer. ANAB Certificate number: AR-1761

Quality Control Assessment:

The product quality is controlled by regularly performed quality control tests (retests).

Intended Use:

The product covered by this certificate is designed for calibration or for use in quality control procedures for the specified chemical compound listed page 1. This product can be used for quantification and/or identification. If dilution is required use only diluent compatible with all certified analyses in this preparation. All solutions should be thoroughly mixed prior to use.

Expiration/Retest dates:

Expiration date/Retest date of the unopened flask stored at the recommended storage condition is the last day of the month listed page 1.

A retest will be performed 6 months prior to the stated retest date. Upon successful retesting, a new retest date or expiration date is set for the product. The certificate of analysis is then updated and made available on our website. For our products, the extension of the shelf life is capped to 10 years after release as the maximum period.

Gravimetric preparation:

All balances are calibrated annually by an ISO/IEC 17025 accredited calibration service. Calibration verification is performed weekly with certified traceable weights. Each balance has been assigned a minimum weighing.

Purity:

- Purity and/or chemical identity are determined by one or more of the following techniques: HPLC/UV, GC/FID, LC/MS, IR, UV, 1H NMR, Karl Fischer, melting point and optical rotation if applicable
- Purity of isomeric compounds is reported as the sum of the isomers
- Purity values are rounded to the last decimal place given

Uncertainty Statistics and Confidence limits:

The uncertainties are determined in accordance with ISO 17034 and ISO/IEC 17025. Uncertainty is given for a minimum injection volume of 1 µl. The certified uncertainty value (including characterization uncertainty, homogeneity between ampoules uncertainty, storage stability uncertainty and shipping stability uncertainty) is combined using the following formula:

$$U(y) = \sqrt{U^2_{characterization} + U^2_{homogeneity} + U^2_{storage\ stability} + U^2_{shipping\ stability}}$$

The packaged amount is the minimum sample size for which uncertainty is valid.

Stability:

The manufacturer guarantees the stability of this product throughout its intended shelf life, when handled and stored accordingly to the given storage conditions.

Legal and Safety Notice:

This product is for routine laboratory analysis and research purposes only. Due to the hazardous nature, only trained personnel should handle this product. The General Terms and Conditions of Lipomed apply.

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