



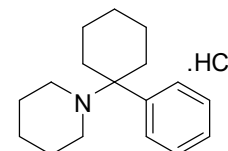
# CERTIFIED REFERENCE MATERIAL CERTIFICATE OF ANALYSIS

## NMIA D748c: Phencyclidine hydrochloride

Report ID: D748c.2026.01 (Bottled 260305)

Chemical Formula:  $C_{17}H_{25}N.HCl$

Molecular Weight: 279.9 g/mol (HCl), 243.4 g/mol (base)



### Certified value

Batch No.	CAS No.	Purity (mass fraction)
25-D-02	956-90-1 (HCl) 77-10-1 (base)	99.3 ± 0.4%

The uncertainty has been calculated according to ISO Guide 35 and is stated at the 95% confidence limit ( $k = 2$ ).

**IUPAC name:** 1-(1-Phenylcyclohexyl)piperidine hydrochloride (1:1)

**Expiration of certification:** The property values are valid till 26 March 2029, three years from the date of certification provided the **unopened** material is handled and stored in accordance with the recommendations below. The material as issued in the unopened container and stored as recommended below should be suitable for use beyond this date, subject to confirmation of batch stability from the issuing body. The expiry date/shelf life does not apply to sample bottles that have been opened. In such cases it is recommended that the end-user conduct their own in-house stability trials. The material will be re-tested on an annual basis to ensure that the property values are still valid. In the event a product fails the stability trial, notification will be sent to all impacted customers.

**Description:** White powder prepared by synthesis and certified for identity and purity by NMI Australia. Packaged in amber glass bottles with a septum and crimped aluminium cap.

**Intended use:** This certified reference material is suitable for use as a primary calibrator.

**Instructions for use:** Equilibrate the bottled material to room temperature before opening.

**Recommended storage:** When not in use this material should be stored at or below 25 °C in a closed container in a dry, dark area.

**Metrological traceability:** The certified purity value is traceable to the SI unit for mass (kg) through Australian national standards via balance calibration. Quantitative NMR provides an independent direct measure of the mass fraction of the analyte of interest, calibrated with an internal standard certified for purity (mass fraction).

**Stability:** In the absence of long term stability data the measurement uncertainty at the 95% coverage interval has been expanded to accommodate any potential change in the property value. The stability component has been estimated from stability trials conducted on similar materials by NMI Australia over the last ten years. The measurement uncertainty at the 95% confidence interval also includes a stability component determined from accelerated stability trials conducted at 40 °C and 75% humidity for 14 days. At the recommended storage conditions this material has demonstrated stability for a period of five years. The measurement uncertainty includes components for long term stability at the recommended storage conditions and accelerated stability trials conducted at 40 °C and 75% humidity for 14 days.

The long-term stability of the compound in solution has not been examined.

**Homogeneity assessment:** The homogeneity of the material was assessed using purity assay by GC-FID on ten randomly selected 1-2 mg sub samples of the material. The material was judged to be sufficiently homogeneous at this level of sampling as the variation in analysis results between samples was not significantly different at a 95% confidence level from that observed on repeat analysis of the same sample.

**Safety:** Treat as a hazardous substance. Use appropriate work practices when handling to avoid skin or eye contact, ingestion or inhalation of dust. Refer to the provided safety data sheet.

S. R. Davies

Dr Stephen R. Davies,  
Team Leader,  
Chemical Reference Materials, NMI.  
27 March 2026

This report supersedes any issued prior to 27 March 2026.

NATA Accreditation No. 198 / Corporate Site No. 14214.

**Legal notice:** Terms and Conditions associated with the provision of this reference material can be found on the NMIA website.

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### Characterisation Report:

GC-FID: Instrument: Agilent 8890 GC-VII  
 Column: HP-1MS, 30 m × 0.32 mm I.D. × 0.25 μm  
 Program: 100 °C (1 min), 10 °C/min to 220 °C, 30 °C/min to 300 °C (3 min)  
 Injector: 200 °C  
 Detector Temp: 320 °C  
 Carrier: Helium  
 Split ratio: 20/1  
 Relative mass fraction of the main component as the free base:  
 Initial analysis: Mean = 99.9%, s = 0.01% (10 sub samples in duplicate, September 2025)  
 Re-analysis: Mean = 99.9%, s = 0.002% (5 sub samples in duplicate, March 2026)

Karl Fischer analysis: Moisture content 0.2% mass fraction (September 2025)  
 Moisture content <0.1% mass fraction (March 2026)

### The following analytical data was obtained on the bulk material subsequently used in the preparation of the bottles.

The identity was confirmed by a range of spectroscopic techniques, NMR and GC-MS. The certified purity value was obtained by quantitative nuclear magnetic resonance (qNMR). The certified purity value by qNMR was obtained using five-proton multiplet between 7.30 – 7.91 ppm measured against a certified internal standard of maleic acid. Supporting evidence is provided by mass balance from a combination of traditional analytical techniques, including GC-FID, thermogravimetric analysis and Karl Fischer analysis. The purity value is calculated as per Equation 1.

$$\text{Purity} = (100 \% - I_{\text{ORG}}) \times (100 \% - I_{\text{VOL}} - I_{\text{NVR}}) \quad \text{Equation 1}$$

$I_{\text{ORG}}$  = Organic impurities of related structure,  $I_{\text{VOL}}$  = volatile impurities,  $I_{\text{NVR}}$  = non-volatile residue.

GC-FID: Instrument: Agilent 8890 GC-VII  
 Column: HP-1MS, 30 m × 0.32 mm I.D. × 0.25 μm  
 Program: 100 °C (1 min), 10 °C/min to 220 °C, 30 °C/min to 300 °C (3 min)  
 Injector: 200 °C  
 Detector Temp: 320 °C  
 Carrier: Helium  
 Split ratio: 20/1  
 Relative mass fraction of the main component as the free base:  
 Initial analysis: Mean = 99.9%, s = 0.01% (10 sub samples in duplicate, September 2025)

Karl Fischer analysis: Moisture content 0.2% mass fraction (September 2025)

Thermogravimetric analysis: Non-volatile residue <0.1% mass fraction (September 2025). The volatile content (e.g. organic solvents and/or water) could not be determined accurately due to the inherent volatility of the material and/or degradation at elevated temperatures.

QNMR: Instrument: Bruker Avance-III-500  
 Field strength: 500 MHz  
 Solvent: MeOH-d4 (3.34 ppm)  
 Internal standard: Maleic acid (100.0% mass fraction)  
 Initial analysis: Mean (2.4 ppm) = 99.31%, s = 0.20% (5 sub samples, October 2025)  
 Initial analysis: Mean (7.3–7.9 ppm) = 99.25%, s = 0.10% (5 sub samples, October 2025)

### Spectroscopic and other characterisation data

GC-MS:	Instrument:	Agilent 8890
	Column:	HP-5MS, 30 m x 0.25 mm I.D. x 0.25 $\mu$ m
	Program:	100 $^{\circ}$ C (1 min), 20 $^{\circ}$ C/min to 300 $^{\circ}$ C (3 min)
	Injector:	160 $^{\circ}$ C
	Split ratio:	20/1
	Transfer line temp:	280 $^{\circ}$ C
	Carrier:	Helium, 1.0 mL/min
	Scan range:	50-550 $m/z$
	The retention time of the free base is reported along with the major peaks in the mass spectrum. The latter are reported as mass/charge ratios and (in brackets) as percentage relative to the base peak.	
	Free base (13.5 min):	243 ( $M^+$ , 30), 242 (40), 200 (100), 186 (21), 158 (40), 129 (54), 115 (61), 91 (58) $m/z$
TLC:	Conditions:	Kieselgel 60F <sub>254</sub> . Hexane/ethyl acetate (3:1) Single spot observed, $R_f$ = 0.24. Visualisation with UV at 254 nm.
$^1$ H NMR:	Instrument:	Bruker Avance III-500
	Field strength:	500 MHz
	Solvent:	MeOH- $d_4$ (3.31 ppm)
	Spectral data:	$\delta$ 1.12-1.29 (3H, m), 1.35 (2H, qt, $J$ = 4.0, 13.1 Hz), 1.60 (1H, m), 1.72 (1H, m), 1.78-1.92 (6H, m), 1.97 (2H, dt, $J$ = 3.3, 12.9 Hz), 2.37 (2H, m), 3.07 (2H, dm, $J$ = 11.5 Hz), 3.75 (2H, bd, $J$ = 11.5 Hz), 7.54-7.70 (5H, m) ppm Ethanol estimated at 0.4% mass fraction was observed in the $^1$ H NMR
$^{13}$ C NMR:	Instrument:	Bruker Avance III-500
	Field strength:	125 MHz
	Solvent:	MeOH- $d_4$ (49.0 ppm)
	Spectral data:	$\delta$ 21.7, 22.6, 23.3, 24.7, 30.9, 71.4, 129.0, 129.6, 130.3 ppm
Melting point:	235 $^{\circ}$ C	
Microanalysis:	Found:	C = 71.9%; H = 9.5%; N = 5.2%; (September, 2025)
	Calculated:	C = 73.0%; H = 9.4%; N = 5.0%; (Calculated for C <sub>17</sub> H <sub>25</sub> N.HCl)