NMIA D1057: (±)-N- Methyl-1-(4-methylthiophenyl)-2-aminopropane hydrochloride

Report ID: D1057.2015.04

Chemical Formula: C11H17NS.HCl

Molecular Weight: 231.8 g/mol (HCl), 195.3 g/mol (base)

# Property value

|  |  |  |
| --- | --- | --- |
| **Batch No.** | **CAS No.** | **Purity estimate** |
| **15-D-13** | **634607-12-8 (HCl)**  **547736-90-3 (base)** | **99.5 ± 1.5%** |

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

IUPAC name: 1-[4-(Methylsulfanyl)phenyl]-*N*-methyl-2-propanamine hydrochloride (1:1).

Expiration of certification:The property values are valid till 21 May 2018, i.e. three years from the date of re-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.

**Description:** White solid prepared by synthesis, and certified for identity and purity by NMIA. Packaged in amber glass bottles with a septum and crimped aluminium cap or screw top cap.

Intended use: This reference material should be used for qualitative analysis only. This certified reference material is suitable for use as a primary calibrator

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

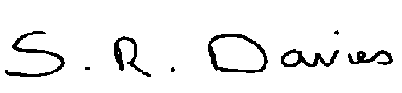
Recommended storage: When not in use this material should be stored at or below 25 ºC in a closed container in a dry, dark area.

Metrological traceability:The certified purity value is traceable to the SI unit for mass (kg) through Australian national standards via balance calibration. In the mass balance approach all impurities are quantified as a mass fraction and subtracted from 100%. 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. 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 short term accelerated stability trials. This material has demonstrated stability over a minimum period of three years. The measurement uncertainty at the 95% confidence interval includes a stability component which has been estimated from annual stability trials. 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 nine 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.



Dr Stephen R. Davies,

Team Leader,

Chemical Reference Materials, NMI.

20 October 2022

This report supersedes any issued prior to 28 September 2022.

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.

Characterisation Report:

The identity was confirmed by a range of spectroscopic techniques, NMR, IR and MS. The purity value was obtained by mass balance from a combination of traditional analytical techniques, including GC-FID, thermogravimetric analysis, Karl Fischer analysis and 1H NMR spectroscopy. The purity value is calculated as per Equation 1.

Purity = (100 % - IORG) x (100 % - IVOL – INVR) Equation 1

IORG = Organic impurities of related structure, IVOL = volatile impurities, INVR = non-volatile residue.

Supporting evidence is provided by qualitative headspace GC-MS analysis of occluded solvents and elemental microanalysis.

GC-FID: Instrument: Varian CP-3800

Column: VF-1MS, 30 m × 0.32 mm I.D. × 0.25 μm

Program: 100 °C (1 min), 10 °C/min to 250 °C, 30 oC/min to 300 oC (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 = 99.7%, s = 0.02% (9 sub samples in duplicate, May 2015)

Re-analysis: Mean = 99.6%, s = 0.01% (5 sub samples in duplicate, November 2016)

Re-analysis: Mean = 99.6%, s = 0.02% (5 sub samples in duplicate, September 2018)

GC-FID: Instrument: Varian CP-3800

Column: HP-5, 30 m × 0.32 mm I.D. × 0.25 μm

Program: 100 °C (1 min), 10 °C/min to 250 °C, 30 oC/min to 300 oC (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 = 99.7%, s = 0.02% (9 sub samples in duplicate, May 2015)

Re-analysis: Mean = 99.6%, s = 0.01% (5 sub samples in duplicate, November 2016)

Re-analysis: Mean = 99.6%, s = 0.02% (5 sub samples in duplicate, September 2018)

Karl Fischer analysis: Moisture content ≤ 0.1% mass fraction (May 2015)

Thermogravimetric analysis: Non volatile residue < 0.2% mass fraction (May 2015). The volatile content (e.g. organic solvents and/or water) could not be determined because of the inherent volatility of the material and/or degradation at elevated temperatures.

**Spectroscopic and other characterisation data**

GC-MS: Parent compound:

Instrument: Agilent 6890/5973

Column: HP-1MS, 30 m x 0.25 mm I.D. x 0.25 μm

Program: 100 °C (1 min), 10 °C/min to 250 °C, 30 °C/min to 300 °C (3 min)

Injector: 180 °C,

Split ratio: 20/1

Transfer line temp: 280 °C

Carrier: Helium, 1.0 mL/min

Scan range: 50-550 *m/z*

The retention time of the free base is reported with the major peaks in the mass spectra. The latter are reported as mass/charge ratios and (in brackets) as a percentage relative to the base peak.

Free base (9.5 min): 195 (M+, 1), 164 (3), 137 (19), 122 (17), 91 (8), 78 (7), 58 (100) *m/z*

ESI-MS: Instrument: Micromass Quatro LC Micro

Operation: Positive ion mode, direct infusion at 10 L/min

Ionisation: ESI spray voltage at 3.5 kV positive ion

EM voltage: 650 V

Cone voltage: 15 V

Peak: 196.3 (M+H+) *m/z*

HS-GC-MS: Instrument: Agilent 6890/5973/G1888

Column: DB-624, 30 m x 0.25 mm I.D. x 1.4 μm

Program: 50 °C (5 min), 7 °C/min to 120 °C, 15 °C/min to 220 °C (8.3 min)

Injector: 150 °C

Transfer line temp: 280 °C

Carrier: Helium, 1.2 mL/min

Split ratio: 50/1

Solvents detected: Isopropanol, diethyl ether

TLC: Conditions: Kieselgel 60F254. Methanol/ammonia (200:3)

Single spot observed, Rf = 0.3

IR: Instrument: Bruker Alpha Platinum ATR

Range: 4000-400 cm-1, neat

Peaks: 2960, 2727, 2464, 1481, 1435, 1385, 1066, 800, 533, 464 cm-1

1H NMR: Instrument: Bruker Avance III-500

Field strength: 500 MHz

Solvent: D2O (4.79 ppm)

Spectral data:  1.24 (3H, d, *J* = 6.6 Hz), 2.47 (3H, s), 2.68 (3H, s), 2.84 (1H, dd, *J* = 8.2, 13.9 Hz), 3.02 (1H, dd, *J* = 6.3, 13.9 Hz), 3.49 (1H, m), 7.24 (2H, d, *J* = 8.3 Hz), 7.31 (2H, d, *J* = 8.3 Hz) ppm

Isopropanol estimated at 0.1% mass fraction was observed in the 1H NMR

Diethyl ether estimated at 0.1% mass fraction was observed in the 1H NMR

13C NMR: Instrument: Bruker Avance III-500

Field strength: 126 MHz

Solvent: D2O

Spectral data: 14.6, 14.7, 29.9, 38.1, 56.3, 126.8, 130.1, 132.7, 136.6 ppm (This data was first reported in the C of A of DxxxA)

Melting point: 167-168 °C

Microanalysis: Found: C = 57.0%; H = 8.0%; N = 6.1%; Cl = 15.2%; S = 13.8% (June, 2015)

Calculated: C = 57.0%; H = 7.8%; N = 6.0%; Cl = 15.3%; S = 13.8% (Calculated for C11H17NS.HCl)

**Amendment record**

Original report ID: D1057.2015.01 (GT/SRD)

Date of issue: 18th June, 2015

Date of revision: 31 March 2020 (BC/AM)

Revised report ID: D1057.2015.02

* Update into new report format

Date of revision: 28 July 2021 (JH)

Revised report ID: D1057.2015.03

* Update Corporate Site no. and header to new department name

Date of revision: 28 September 2022 (TD)

Revised report ID: D1057.2015.04

Revisons:

* Update to the new template (change departmental name, NATA logo…)
* Insert estimated purity uncertainty