Australian Government
Department of Industry, Science and Resources

National Measurement Institute

NATA
WORLD RECOGNISED ACCREDITATION

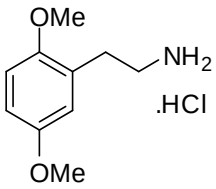
CERTIFIED REFERENCE MATERIAL CERTIFICATE OF ANALYSIS

NMIA D993: 2,5-Dimethoxyphenylethylamine hydrochloride

Report ID: D993.2023.01 (Bottled 161025)

Chemical Formula: $C_{10}H_{15}NO_2$.HCl

Molecular Weight: 217.7 g/mol (HCl), 181.2 g/mol (base)



Certified value

Batch No.	CAS No.	Purity (mass fraction)
13-D-06	3166-74-3 (HCl) 3600-86-0 (base)	99.8 ± 0.4%

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

IUPAC name: 2-(2,5-Dimethoxyphenyl)ethanamine hydrochloride.

Expiration of certification: The property values are valid till 14 June 2028, five 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 powder 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 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 all impurities are quantified as a mass fraction and subtracted from 100%.

Stability: This material has demonstrated stability over a minimum period of five 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 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.
19 June 2023

This report supersedes any issued prior to 19 June 2023

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 certified purity value was obtained by mass balance from a combination of traditional analytical techniques, including GC-FID, thermogravimetric analysis, Karl Fischer analysis and ^{1}H NMR spectroscopy. The purity value is calculated as per Equation 1.

Purity = (100 % - I_{ORG}) x (100 % - I_{VOL} – I_{NVR}) Equation 1

I_{ORG} = Organic impurities of related structure, I_{VOL} = volatile impurities, I_{NVR} = 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 or Agilent 6890	
	Column:	HP-1 or VF-1MS, 30 m × 0.32 mm I.D. × 0.25 μm	
	Program:	60 °C (1 min), 10 °C/min to 100 °C, 15 °C /min to 250 °C, 30 °C /min to 300 °C (3 min) or 60 °C (1 min), 5 °C/min to 160 °C, 15 °C /min to 250 °C, 30 °C /min to 300 °C (3 min) [2016]	
	Injector:	250 °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 = 100%, s = 0.02% (10 sub samples in duplicate, May 2013)	
	Re-analysis:	Mean = 99.7%, s = 0.09% (5 sub samples in duplicate, August 2014)	
	Re-analysis:	Mean = 99.9%, s = 0.03% (5 sub samples in duplicate, July 2015)	
	Re-analysis:	Mean = 99.9%, s = 0.02% (5 sub samples in duplicate, June 2016)	
	Re-analysis:	Mean = 99.9%, s = 0.03% (5 sub samples in duplicate, May 2019)	
	Re-analysis:	Mean = 99.9%, s = 0.01% (5 sub samples in duplicate, June 2023)	

GC-FID:	Instrument:	Varian CP-3800	
	Column:	TG-17MS, 30 m × 0.32 mm I.D. × 0.25 μm	
	Program:	60 °C (1 min), 10 °C/min to 100 °C, 15 °C /min to 250 °C, 30 °C /min to 300 °C (3 min)	
	Injector:	250 °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 = 100%, s = 0.01% (10 sub samples in duplicate, May 2013)	

Karl Fischer analysis:	Moisture content < 0.1% mass fraction (May 2013 and August 2014) Moisture content ca 0.1% mass fraction (July 2015 and June 2016) Moisture content < 0.1% mass fraction (May 2019, June 2023)
Thermogravimetric analysis:	Non volatile residue < 0.2% mass fraction (May 2013). 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:	Column:	TG1-MS, 30 m × 0.25 mm I.D. × 0.25 μm	
	Program:	60 °C (1 min), 10 °C/min to 100 °C, 15 °C/min to 250 °C, 30 ºC/min to 300 °C (3 min)	
	Injector:	250 °C	Split ratio: 20/1
	Transfer line temp:	300 °C	
	Carrier:	Helium, 1.0 mL/min	
	The retention times 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 a percentage relative to the base peak.		
	Free base(11.0 min):	181 (M^+, 16), 152 (100), 137 (55), 121 (16), 91 (13), 77 (11), 65 (8) *m/z*	
ESI-MS:	Instrument:	MassLynx 4.1	
	Ionisation mode:	Electrospray positive ion	
	Capillary voltage:	3.5 kV	Cone voltage: 45 V
	Source temp:	100 ºC	Desolvation gas temperature: 200 ºC
	Cone gas flow rate:	1 L/hr	Desolvation gas flow rate: 500 L/hr
	Peak:	182.1 ($M+H^+$) *m/z*	
HS-GC-MS:	Instrument:	Agilent 6890/5973/G1888	
	Column:	DB-624, 30 m × 0.25 mm I.D. × 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:	Propan-2-ol, diethyl ether	
TLC:	Conditions:	Kieselgel 60F_{254}. Methanol/conc. ammonia (100:1.5) Single spot observed, R_f = 0.3. Visualisation with ninhydrin	
IR:	Instrument:	Biorad FTS3000MX FT-IR	
	Range:	4000-400 cm^{-1}, KBr powder	
	Peaks:	2964, 2911, 2755, 2659, 2571, 2477, 2060, 1612, 1504, 1224, 1044, 852, 810, 704 cm^{-1}	
^{1}H NMR:	Instrument:	Bruker Avance-400	
	Field strength:	400 MHz	
	Solvent:	D_2O (4.79 ppm)	
	Spectral data:	δ 2.93 (2H, t, *J* = 7.0 Hz), 3.21 (2H, t, *J* = 6.9 Hz), 3.77 (3H, s), 3.80 (3H, s), 6.85 (1H, d, *J* = 3.1 Hz), 6.90 (1H, dd, *J* = 3.0, 8.9 Hz), 6.98 (1H, d, *J* = 8.9 Hz) ppm Diethyl ether and propan-2-ol estimated at 0.1% combined mass fraction was observed in the ^{1}H NMR	
^{13}C NMR:	Instrument:	Bruker Avance-400	
	Field strength:	100 MHz	
	Solvent:	D_2O	
	Spectral data:	δ 27.9, 39.6, 55.8, 56.0, 112.6, 113.3, 116.8, 126.0, 151.8, 152.8 ppm	
Melting point:		138-140 °C	
Microanalysis:	Found:	C = 55.2%; H = 7.4%; N = 6.4% (May 2013)	
	Calculated:	C = 55.2%; H = 7.4%; N = 6.4% (Calculated for $C_{10}H_{15}NO_2$.HCl)	