Australian Government
Department of Industry, Science and Resources

National Measurement Institute

NATA
WORLD RECOGNISED ACCREDITATION

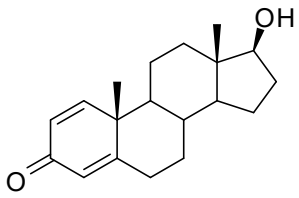
CERTIFIED REFERENCE MATERIAL CERTIFICATE OF ANALYSIS

NMIA S008b: Boldenone

Report ID: S008b.2026.01 (Bottled 180530)

Chemical Formula: $C_{19}H_{26}O_2$

Molecular Weight: 286.4 g/mol



Certified value

Batch No.	CAS No.	Purity (mass fraction)
18-S-01	846-48-0	97.6 ± 0.7%

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

IUPAC name: (17β)-17-Hydroxyandrosta-1,4-dien-3-one.

Expiration of certification: The property values are valid till 10 March 2029, 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 sourced from an external supplier and certified for identity and purity by NMI Australia. 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 4 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: The measurement uncertainty at the 95% confidence interval includes a stability component which has been estimated from annual and accelerated 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.
30 April 2026

This report supersedes any issued prior to 30 April 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.

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:	Agilent 6890N or 7890
	Column:	HP-1 or HP-35, 30 m × 0.32 mm I.D. × 0.25 μm
	Program:	190 °C (1 min), 15 °C/min to 300 °C (5 min), or 190 °C (1 min), 15 °C/min to 280 °C (6 min), 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:	
	Initial analysis:	Mean = 99.4%, s = 0.02% (10 sub samples in duplicate, February 2018)
	Re-analysis:	Mean = 99.4%, s = 0.06% (5 sub samples in duplicate, February 2019)
	Re-analysis:	Mean = 99.4%, s = 0.05% (5 sub samples in duplicate, April 2020)
	Re-analysis:	Mean = 99.3%, s = 0.02% (5 sub samples in duplicate, June 2021)
	Re-analysis:	Mean = 99.0%, s = 0.03% (5 sub samples in duplicate, June 2023)
	Re-analysis:	Mean = 99.6%, s = 0.01% (5 sub samples in duplicate, June 2024)
	Re-analysis:	Mean = 99.5%, s = 0.04% (5 sub samples in duplicate, March 2026)
Karl Fischer analysis:		Moisture content < 0.1% mass fraction (March 2018) Moisture content = 0.3% mass fraction (March 2019) Moisture content = 0.5% mass fraction (April 2020) Moisture content = 0.4% mass fraction (July 2020) Moisture content = 0.5% mass fraction (June 2021) Moisture content = 1.0% mass fraction (June 2023) Moisture content = 1.3% mass fraction (June 2024) Moisture content = 1.5% mass fraction (April 2025) Moisture content = 1.8% mass fraction (March 2026)
Thermogravimetric analysis:		Volatiles content 0.1-0.2% and non-volatile residue < 0.2% mass fraction (March 2018)

Spectroscopic and other characterisation data

GC-MS:	Instrument:	Agilent 6890/5973
	Column:	HP-1MS, 30 m x 0.25 mm I.D. x 0.25 μm
	Program:	190 °C (1 min), 15 °C/min to 300 °C (5 min)
	Injector:	250 °C
	Transfer line temp:	280 °C
	Carrier:	Helium, 1.0 mL/min
	Split ratio:	20/1
	The retention time of the parent compound is reported along 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.	
	Parent (9.1 min):	286 (M^+, 8), 147 (13), 122 (100), 91 (21) *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:	Ethyl acetate
TLC:	Conditions:	Kieselgel 60F_{254}. Hexane/ethyl acetate (1/1) Single spot observed, R_f = 0.4. Visualisation with UV at 254 nm
IR:	Instrument:	Biorad FTS300MX FT-IR
	Range:	4000-400cm^{-1}, KBr powder
	Peaks:	3746, 3477, 2940, 1660, 1619, 1442, 1409, 1298, 1241, 1133, 1065, 1024, 929, 886, 821 cm^{-1}
^{1}H NMR:	Instrument:	Bruker Avance III 500
	Field strength:	500 MHz
	Solvent:	$CDCl_3$ (7.26 ppm)
	Spectral data:	δ 0.81 (3H, s),0.91-1.11 (4H, m), 1.23 (3H, s), 1.32 (1H, m), 1.46 (1H, m), 1.56-1.77 (5H, m), 1.87 (1H, m), 1.93 (1H, m), 2.06 (1H, m), 2.35 (1H, m) 2.46 (1H, m), 3.63 (1H, t, *J* = 8.5 Hz), 6.07 (1H, t, *J* = 1.4 Hz), 6.22 (1H, dd, *J* = 1.9, 10.1 Hz), 7.06 (1H, d, *J* = 10.2 Hz) ppm
	Ethyl acetate estimated at 0.1% mass fraction was observed in the ^{1}H NMR	
^{13}C NMR:	Instrument:	Bruker Avance III 500
	Field strength:	126 MHz
	Solvent:	$CDCl_3$ (77.2 ppm)
	Spectral data:	δ 11.3, 18.9, 22.7, 23.7, 30.5, 32.9, 33.3, 35.7, 36.5, 43.3, 43.8, 50.2, 52.7, 81.6, 124.0, 127.6, 156.3, 169.6, 186.6 ppm
Melting point:		172-173 °C
Microanalysis:	Found:	C = 79.8%; H = 9.5% (March 2018)
	Calculated:	C = 79.7%; H = 9.2% (Calculated for $C_{19}H_{26}O_2$)