



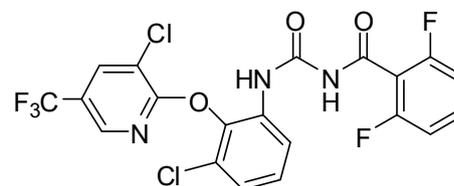
CERTIFIED REFERENCE MATERIAL CERTIFICATE OF ANALYSIS

NMIA P1490: Fluazuron

Report ID: P1490.2026.01

Chemical Formula: C₂₀H₁₀Cl₂F₅N₃O₃

Molecular Weight: 506.2 g/mol



Certified value

Batch No.	CAS No.	Purity (mass fraction)
97-000666	86811-58-7	95.6 ± 2.2%

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

IUPAC name: N-[(4-Chloro-3-[[3-chloro-5-(trifluoromethyl)-2-pyridinyl]oxy]phenyl)carbamoyl]-2,6-difluorobenzamide

Expiration of certification: The property values are valid till 5 March 2031, 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 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 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. 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: 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 HPLC with UV detection on five 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 March 2026

This report supersedes any issued prior to 19 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.

Characterisation Report:

The identity was confirmed by a range of spectroscopic techniques, NMR, IR and MS. The certified purity value was obtained from a combination of traditional analytical techniques and quantitative nuclear magnetic resonance (qNMR). The techniques used in the mass balance approach include HPLC with UV detection thermogravimetric analysis, Karl Fischer analysis and ¹H NMR spectroscopy. 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_{ORG} = Organic impurities of related structure, I_{VOL} = volatile impurities, I_{NVR} = non-volatile residue

The certified purity value by qNMR was obtained using a combination of the one proton triplet at 7.0 ppm, the one proton doublet at 8.0 ppm and the one proton doublet at 8.3 ppm against a certified internal standard of dimethyl sulfone.

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

HPLC: Instrument: Thermo Scientific Ultimate 3000
 Column: Grace Alltima C18, 5 µm (4.6 mm. x 150 mm)
 Column oven: 40 °C
 Mobile Phase: Acetonitrile/MilliQ water (65:35 v/v)
 Flow rate: 1.0 mL/min
 Detector: RS Diode Array Detector, operating at 260 nm
 Relative mass fraction of the main component:
 Initial analysis: Mean = 99.9%, s = < 0.001% (5 sub samples in duplicate, March 2026)

HPLC: Instrument: Waters Model 1525 Binary pump, 717 plus autosampler
 Column: Alltech Alltima C18, 5 µm (4.6 mm. x 150 mm).
 Column oven: Ambient
 Mobile Phase: Acetonitrile/MilliQ water (65:35 v/v)
 Flow rate: 1.0 mL/min
 Detector: Waters 2998 PDA operating at 260 nm
 Relative mass fraction of the main component:
 Initial analysis: Mean = 99.9%, s = 0.1% (7 sub samples in duplicate, April 1999)
 Re-analysis: Mean = 99.8%, s = 0.01% (5 sub samples in duplicate, August 2005)
 Re-analysis: Mean = 99.9%, s = 0.002% (5 sub samples in duplicate, November 2010)
 Re-analysis: Mean = 99.9%, s = 0.01% (5 sub samples in duplicate, September 2020)

Thermogravimetric analysis: Volatile content 4.0% and non volatile content < 0.2% mass fraction (October 2005)
 Volatile content 4.0% and non volatile content < 0.2% mass fraction (July 2006)
 Volatile content 4.4% and non volatile residue < 0.1% mass fraction (November 2010)
 Volatile content 3.4% and non volatile residue < 0.1% mass fraction (October 2020)
 Volatile content 3.4% and non volatile residue < 0.1% mass fraction (March 2026)

qNMR: Instrument: Bruker DMX-600
 Field strength: 600 MHz
 Solvent: CDCl₃ (7.26 ppm)
 Internal standard: Dimethyl sulfone (100% mass fraction)
 Initial analysis: Mean (7.0 ppm) = 95.6%, s = 0.4% (5 sub samples, December 2011)
 Mean (8.0 ppm) = 95.1%, s = 0.6% (5 sub samples, December 2011)
 Mean (8.3 ppm) = 95.2%, s = 0.5% (5 sub samples, December 2011)

Spectroscopic and other characterisation data

TLC:	Conditions:	Kieselgel 60F ₂₅₄ . toluene/acetone/diethylamine (85:10:5) Single spot observed, R _f = 0.5
IR:	Instrument:	Bruker Alpha Platinum ATR
	Range:	4000-400 cm ⁻¹ , neat
	Peaks:	1723, 1699, 1603, 1558, 1466, 1329, 1236, 1071, 1018, 794 cm ⁻¹
¹ H NMR:	Instrument:	Bruker Avance III-500
	Field strength:	500 MHz
	Solvent:	CDCl ₃ + TFA (7.26 ppm)
	Spectral data:	δ 7.10 (2H, m), 7.40 (1H, dd), 7.50-7.65 (2H, m), 8.15 (1H, d), 8.35 (1H, m) ppm
Melting point:		217-219 °C
Microanalysis:	Found:	C = 46.5%; H = 2.0%; N = 8.1%, F = 18.4%, Cl = 16.8% (December 2011)
	Found:	C = 46.3%; H = 2.0%; N = 8.1% (August 2005)
	Calculated:	C = 47.5%; H = 2.0%; N = 8.3%, F = 18.8%, Cl = 14.0% (Calc for C ₂₀ H ₁₀ Cl ₂ F ₅ N ₃ O ₃)