



FORENSIC CHEMISTRY



Cayman Chemical
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FORENSIC CHEMISTRY AT CAYMAN CHEMICAL

With more than 30 years of experience in the synthesis, purification, and characterization of biochemicals, Cayman Chemical has become a leader in the field of designer drugs by providing high-purity reference standards to federally licensed laboratories and qualified academic research institutions for forensic analysis. Our highly trained staff of chemists provide institutions with solutions to quickly identify and understand the physiological and toxicological properties of new designer drugs. Cayman synthesizes a range of analytical standards including synthetic cannabinoids, cathinones, phenethylamines, amphetamines, indanes, opioids, benzodiazepines, tryptamines, and phytocannabinoids, among many others.

For institutions that rely on highly traceable reference standards for use in quantitative or qualitative testing, Cayman offers synthesized reference materials and certified reference materials accredited to meet ISO/IEC 17025:2005 and ISO Guide 34:2009 guidelines.



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QUALITY

Cayman is committed to ensuring and maintaining quality in all aspects of its certified reference material production with a goal of meeting or exceeding our customers' expectations.

This goal is realized through a robust quality management system implemented and maintained by trained staff to meet the requirements set forth in ISO/IEC 17025 and ISO Guide 34. This quality management system is applicable to all staff and activities associated with the manufacture and testing of certified reference standards in Cayman's ISO-accredited laboratory.

ACCREDITED
ISO/IEC 17025 #AT-1773
ISO Guide 34 #AR-1774



ISO/IEC 17025:2005 meets the general requirements for the competence of testing and calibration laboratories. This ISO standard ensures Cayman is carrying out tests and calibrations to the highest degree of quality and reliability while characterizing Reference Materials (RMs) and certified Reference Materials (CRMs).



ISO Guide 34:2009 meets the general requirements for the competence of RM producers. This ISO standard recognizes Cayman for its competence in carrying out the standardized production, storage, and distribution of CRMs.

CERTIFICATE of ANALYSIS

U-47700 CRM
trans-3,4-dichloro-N-[2-(dimethylamino)cyclohexyl]-N-methylbenzamide





ACCREDITED
 ISO/IEC 17025 IAT-1773
 ISO Guide 34 IAB-1774




For R&D purposes only. Not intended for human or animal use.

Item No:	19397
Batch No:	0481623
CAS Registry No:	82657-23-6
Expiry Date:	26APR2019 (valid from date of certification)
Supplied as:	1 mg/mL (nominal) solution in methanol
Volume per Ampule:	Not less than 1 mL. Ampules are overfilled. It is advised that labs use measured volumes.
Storage:	Store unopened at -20°C. Warm to RT prior to opening.
Safety:	Flammable, Poison

Compound Information

CF: $C_{19}H_{22}Cl_2N_2O$
 FW: 329.30 amu

Certified Concentration

Certified Concentration - 1.000 mg/ml ± 0.005 mg/ml

Concentration is calculated based on product mass, solution mass, corrected purity, and density at 20°C. It is traceable to SI units through an unbroken chain of measurements.
 Uncertainty of concentration is expressed as 2nd expanded uncertainty in accordance with ISO 17025 and Guide 34 at the approximate 95% confidence interval using a coverage factor of k=2 and incorporates uncertainties from the corrected purity, solution preparation, homogeneity, long and short term stability.
 Concentration was verified by comparison to an independently prepared calibration standard.

Neat Material Quality Information (Item No: 18596 Batch No: 0479029)

Qualifier	Method	Limit	Result	Meets Specifications
Chromatographic Purity_HPLC	Cayman Method TST SD132	≥98.00%	99.04% ± 0.18%	✓
Identity_LC-MS	Cayman Method TST SD13, ±ESI	329.1 ± 0.5 amu	329.2 amu	✓
Identity_GC-MS	Cayman Method TST SD12	Conforms	Conforms	✓
FTIR	USP<851> (diamond ATR)	Conforms	Conforms	✓
% LOD	Cayman Method TST SD24	≤5.00%	0.34% ± 0.52%	✓
% ROI	Cayman Method TST SD06	≤3.00%	<0.10% ± 0.33%	✓
*Identity_NMR	¹ H NMR	Conforms	Conforms	✓
**Corrected Purity			98.60% ± 0.38%	

*NMR is provided as supplementary info but is not within scope of ISO accreditation
 **Corrected purity is determined as follows: Corrected Purity = (100% - % LOD) - % ROI / Chromatographic Purity(100)

Measurement Uncertainty
 All measurement uncertainties are expressed as expanded uncertainties in accordance with ISO 17025 and Guide 34 at the approximate 95% confidence interval using a coverage factor of k=2.

Cayman Chemical certifies that this standard meets the specifications stated in this certificate and warrants this product to meet the stated acceptance criteria through the expiration date when stored unopened as recommended.

Approval: _____ Title: Cayman Chemical ISO Quality Manager Certification Date: 04APR2016
 Page 1 of 5 Certificate 18091-0475109-01

Example of a certificate of analysis for a CRM

RMs and CRMs will be accompanied by an enhanced certificate of analysis, accredited to the requirements in ISO/IEC 17025:2005 and ISO Guide 34:2009.

- Includes purity information and a full characterization, with spectra attached, for RMs
- Will also report a certified concentration and its uncertainty, homogeneity, and long-term stability information for CRMs





PRODUCTS: GRADES

CERTIFIED REFERENCE MATERIALS

Certified Reference Materials (CRMs) serve as Primary Standards as defined by ISO and are suitable for labs requiring traceable quantitative standards. A CRM, as defined by ISO Guide 34:2009, must include a certified property value fully traceable to SI units as well as uncertainty. Cayman's CRMs are suitable for accurately measuring concentrations of analytes in test samples and are sold as quantitative solutions in sealed ampules.

REFERENCE MATERIALS

Cayman's Reference Materials (RMs) are sold as neat solids in several sizes allowing for a low-cost, scalable, and highly-flexible option for analytical labs where accurate qualitative results are desired. An RM is fully characterized, and its property values are tested to ISO/IEC 17025:2005 guidelines, making it fit for direct use by labs requiring traceable qualitative standards.

WHICH ONE IS RIGHT FOR YOU?

	Certified Reference Materials	Reference Materials	Research Materials
Quantitative Solutions			
Sealed Ampule Packaging			
Produced in Cayman's ISO Guide 34:2009 and ISO/IEC 17025:2005 Accredited Lab			
Enhanced Certificate of Analysis			
Recommended for ISO/IEC 17025:2005 Testing Labs			
Multiple and/or Custom Sizes			
Qualitative Solids			
Recommended for General Research			
Standard Certificate of Analysis			
Qualitative Solutions			



PRODUCTS: CATEGORIES

Cayman's forensic product line is continually evolving. We are dedicated to working with the forensic and academic communities to identify emerging drugs of abuse and to quickly make authentic reference standards available from our ISO/IEC 17025:2005 and ISO Guide 34:2009 labs.

- Cannabinoids
- Alkaloids
- Amphetamines
- Benzodiazepines
- Cathinones
- Indanes
- Nootropics
- Opioids
- Phencyclidines
- Phenethylamines
- Phytocannabinoids
- Piperazines
- Terpenoids
- Tryptamines

Cayman offers parent compounds as well as metabolites, isomers, deuterated standards, and DEA exempt reference standards. Custom mixtures are available upon request.





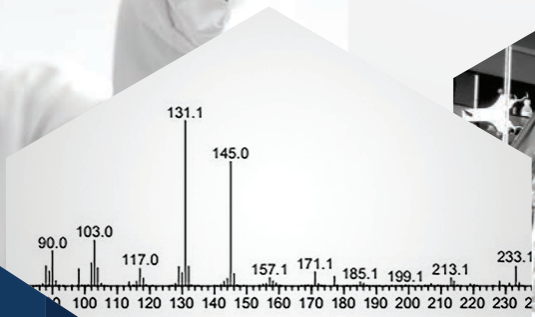
SERVICES

Cayman scientists collaborate with forensic and academic labs to provide data and analytical reference standards to help quickly identify emerging drugs of abuse. With a staff of more than 50 chemists located on a 241,000 ft² campus in Ann Arbor, Michigan, Cayman has the resources and expertise to offer affordable custom services with reasonable pricing and reliable lead times.

CUSTOM MIXTURES

Cayman's custom mixtures provide an accurate and simplified workflow solution for your mass spectrometry (MS) applications.

- Packaged in amber ampules; headspace purged with argon
- Designed for direct snap and inject use in MS applications
- Cost-effective





ANALYTICAL SERVICES

Cayman's analytical team has more than 20 years of experience in analytical chemistry and offers a wide range of services at competitive prices.

- LC-MS/MS quantitative analysis of drugs and metabolites
- Unknown identification *via* high resolution MS/MS, NMR, and GC-MS
- Analytical support services including MS, NMR, GC-MS, HPLC, optical rotation, and HPLC purification
- ISO/IEC 17025:2005 accredited analytical services

CUSTOM ORGANIC SYNTHESIS

Cayman offers custom synthesis of high-purity reference standards at reasonable prices and rapid delivery. Our scientists will work with each customer to confirm emerging drugs of abuse and their metabolites.

- Competitive pricing
- Rapid turnaround/on-time delivery
- Comprehensive characterization (HPLC, MS, NMR, etc.)
- Deuterium and ¹³C labeling
- Isomer and metabolite synthesis





TOOLS AND RESOURCES

Along with providing reference standards and RMs, Cayman offers several resources to assist the forensic and academic communities in their research. Visit www.caymanchem.com/forensics to take advantage of these free online tools.

GC-MS DRUG IDENTIFICATION TOOL

In three easy steps, search unknowns by formula weight, base peak, or 2nd base ion.

STEP 1

Filter: 257

Showing 1 to 12 of 12 entries (filtered from 1,196 total entries)

Item No	Product
16387	AB-CHMINACA metabolite M1A
15886	Dextrorphan (tartrate)
14165	A-834735 Degradant

SEARCH BY FW, BASE PEAK, OR 2ND BASE ION

STEP 2

FW (free base)	Base Peak Ion	2nd Base Peak Ion	GCMS
372.5	257	328	GCMS
407.5	257	256	GCMS
339.5	257	242	GCMS
348.6	257	91	GCMS

SELECT PRODUCT

STEP 3

VIEW GC-MS

SYNTHETIC CANNABINOID FLIPBOOK

Cayman's Flipbook tool is a user-friendly application designed for forensic chemists to quickly identify drugs of abuse that share common pharmacophores with scheduled substances. Users of the Flipbook tool must be affiliated with federal, state, or local governments or associated with a recognized research institution.

Your current selections are recognized as
AB-PINACA
ITEM No: **14038** [View Item >](#)

[Share Your Findings](#)
[Reset to AB-PINACA](#)
[Request a Quote](#)

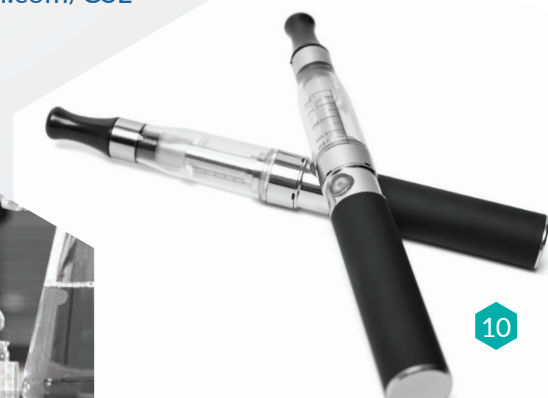
This compound has at least one pharmacophore that is common to the following controlled substances. Click below to view full product information. Not finding a pharmacophore of interest? Tell us what needs to be added.

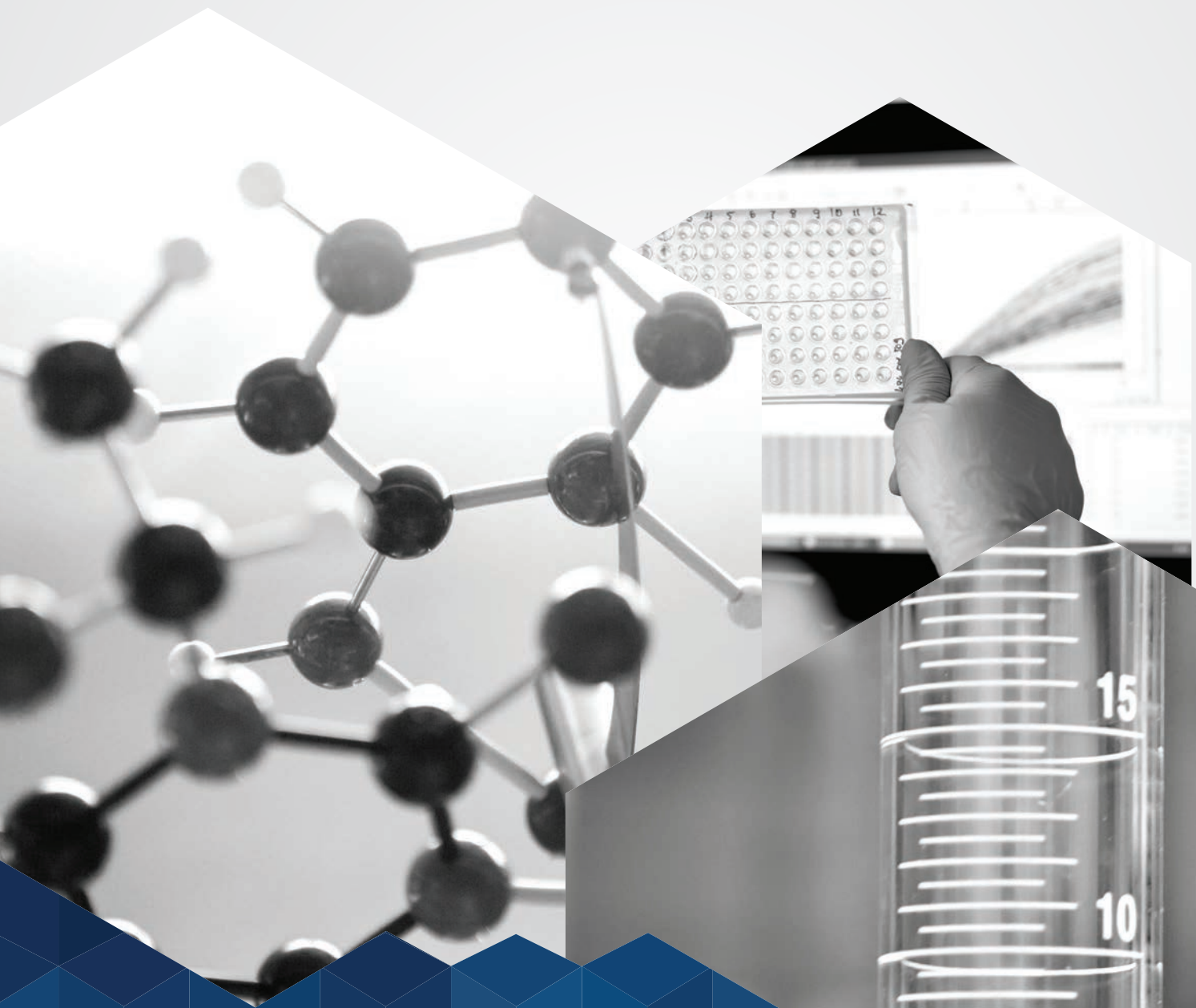
[JWH081](#)
[JWH 122](#)
[RCS-4](#)
[JWH018](#)

CAYMAN SPECTRAL LIBRARY

In support of forensic research, Cayman has compiled a GC-MS Library containing 70EV EI MS data of hundreds of our emerging forensic drug standards. This library is provided as a free service to assist forensic labs in the identification of emerging drugs of abuse.

- Updated continuously
- Available in Agilent MSD ChemStation and NIST formats
- Available for download free of charge at www.caymanchem.com/CSL





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