

CERTIFICATE of ANALYSIS



Atypical Stimulants Analytical Standards Panel

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

Item No.:	31618
Batch No.:	0651784
Size:	100 µg/well
Expiry Date:	05OCT2025 (valid from date of certification)
Storage & Handling:	Store upright and unopened at -20°C. Warm to room temperature prior to opening.
Safety:	Danger. Review the Safety Data Sheets before use.

Description

This product consists of 96-well Matrix plates containing individual atypical stimulants and stimulant-class standards. The individual well locations for each unique standard are listed in the table below.

Traceability Statement

This kit was prepared from individual standards that have been verified through standard quality testing and are traceable via individual item and batch numbers. All compounds used to make this kit were used within their valid expiry dates. Stability testing of this kit is ongoing to ensure continuous quality and traceability of the materials.

Quality Testing

A single kit was pulled randomly from the batch and high resolution accurate mass analysis was performed to verify the contents of each vial position. A summary of results is reported below as the average ppm mass error $\pm$ standard deviation determined for all analytes.

Test	Result	Specification	Meets Specification
Average mass error	2.92 $\pm$ 1.14 ppm	$\pm$ 10 ppm	Yes

Individual results are reported in the table on pages 2-9.

Approval: 

Title: QC Product Support Specialist

Certification Date: 05OCT2022

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

CERTIFICATE of ANALYSIS



Kit Contents Plate 1

Well	Item Name	Molecular Formula (free analyte)	Calculated [M+H] ⁺ m/z	Measured [M+H] ⁺ m/z	Mass Accuracy (ppm)
A1	Unused	Unused	Unused	Unused	Unused
A2	Piperazine	C ₄ H ₁₀ N ₂	87.0923	87.0916	8.01
A3	1,3-Dimethylbutylamine (hydrochloride)	C ₆ H ₁₅ N	102.1283	102.1277	6.35
A4	Octodrine (hydrochloride)	C ₈ H ₁₉ N	130.1596	130.159	4.99
A5	2-AI (hydrochloride)	C ₉ H ₁₁ N	134.0970	134.0963	5.59
A6	Phenylacetone	C ₉ H ₁₀ O	135.0811	135.0805	4.18
A7	Phenylacetic Acid	C ₈ H ₈ O ₂	137.0603	137.0598	3.87
A8	N-methyl-2-AI (hydrochloride)	C ₁₀ HN	148.1127	148.1121	4.04
A9	Cathine	C ₉ HNO	152.1076	152.107	4.04
A10	1-(4-Methoxyphenyl)piperazine (hydrochloride)	C ₁₁ H ₁₆ N ₂ O	193.1342	193.1336	2.92
A11	α-Phenylacetoacetonitrile	C ₁₀ H ₉ NO	160.0763	160.0758	3.21
A12	Unused	Unused	Unused	Unused	Unused
B1	Unused	Unused	Unused	Unused	Unused
B2	Phenylpiperazine (hydrochloride)	C ₁₀ H ₁₄ N ₂	163.1236	163.123	3.67
B3	Phenyl-2-nitropropene	C ₉ H ₉ NO ₂	164.0712	164.0707	3.22
B4	MEAI (hydrochloride)	C ₁₀ HNO	164.1076	164.1071	3.13
B5	1-Benzyl-2-methylpiperazine (hydrochloride)	C ₁₂ H ₁₈ N ₂	191.1549	191.1543	3.13
B6	(1S,2S)-(+)-Pseudoephedrine	C ₁₀ H ₁₅ NO	166.1233	166.1226	4.00
B7	3',4'-Dihydroxyphenylacetone	C ₉ H ₁₀ O ₃	167.0709	167.0703	3.56
B8	5-APDI (hydrochloride)	C ₁₂ H ₁₇ N	176.1440	176.1434	3.40
B9	BZP (hydrochloride)	C ₁₁ H ₁₆ N ₂	177.1392	177.1387	3.09
B10	BMK Glycidic Acid (sodium salt)	C ₁₀ H ₉ O ₃	178.0631	178.0613	9.94
B11	MDAI (hydrochloride)	C ₁₀ H ₁₁ NO ₂	178.0869	178.0862	3.81
B12	Unused	Unused	Unused	Unused	Unused

CERTIFICATE of ANALYSIS



Kit Contents Plate 1 Continued

Well	Item Name	Molecular Formula (free analyte)	Calculated [M+H] ⁺ m/z	Measured [M+H] ⁺ m/z	Mass Accuracy (ppm)
C1	Unused	Unused	Unused	Unused	Unused
C2	4,5-MDAI (hydrochloride)	C ₁₀ H ₁₁ NO ₂	178.0869	178.0863	3.25
C3	MMAI (hydrochloride)	C ₁₁ H ₁₅ NO	178.1233	178.1226	3.73
C4	Piperonyl methyl ketone	C ₁₀ H ₁₀ O ₃	179.0709	179.0704	2.76
C5	1-(4-Trifluoromethylphenyl)piperazine (hydrochloride)	C ₁₁ HF ₃ N ₂	231.1110	231.1103	2.95
C6	1-(4-Fluorophenyl)piperazine (hydrochloride)	C ₁₀ HFN ₂	181.1142	181.1136	3.18
C7	1-(4-Chlorophenyl)piperazine	C ₁₀ HCIN ₂	197.0846	197.084	3.18
C8	1-(2-Fluorophenyl)piperazine (hydrochloride)	C ₁₀ HFN ₂	181.1142	181.1136	3.18
C9	(+)-Chloropseudoephedrine (hydrochloride)	C ₁₀ H ₁₄ CIN	184.0894	184.0887	3.68
C10	Ecgonine (hydrochloride)	C ₉ H ₁₅ NO ₃	186.1131	186.1125	3.19
C11	Deschloronorketamine (hydrochloride)	C ₁₂ H ₁₅ NO	190.1233	190.1225	4.02
C12	Unused	Unused	Unused	Unused	Unused
D1	Unused	Unused	Unused	Unused	Unused
D2	4,4'-Dimethylaminorex	C ₁₁ H ₁₄ N ₂ O	191.1185	191.1179	3.21
D3	4-fluoro Deschloroketamine (hydrochloride)	CH ₁₆ FNO	222.1295	222.1288	3.12
D4	MBZP (hydrochloride)	C ₁₂ H ₁₈ N ₂	191.1549	191.1543	3.13
D5	(+)-Ephedrine (hydrochloride)	C ₁₀ H ₁₅ NO	166.1233	166.1227	3.40
D6	1-Benzyl-3-methylpiperazine	C ₁₂ H ₁₈ N ₂	191.1549	191.1543	3.13
D7	Cocaine	C ₁₇ H ₂₁ NO ₄	304.1550	304.1538	3.81
D8	Methyl 2-phenylacetoacetate	C ₁₁ H ₁₂ O ₃	193.0865	193.086	2.82
D9	4-methoxy PCE (hydrochloride)	C ₁₅ H ₂₃ NO	234.1859	234.185	3.69
D10	DL-Norephedrine (hydrochloride)	C ₉ HNO	152.1076	152.107	4.04
D11	1-(3-Methoxyphenyl)piperazine	C ₁₁ H ₁₆ N ₂ O	193.1342	193.1335	3.43
D12	Unused	Unused	Unused	Unused	Unused

CERTIFICATE of ANALYSIS



Kit Contents Plate 1 Continued

Well	Item Name	Molecular Formula (free analyte)	Calculated [M+H] ⁺ m/z	Measured [M+H] ⁺ m/z	Mass Accuracy (ppm)
E1	Unused	Unused	Unused	Unused	Unused
E2	1-Piperidinocyclohexanecarbonitrile	C ₁₂ H ₂₀ N ₂	193.1705	193.1699	3.35
E3	Caffeine	C ₈ H ₁₀ N ₄ O ₂	195.0883	195.0877	2.95
E4	4-fluoro BZP (hydrochloride)	C ₁₁ H ₁₅ FN ₂	195.1298	195.1293	2.70
E5	3-Fluorophenmetrazine (hydrochloride)	C ₁₁ H ₁₄ FNO	196.1138	196.1133	2.76
E6	1-(3-Chlorophenyl)piperazine (hydrochloride)	C ₁₀ HCIN ₂	197.0846	197.0842	2.16
E7	1-(3-Fluorophenyl)piperazine (hydrochloride)	C ₁₀ HFN ₂	181.1142	181.1136	3.18
E8	Deschloroketamine (hydrochloride)	CH ₁₇ NO	204.1389	204.1384	2.52
E9	BMK ethyl glycidate	C ₁₂ H ₁₄ O ₃	207.1022	207.1016	2.87
E10	2-fluoro Deschloronorketamine (hydrochloride)	C ₁₂ H ₁₄ FNO	208.1138	208.1132	3.08
E11	1-(2-Chloro-3-fluorophenyl)piperazine (hydrochloride)	C ₁₀ H ₁₂ ClFN ₂	215.0752	215.0746	2.81
E12	Unused	Unused	Unused	Unused	Unused
F1	Unused	Unused	Unused	Unused	Unused
F2	1-(3-Chloro-4-fluorophenyl)piperazine (hydrochloride)	C ₁₀ H ₁₂ ClFN ₂	215.0752	215.0746	2.81
F3	Harmaline	CH ₁₄ N ₂ O	215.1185	215.1181	1.92
F4	deschloro-N-ethyl-Ketamine (hydrochloride)	C ₁₄ H ₁₉ NO	218.1546	218.154	2.59
F5	PCPr (hydrochloride)	C ₁₅ H ₂₃ N	218.1909	218.1903	2.97
F6	Normethoxetamine (hydrochloride)	CH ₁₇ NO ₂	220.1338	220.1332	2.86
F7	1-(3-Methylbenzyl)piperazine	C ₁₂ H ₁₈ N ₂	191.1549	191.1543	3.13
F8	Methyl 2-phenyl-2-(pyrrolidin-1-yl)acetate (hydrochloride)	CH ₁₇ NO ₂	220.1338	220.1333	2.40
F9	3-hydroxy PCE (hydrochloride)	C ₁₄ H ₂₁ NO	220.1702	220.1695	3.24
F10	MDBP (hydrochloride)	C ₁₂ H ₁₆ N ₂ O ₂	221.1291	221.1284	3.07
F11	PMK Glycidic Acid (sodium salt)	C ₁₁ H ₉ O ₅	221.0455 (M-H)	221.0455	0.00
F12	Unused	Unused	Unused	Unused	Unused

CERTIFICATE of ANALYSIS



Kit Contents Plate 1 Continued

Well	Item Name	Molecular Formula (free analyte)	Calculated [M+H] ⁺ m/z	Measured [M+H] ⁺ m/z	Mass Accuracy (ppm)
G1	Unused	Unused	Unused	Unused	Unused
G2	2-fluoro Deschloroketamine (hydrochloride)	C ₁₃ H ₁₆ FNO	222.1295	222.1288	3.12
G3	Benzoylpiperazine	C ₁₁ H ₁₄ N ₂ O	191.1185	191.118	2.68
G4	3-fluoro Deschloroketamine (hydrochloride)	C ₁₃ H ₁₆ FNO	222.1295	222.1289	2.67
G5	Norketamine (hydrochloride)	C ₁₂ H ₁₄ ClNO	224.0843	224.0836	3.09
G6	Tiletamine (hydrochloride)	C ₁₂ H ₁₇ NOS	224.1110	224.1102	3.51
G7	Theacrine	C ₉ H ₁₂ N ₄ O ₃	225.0988	225.0981	3.29
G8	Ephenidine (hydrochloride)	C ₁₆ H ₁₉ N	226.1596	226.1589	3.31
G9	Rolicyclidine (hydrochloride)	C ₁₆ H ₂₃ N	230.1909	230.1903	2.82
G10	2,3-Dichlorophenylpiperazine (hydrochloride)	C ₁₀ H ₁₂ Cl ₂ N ₂	231.0457	231.045	2.83
G11	1-(3-Trifluoromethylphenyl)piperazine (hydrochloride)	C ₁₁ H ₁₃ F ₃ N ₂	231.1110	231.1104	2.52
G12	Unused	Unused	Unused	Unused	Unused
H1	Unused	Unused	Unused	Unused	Unused
H2	1-(2-Trifluoromethylphenyl)piperazine (hydrochloride)	C ₁₁ H ₁₃ F ₃ N ₂	231.1110	231.1104	2.52
H3	BMK Glycidic Acid	C ₁₀ H ₁₀ O ₃	179.0709	179.0705	2.21
H4	2-(3-(Trifluoromethyl)phenyl)piperazine (hydrochloride)	C ₁₁ H ₁₃ F ₃ N ₂	231.1110	231.1104	2.52
H5	2-methoxy Ketamine (hydrochloride)	C ₁₄ H ₁₉ NO ₂	234.1495	234.1488	2.90
H6	(R)-Ketamine (hydrochloride)	C ₁₃ H ₁₆ ClNO	238.0999	238.0994	2.28
H7	Methoxmetamine (hydrochloride)	C ₁₄ H ₁₉ NO ₂	234.1495	234.1489	2.47
H8	2'-hydroxy Cocaine	C ₁₇ H ₂₁ NO ₅	320.1499	320.149	2.73
H9	(S)-(+)-MT-45 (hydrochloride)	C ₂₄ H ₃₂ N ₂	349.2644	349.2639	1.57
H10	PMK methyl glycidate	C ₁₂ H ₁₂ O ₅	237.0764	237.0754	4.11
H11	1-(2,5-Dimethoxybenzyl)piperazine (hydrochloride)	C ₁₃ H ₂₀ N ₂ O ₂	237.1604	237.1598	2.44
H12	Unused	Unused	Unused	Unused	Unused

CERTIFICATE of ANALYSIS



Kit Contents Plate 2

Well	Item Name	Molecular Formula (free analyte)	Calculated [M+H] ⁺ m/z	Measured [M+H] ⁺ m/z	Mass Accuracy (ppm)
A1	Unused	Unused	Unused	Unused	Unused
A2	Ketamine (hydrochloride)	C ₁₃ H ₁₆ ClNO	238.0999	238.0993	2.70
A3	(±)-threo-Methylphenidate (hydrochloride)	C ₁₄ H ₁₉ NO ₂	234.1495	234.1488	2.90
A4	(S)-Ketamine (hydrochloride)	C ₁₃ H ₁₆ ClNO	238.0999	238.0993	2.70
A5	(2R,6R)-Hydroxynorketamine (hydrochloride)	C ₁₂ H ₁₄ ClNO ₂	240.0792	240.0786	2.53
A6	1-(4-Bromophenyl)piperazine (hydrochloride)	C ₁₀ H ₁₃ BrN ₂	241.0341	241.0335	2.53
A7	PCP (hydrochloride)	C ₁₇ H ₂₅ N	244.2066	244.206	2.45
A8	Norcocaine (hydrochloride)	C ₁₆ H ₁₉ NO ₄	290.1393	290.1386	2.44
A9	(±)-threo-Ethylphenidate (hydrochloride)	C ₁₅ H ₂₁ NO ₂	248.1651	248.1645	2.53
A10	(±)-threo-Isopropylphenidate (hydrochloride)	C ₁₆ H ₂₃ NO ₂	262.1808	262.1801	2.59
A11	PCEEA (hydrochloride)	C ₁₆ H ₂₅ NO	248.2015	248.2008	2.88
A12	Unused	Unused	Unused	Unused	Unused
B1	Unused	Unused	Unused	Unused	Unused
B2	Tenocyclidine (hydrochloride)	C ₁₅ H ₂₃ NS	250.1630	250.1623	2.88
B3	PMK ethyl glycidate	C ₁₃ H ₁₄ O ₅	251.0920	251.0913	2.89
B4	N-Ethylorketamine (hydrochloride)	C ₁₄ H ₁₈ ClNO	252.1156	252.1151	1.95
B5	(±)-threo-4-Fluoromethylphenidate (hydrochloride)	C ₁₄ H ₁₈ FNO ₂	252.1401	252.1394	2.61
B6	2-DPMP (hydrochloride)	C ₁₈ H ₂₁ N	252.1753	252.1747	2.38
B7	D2PM (hydrochloride)	C ₁₇ H ₁₉ NO	254.1546	254.1538	3.01
B8	Dextrophan (tartrate)	C ₁₇ H ₂₃ NO	258.1859	258.1853	2.18
B9	5-IAI (hydrochloride)	C ₉ H ₁₀ IN	259.9937	259.993	2.67
B10	3-methoxy PCP (hydrochloride)	C ₁₈ H ₂₇ NO	274.2172	274.2164	2.79
B11	1-(1-Phenylcyclohexyl)-4-hydroxypiperidine	C ₁₇ H ₂₅ NO	260.2015	260.2009	2.36
B12	Unused	Unused	Unused	Unused	Unused

CERTIFICATE of ANALYSIS



Kit Contents Plate 2 Continued

Well	Item Name	Molecular Formula (free analyte)	Calculated [M+H] ⁺ m/z	Measured [M+H] ⁺ m/z	Mass Accuracy (ppm)
C1	Unused	Unused	Unused	Unused	Unused
C2	trans-4-phenyl-4-Piperidinocyclohexanol	C ₁₇ H ₂₅ NO	260.2015	260.2009	2.36
C3	Methoxpropamine (hydrochloride)	C ₁₆ H ₂₃ NO ₂	262.1808	262.1802	2.21
C4	PCMPA (hydrochloride)	C ₁₆ H ₂₅ NO	248.2015	248.2009	2.47
C5	(±)-threo-Propylphenidate (hydrochloride)	C ₁₆ H ₂₃ NO ₂	262.1808	262.1802	2.21
C6	3-p-FBT (hydrochloride)	C ₁₅ H ₁₈ FNO ₂	264.1401	264.1394	2.49
C7	N-Propylnorketamine (hydrochloride)	C ₁₅ H ₂₀ CINO	266.1312	266.1307	2.04
C8	(±)-threo-4-Fluoroethylphenidate (hydrochloride)	C ₁₅ H ₂₀ FNO ₂	266.1557	266.1551	2.28
C9	Trimetazidine (hydrochloride)	C ₁₄ H ₂₂ N ₂ O ₃	267.1709	267.1703	2.41
C10	1,4-Dibenzylpiperazine (hydrochloride)	C ₁₈ H ₂₂ N ₂	267.1862	267.1856	2.24
C11	Pipradrol (hydrochloride)	C ₁₈ H ₂₁ NO	268.1702	268.1695	2.66
C12	Unused	Unused	Unused	Unused	Unused
D1	Unused	Unused	Unused	Unused	Unused
D2	4-methoxy PCP (hydrochloride)	C ₁₈ H ₂₇ NO	274.2172	274.2164	2.79
D3	2C-B-BZP (hydrochloride)	C ₁₃ H ₁₉ BrN ₂ O ₂	315.0709	315.0704	1.55
D4	3-hydroxy PCP (hydrochloride)	C ₁₇ H ₂₅ NO	260.2015	260.201	1.98
D5	2-bromo Deschloroketamine	C ₁₃ H ₁₆ BrNO	282.0494	282.0491	1.15
D6	(±)-threo-Methylnaphthidate (hydrochloride)	C ₁₈ H ₂₁ NO ₂	284.1651	284.1645	2.21
D7	Diclofensine (hydrochloride)	C ₁₇ H ₁₇ Cl ₂ NO	322.0766	322.0763	0.99
D8	Adrafinil	C ₁₅ H ₁₅ NO ₃ S	312.0665 (Na+)	312.0662	0.96
D9	Methoxetamine (hydrochloride)	C ₁₅ H ₂₁ NO ₂	248.1651	248.1646	2.13
D10	Benzoylecgonine	C ₁₆ H ₁₉ NO ₄	290.1393	290.1387	2.10
D11	RTI-31	C ₁₆ H ₂₀ CINO ₂	294.1262	294.1255	2.23
D12	Unused	Unused	Unused	Unused	Unused

CERTIFICATE of ANALYSIS



Kit Contents Plate 2 Continued

Well	Item Name	Molecular Formula (free analyte)	Calculated [M+H] ⁺ m/z	Measured [M+H] ⁺ m/z	Mass Accuracy (ppm)
E1	Unused	Unused	Unused	Unused	Unused
E2	(±)-threo-Ethyl-naphthidate (hydrochloride)	C ₁₉ H ₂₃ NO ₂	298.1808	298.1802	1.94
E3	Benocyclidine	C ₁₉ H ₂₅ NS	300.1787	300.1779	2.57
E4	(±)-threo-3,4-Dichloromethylphenidate (hydrochloride)	C ₁₄ H ₁₇ Cl ₂ NO ₂	302.0715	302.0711	1.44
E5	Scopolamine (hydrobromide)	C ₁₇ H ₂₁ NO ₄	304.1550	304.1544	1.84
E6	MT-45 (hydrochloride)	C ₂₄ H ₃₂ N ₂	349.2644	349.264	1.28
E7	Bromantane	C ₁₆ H ₂₀ BrN	306.0858	306.0854	1.34
E8	Unused	Unused	Unused	Unused	Unused

CERTIFICATE of ANALYSIS



Revision History

Revision No.	Date	Reason for Revision
01	05OCT2022	Initial version

Disclaimers

Material Safety Data

This material should be considered hazardous until information to the contrary becomes available. Do not ingest, swallow, or inhale. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. This information contains some but not all of the information required for the safe and proper use of this material. Before use, review the complete Material Safety Data Sheet, which has been sent *via* email to your institution.

Warranty and Limitation of Remedy

Cayman Chemical Company makes no warranty or guarantee of any kind, whether written or oral, expressed or implied, including without limitation, any warranty of fitness for a particular purpose, suitability and merchantability, which extends beyond the description of the chemicals hereof. Cayman warrants only to the original customer that the material will meet our specifications at the time of delivery.

Cayman will carry out its delivery obligations with due care and skill. Thus, in no event will Cayman have any obligation or liability, whether in tort (including negligence) or in contract, for any direct, indirect, incidental or consequential damages, even if Cayman is informed about their possible existence.

This limitation of liability does not apply in the case of intentional acts or negligence of Cayman, its directors or its employees.

Buyer's exclusive remedy and Cayman's sole liability hereunder shall be limited to a refund of the purchase price, or at Cayman's option, the replacement, at no cost to Buyer, of all material that does not meet our specification.

Said refund or replacement is conditioned on Buyer giving written notice to Cayman within thirty (30) days after arrival of the material at its destination. Failure of Buyer to give said notice within thirty (30) days shall constitute a waiver of Buyer of all claims hereunder with respect to said material. For further details, please refer to our Warranty and Limitations of Remedy located on our website and in our catalog.

This Certificate shall not be reproduced except in full, without written approval from the Cayman Chemical Company.

CAYMAN CHEMICAL
1180 EAST ELLSWORTH RD
ANN ARBOR, MI 48108 • USA

PHONE: [800] 364-9897
[734] 971-3335
FAX: [734] 971-3640

techserv@caymanchem.com
www.caymanchem.com