



CERTIFICATE OF ANALYSIS

5-Amino-1MQ

5 mg

LOT NUMBER

APX-2026-0612-A

REPORT NUMBER

APX-COA-2026-0612-A

COA ISSUE DATE

2026-06-12

COMPOUND REFERENCE

Material family
small molecule

Reference formula
 $C_{10}H_{11}IN_2$

Average mass
286.11 Da

Monoisotopic mass
285.9967 Da

MATERIAL & COMPOSITION

Nominal component amounts
5-Amino-1MQ: 5 mg

Sequence / construct
See complete identity results

Recorded storage
-20 +/- 5 C, protected from light; sealed dry vial

Formula and neutral masses describe the stated reference species. Counterions, solvates, formulation and measured ions retain their own reporting basis.

RECORDED RESULTS

5-Amino-1MQ

Purity

% integrated detector area

99.896%

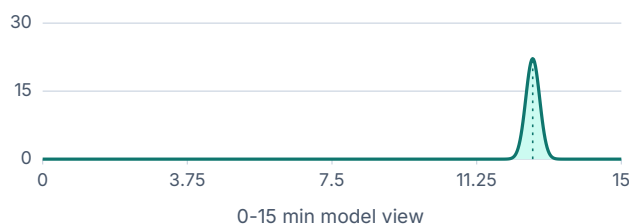
Active content

4.99825 mg/vial

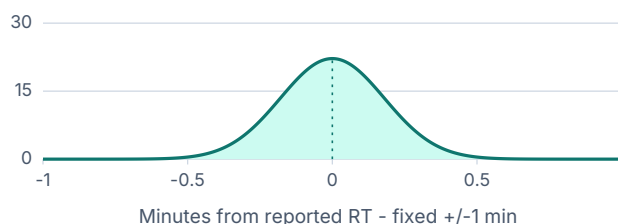
ESTIMATED PEAK PROFILE

Reported RT: 12.703 min

Modeled area density (10^6 counts/min)



Reported integrated area: 9,989,600 counts



Gaussian model; N = 5,000 assumed. Width and height estimated; not detector measurements.

61 recorded endpoints across 21 test groups. Results apply to this configuration and lot. For research use only; not for human or animal use.

APPROVED BY

K. Norwood

COA issued 2026-06-12

ONLINE REPORT

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02 Contamination & microbiology
Metals, solvents and microbial results

03+ Complete assay results
Methods, specifications and analytical context

Contamination & microbiology

All applicable tested criteria met

32 applicable endpoints reviewed against their stated specifications.

ELEMENTAL IMPURITIES		
Lead	✓	PASS
Cadmium	✓	PASS
Arsenic	✓	PASS
Mercury	✓	PASS
Cobalt	✓	PASS
Vanadium	✓	PASS
Nickel	✓	PASS
Palladium	✓	PASS
Platinum	✓	PASS
Rhodium	✓	PASS
Ruthenium	✓	PASS
Iridium	✓	PASS
RESIDUAL SOLVENTS		
Methanol	✓	PASS
Acetonitrile	✓	PASS
Dichloromethane	✓	PASS
N, N-dimethylformamide	✓	PASS
Ethanol	✓	PASS
Acetone	✓	PASS
Ethyl acetate	✓	PASS
Toluene	✓	PASS
n-Hexane	✓	PASS
Benzene	✓	PASS
MICROBIOLOGY & ENDOTOXINS		
Sterility: FTM	✓	PASS
Sterility: SCDM	✓	PASS
Bacterial endotoxins	✓	PASS
TAMC	✓	PASS
TYMC	✓	PASS
Escherichia coli	✓	PASS
Staphylococcus aureus	✓	PASS
Pseudomonas aeruginosa	✓	PASS
Salmonella species	✓	PASS
Candida albicans	✓	PASS

PASS indicates that the recorded result meets its stated criterion for the tested sample. Exact values, detection limits, sampling scope and methods follow in the complete results. For research use only.

Complete assay results

Reported values, units and acceptance outcomes are reproduced separately for each endpoint. Method keys link to the method reference section.

Endpoint	Reported result / basis	Acceptance criterion	Method / outcome
T01 / Identity and structure			
01 / Orthogonal identity against specified reference	Conforms to the assigned reference; see identity basis Unit: qualitative Basis B01	Conforms to the specified acceptance criterion Unit: qualitative	M01 PASS C01
02 / Orthogonal fingerprint similarity	= 0.9994 similarity (0-1) Basis B02	>= 0.995 Unit: similarity (0-1)	M01 PASS C02
16 / 5-amino-1MQ cation positive ESI	= 159.092 m/z Numeric value: 159.091674 Basis B14	159.091 to 159.092 Lower: 159.090879 Upper: 159.092469 Unit: m/z	M01 PASS C02
T02 / Chromatographic purity			
03 / 5-Amino-1MQ chromatographic purity	= 99.896 % integrated detector area Basis B03	99.7 to 100 Unit: % integrated detector area	M02 PASS C02
T03 / Active content and assay			
08 / 5-Amino-1MQ active content	= 4.99825 mg/vial Basis B06	4.9 to 5.1 Unit: mg/vial	M04 PASS C02
09 / 5-Amino-1MQ label claim assay	= 99.965 % label claim Basis B07	98 to 102 Unit: % label claim	M04 PASS C02
T04 / Blend composition			
13 / Applicability decision	Not applicable — One declared active or a water/preservative reagent. Preservative is separately quantified under T14; there is no multi-active blend ratio. Unit: qualitative Basis B08	Same as reported result Unit: qualitative Basis B09	M06 N/A — justified C05
T05 / Related substances and degradants			
04 / 5-Amino-1MQ Unknown U1	= 0.052 % integrated detector area Basis B04	<= 0.1 Unit: % integrated detector area	M03 PASS C03
05 / 5-Amino-1MQ Unknown U2	= 0.031 % integrated detector area Basis B04	<= 0.1 Unit: % integrated detector area	M03 PASS C03

Endpoint	Reported result / basis	Acceptance criterion	Method / outcome
06 / 5-Amino-1MQ Unknown U3	= 0.021 % integrated detector area Basis B04	<= 0.1 Unit: % integrated detector area	M03 PASS C03
07 / 5-Amino-1MQ total related peaks	= 0.104 % integrated detector area Basis B05	<= 0.3 Unit: % integrated detector area	M03 PASS C02
T06 / Water content			
14 / Residual water	= 0.552 % w/w finished fill Basis B12	<= 2 Unit: % w/w finished fill	M07 PASS C02
T07 / Counterions and associated species			
15 / Iodide:cation molar ratio	= 1.001 mol/mol Basis B13	0.98 to 1.02 Unit: mol/mol	M08 PASS C02
T08 / Residual solvents			
17 / Methanol	= 20.36 ug/g finished fill Basis B15	<= 3000 Unit: ug/g finished fill	M09 PASS C06
18 / Acetonitrile	= 8.29 ug/g finished fill Basis B15	<= 410 Unit: ug/g finished fill	M09 PASS C07
19 / Dichloromethane	= 3.486 ug/g finished fill Basis B15	<= 600 Unit: ug/g finished fill	M09 PASS C08
20 / N, N-dimethylformamide	= 3.928 ug/g finished fill Basis B15	<= 880 Unit: ug/g finished fill	M09 PASS C09
21 / Ethanol	= 41.677 ug/g finished fill Basis B15	<= 5000 Unit: ug/g finished fill	M09 PASS C06
22 / Acetone	= 12.702 ug/g finished fill Basis B15	<= 5000 Unit: ug/g finished fill	M09 PASS C09
23 / Ethyl acetate	= 8.657 ug/g finished fill Basis B15	<= 5000 Unit: ug/g finished fill	M09 PASS C09
24 / Toluene	= 1.69 ug/g finished fill Basis B15	<= 890 Unit: ug/g finished fill	M09 PASS C10
25 / n-Hexane	= 1.147 ug/g finished fill Basis B15	<= 290 Unit: ug/g finished fill	M09 PASS C10

Endpoint	Reported result / basis	Acceptance criterion	Method / outcome
26 / Benzene	= 0.085 ug/g finished fill Basis B15	<= 2 Unit: ug/g finished fill	M09 PASS C11
T09 / Elemental impurities			
27 / Lead	= 0.0116 ug/g finished fill Basis B16	<= 0.5 Unit: ug/g finished fill	M10 PASS C12
28 / Cadmium	= 0.0081 ug/g finished fill Basis B16	<= 0.2 Unit: ug/g finished fill	M10 PASS C12
29 / Arsenic	= 0.0162 ug/g finished fill Basis B16	<= 0.5 Unit: ug/g finished fill	M10 PASS C12
30 / Mercury	= 0.006 ug/g finished fill Basis B16	<= 0.1 Unit: ug/g finished fill	M10 PASS C12
31 / Cobalt	= 0.022 ug/g finished fill Basis B16	<= 1 Unit: ug/g finished fill	M10 PASS C12
32 / Vanadium	= 0.0221 ug/g finished fill Basis B16	<= 1 Unit: ug/g finished fill	M10 PASS C12
33 / Nickel	= 0.0346 ug/g finished fill Basis B16	<= 2 Unit: ug/g finished fill	M10 PASS C12
34 / Palladium	= 0.0107 ug/g finished fill Basis B16	<= 1 Unit: ug/g finished fill	M10 PASS C12
35 / Platinum	= 0.0096 ug/g finished fill Basis B16	<= 1 Unit: ug/g finished fill	M10 PASS C12
36 / Rhodium	= 0.0066 ug/g finished fill Basis B16	<= 1 Unit: ug/g finished fill	M10 PASS C12
37 / Ruthenium	= 0.0081 ug/g finished fill Basis B16	<= 1 Unit: ug/g finished fill	M10 PASS C12
38 / Iridium	= 0.0055 ug/g finished fill Basis B16	<= 1 Unit: ug/g finished fill	M10 PASS C12

Endpoint	Reported result / basis	Acceptance criterion	Method / outcome
T10 / Sterility test			
43 / Sterility: FTM	No growth at 14 days in all 20 units Unit: qualitative Basis B21	Conforms to the specified acceptance criterion Unit: qualitative	M14 PASS C13
44 / Sterility: SCDM	No growth at 14 days in all 20 units Unit: qualitative Basis B22	Conforms to the specified acceptance criterion Unit: qualitative	M14 PASS C13
T11 / Bacterial endotoxins			
45 / Bacterial endotoxins	<0.025 EU/mg active-equivalent Basis B23	<= 0.1 Unit: EU/mg active-equivalent	M15 PASS C14
T12 / Microbial enumeration			
46 / TAMC	<1 CFU/g finished fill Basis B24	<= 100 Unit: CFU/g finished fill	M16 PASS C15
47 / TYMC	<1 CFU/g finished fill Basis B24	<= 10 Unit: CFU/g finished fill	M16 PASS C15
48 / Escherichia coli	Not detected in 1g Unit: qualitative Basis B25	Conforms to the specified acceptance criterion Unit: qualitative	M16 PASS C16
49 / Staphylococcus aureus	Not detected in 1g Unit: qualitative Basis B25	Conforms to the specified acceptance criterion Unit: qualitative	M16 PASS C16
50 / Pseudomonas aeruginosa	Not detected in 1g Unit: qualitative Basis B25	Conforms to the specified acceptance criterion Unit: qualitative	M16 PASS C16
51 / Salmonella species	Not detected in 1g Unit: qualitative Basis B25	Conforms to the specified acceptance criterion Unit: qualitative	M16 PASS C16
52 / Candida albicans	Not detected in 1g Unit: qualitative Basis B25	Conforms to the specified acceptance criterion Unit: qualitative	M16 PASS C16
T13 / pH and analytical solution			
39 / pH of specified buffered analytical solution	= 4.84 pH Basis B17	4.1 to 5.5 Unit: pH	M11 PASS C02
T14 / Excipients and preservatives			
40 / Trehalose content	= 5.004 mg/vial Basis B18	4.75 to 5.25 Unit: mg/vial	M12 PASS C02

Endpoint	Reported result / basis	Acceptance criterion	Method / outcome
T15 / Unit uniformity			
10 / 5-Amino-1MQ individual-unit mean	= 99.965 % label claim Basis B08	98 to 102 Unit: % label claim Basis B09	M05 PASS C04
11 / 5-Amino-1MQ acceptance value (n=10)	= 0.8458 % label claim Basis B10	<= 15 Unit: % label claim	M05 PASS C04
12 / 5-Amino-1MQ individual-unit RSD	= 0.3525 % Basis B11	<= 2 Unit: %	M05 PASS C04
T16 / Biological activity			
53 / Applicability decision	Not applicable — No qualified, reference-traceable potency endpoint is established for this selected identity. Identity/content data cannot justify an invented biological potency value; exploratory biological activity would require a separately defined assay. Unit: qualitative Basis B08	Same as reported result Unit: qualitative Basis B09	M17 N/A — justified C05
T17 / Protein and conjugate characterization			
54 / Applicability decision	Not applicable — No recombinant protein, polymer conjugate or complex mixture for this material. Defined synthetic peptide identity is characterized under T01; GHK copper speciation, when relevant, is explicit. Unit: qualitative Basis B08	Same as reported result Unit: qualitative Basis B09	M18 N/A — justified C05
T18 / Process impurities			
55 / Applicability decision	Not applicable — chemical synthesis without cell/tissue manufacturing inputs; HCP, host DNA and Protein A are not relevant. Chemical process impurities are covered under T05/T08/T09. Unit: qualitative Basis B08	Same as reported result Unit: qualitative Basis B09	M19 N/A — justified C05
T19 / Particles and container closure			
56 / Subvisible particles >= 10um	= 21 particles/container Basis B26	<= 6000 Unit: particles/container	M20 PASS C17

Endpoint	Reported result / basis	Acceptance criterion	Method / outcome
57 / Subvisible particles $\geq 25\mu\text{m}$	= 2 particles/container Basis B26	≤ 600 Unit: particles/container	M20 PASS C17
58 / Vacuum decay package integrity	10/10test closures conform; positive-leak controls detected Unit: qualitative Basis B27	Conforms to the specified acceptance criterion Unit: qualitative	M20 PASS C18
T20 / Stability observations			
59 / Reported 6 month assay retention	= 99.91 % of initial assay Basis B28	98 to 102 Unit: % of initial assay	M21 PASS C02
60 / Reported 6 month minimum component purity	= 99.854 % integrated detector area Basis B29	99.7 to 100 Unit: % integrated detector area	M21 PASS C02
61 / Dating disposition	6 month review point; actual expiry/retest not assigned Unit: qualitative Basis B28	Conforms to the specified acceptance criterion Unit: qualitative	M21 PASS C01
T21 / Appearance and physical inspection			
41 / Appearance	white to off-white; uniform lyophilized cake Unit: qualitative Basis B19	Conforms to the specified acceptance criterion Unit: qualitative	M13 PASS C01
42 / Visible foreign matter	None observed in 3 inspected units Unit: qualitative Basis B20	Conforms to the specified acceptance criterion Unit: qualitative	M13 PASS C01

Method reference

The keys below identify the methods referenced in the result tables.

Key / method ID	Method	Technique
M01 M-T01-DEFAULT	Orthogonal chemical/structural identity	LC-HRMS/MS plus sequence/connectivity-sensitive reference comparison
M02 M-T02-HILIC-CAD	Nonchromophoric component chromatographic response purity	HILIC with charged aerosol detection
M03 M-T05-DEFAULT	Related substances	Stability-indicating LC integration; orthogonal size/charge separation for biologics
M04 M-T03-DEFAULT	Calibrated material content	Independent quantitative LC/CAD, protein assay or bioactivity calibration for IU
M05 M-T15-DEFAULT	Individual-unit uniformity	Ten separate unit preparations and fill measurements
M06 M-T04-DEFAULT	Component-resolved blend assay	Separate calibrated selective assay for every declared component
M07 M-T06-KF	Residual formulation water on a defined mass basis	Coulometric Karl Fischer with oven transfer
M08 M-T07-DEFAULT	Counterion composition	Ion chromatography and stoichiometric accounting
M09 M-T08-DEFAULT	Residual solvent panel	headspace GC-MS
M10 M-T09-DEFAULT	Elemental impurity panel	ICP-MS
M11 M-T13-DEFAULT	pH and solution state	Calibrated potentiometry
M12 M-T14-DEFAULT	Excipients/preservatives	Component-specific quantitative LC/CAD or formulation identity
M13 M-T21-DEFAULT	Appearance	Controlled visual examination
M14 M-T10-DEFAULT	Sterility observations in two media with matrix-specific preparation	Membrane filtration/rinsing or neutralized direct inoculation for Lemon dispersion
M15 M-T11-DEFAULT	Bacterial endotoxins	Recombinant factor C fluorometric assay
M16 M-T12-DEFAULT	Microbial enumeration/organisms	Membrane filtration enumeration and enrichment
M17 M-T16-DEFAULT	Functional biological activity	Reference-relative concentration-response assay
M18 M-T17-DEFAULT	Protein/conjugate characterization	SEC-MALS, CE-SDS, peptide mapping, glycan/PEG profiling

Key / method ID	Method	Technique
M19 M-T18-DEFAULT	Biological process impurity panel	Host/process-specific ELISA and qPCR
M20 M-T19-DEFAULT	Particles and package integrity	Light obscuration plus vacuum decay
M21 M-T20-DEFAULT	Stability observation	Time-zero/1/3/6-month trend

Analytical detail appendix

Basis keys preserve the exact analytical scope of each result. Detection limits and sampling context are reported separately from measured values. N/A limits are not numerical detection limits and are omitted from the context key.

Result and criterion bases

Key	Basis
B01	1-Methylquinolin-1-ium-5-amine iodide, 1:1 iodide salt, no stereocentres; catalog salt assignment. Label amount is defined as anhydrous iodide-salt equivalent.
B02	spectrum/peptide-map comparison; score is not proof of stereochemistry
B03	Single analyte method scope; intended blend co-components and excipients excluded by analyte-specific selectivity, not denominator manipulation
B04	Same analyte-specific chromatogram as T02; response factor assumed 1.00 for unknowns; area only
B05	Sum of U1+U2+U3; purity plus related areas = 100%
B06	Assigned component material basis; excludes vehicle/excipient/water; salt basis explicitly in identity specification
B07	Independent calibrated amount / nominal amount x 100; not chromatographic area purity
B08	specified sample/form only
B09	material-specific limit
B10	AV=abs(M-mean)+2.4 sample SD; target 100%; M=mean within 98.5-101.5
B11	Precision criterion for the listed specification, independently of AV
B12	Water as percentage of total net formulation, not peptide area purity
B13	Explicit 1:1iodide salt; label assay uses iodide-salt equivalent
B14	C10H11N2+; one fixed positive charge; excludes iodide. Theoretical159.091674 electron-mass-corrected ion; not [salt+H]+
B15	Material-based limit. Liquid numerical limits are listed specification and not ICH Option1 mass ppm.
B16	Total element; no speciation. material-based criterion, not a dose/route-derived safety limit.
B17	1.000 mg active/mL in 25mM acetate buffer, pH4.80,25.0C; buffer-solution compatibility is not the pH of dry material
B18	Separate excipient-specific assay; not label active
B19	Three containers under diffuse white illumination
B20	Visual observation only; subvisible particles reported separately
B21	FTM30-35C; tested units only; growth-promotion/suitability controls conform
B22	SCDM20-25C; tested units only; no sterility assurance level assigned
B23	Sample reporting limit after1:5 dilution; threshold is and not based on administration route/dose
B24	Zero colonies observed from1g or1 mL equivalent filter; report <1, not exact absence
B25	Specified-organism enrichment in explicit1g/1 mL scope; not a universal pharmacopeial panel
B26	As-supplied liquid or entire dry vial dissolved to stated analytical volume; limits, no injectable compliance claim
B27	method vacuum-decay threshold0.20kPa/60s;5um positive defect control. No universal leakage-to-sterility equivalence.

Key	Basis
B28	Reported change relative to the initial assay. This report does not assign a retest date or shelf life.
B29	Separate endpoint; no shelf-life claim

Sampling and detection context

Key	Reported context
C01	Analytical replicates: 2; Statistic type: individual/qualitative observation; Units sampled: 3; Units type: finished containers
C02	Analytical replicates: 2; Statistic type: mean of independent sample preparations; Units sampled: 3; Units type: finished containers
C03	Analytical replicates: 2; Statistic type: mean of independent sample preparations; Units sampled: 3; Units type: finished containers; LOD: 0.002 % integrated detector area; LOQ: 0.005 % integrated detector area
C04	Analytical replicates: 1; Statistic type: mean of independent sample preparations; Units sampled: 10; Units type: finished containers
C05	Analytical replicates: 0; Statistic type: individual/qualitative observation; Units sampled: 0; Units type: finished containers
C06	Analytical replicates: 2; Statistic type: mean of independent sample preparations; Units sampled: 3; Units type: finished containers; LOD: 1 ug/g finished fill; LOQ: 3 ug/g finished fill
C07	Analytical replicates: 2; Statistic type: mean of independent sample preparations; Units sampled: 3; Units type: finished containers; LOD: 0.3 ug/g finished fill; LOQ: 1 ug/g finished fill
C08	Analytical replicates: 2; Statistic type: mean of independent sample preparations; Units sampled: 3; Units type: finished containers; LOD: 0.2 ug/g finished fill; LOQ: 0.6 ug/g finished fill
C09	Analytical replicates: 2; Statistic type: mean of independent sample preparations; Units sampled: 3; Units type: finished containers; LOD: 0.5 ug/g finished fill; LOQ: 1.5 ug/g finished fill
C10	Analytical replicates: 2; Statistic type: mean of independent sample preparations; Units sampled: 3; Units type: finished containers; LOD: 0.1 ug/g finished fill; LOQ: 0.3 ug/g finished fill
C11	Analytical replicates: 2; Statistic type: mean of independent sample preparations; Units sampled: 3; Units type: finished containers; LOD: 0.01 ug/g finished fill; LOQ: 0.03 ug/g finished fill
C12	Analytical replicates: 2; Statistic type: mean of independent sample preparations; Units sampled: 3; Units type: finished containers; LOD: 0.0005 ug/g finished fill; LOQ: 0.002 ug/g finished fill
C13	Analytical replicates: 1; Statistic type: individual/qualitative observation; Units sampled: 20; Units type: finished containers
C14	Analytical replicates: 2; Statistic type: mean of independent sample preparations; Units sampled: 3; Units type: finished containers; LOD: 0.01 EU/mg active-equivalent; LOQ: 0.025 EU/mg active-equivalent
C15	Analytical replicates: 2; Statistic type: mean of independent sample preparations; Units sampled: 3; Units type: finished containers; LOD: 1 CFU/g finished fill; LOQ: 1 CFU/g finished fill
C16	Analytical replicates: 1; Statistic type: individual/qualitative observation; Units sampled: 1; Units type: finished containers
C17	Analytical replicates: 1; Statistic type: mean of independent sample preparations; Units sampled: 3; Units type: finished containers
C18	Analytical replicates: 1; Statistic type: individual/qualitative observation; Units sampled: 10; Units type: finished containers

Supporting analytical details

01 / Orthogonal identity against specified reference

Field	Reported value	Unit / note
identified structure or sequence	1-Methylquinolin-1-ium-5-amine iodide, 1:1 iodide salt, no stereocentres; catalog salt assignment. Label amount is defined as anhydrous iodide-salt equivalent.	text
neutral average mass	286.11	Da or explicit reason
neutral monoisotopic mass	Not assigned — see component-specific HRMS records; a reference mass is not a measured neutral mass	Explicit context; see value Method and sample context; reference facts are in Identity Reference.
observed mz	Not assigned — heterogeneous construct or no defined ion; orthogonal identity documented instead	Explicit context; see value Method and sample context; reference facts are in Identity Reference.
mass tolerance	+/-5 ppm for an explicitly defined monoisotopic ion; not 5 Da.	Explicit context; see value Method and sample context; reference facts are in Identity Reference.
reduced deglycosylated or intact	Intact specified parent for defined compounds; glycoproteins and PEG retain the specified population heterogeneity. No single exact intact glycoprotein mass is invented.	Explicit context; see value Method and sample context; reference facts are in Identity Reference.
stereochemistry method	Component-specific chiral amino acid analysis or orthogonal structure comparison, where applicable; HRMS cannot distinguish stereoisomers.	Explicit context; see value Method and sample context; reference facts are in Identity Reference.
identity standard traceability	RS-2713; internal standard, not a purchased certified reference material	text

03 / 5-Amino-1MQ chromatographic purity

Field	Reported value	Unit / note
main peak retention time	12.703	min
main peak area	9989600	counts
total integrated area	10000000	counts

08 / 5-Amino-1MQ active content

Field	Reported value	Unit / note
sample preparation volume	5	mL
dilution factor	10	fold

10 / 5-Amino-1MQ individual-unit mean

Field	Reported value	Unit / note
physical unit count	1	Explicit context; see value Method and sample context; reference facts are in Identity Reference.

14 / Residual water

Field	Reported value	Unit / note
dry basis correction	1.005550639530207	factor For mass-fraction reporting only; independent active assay is not blindly multiplied by this factor.

45 / Bacterial endotoxins

Field	Reported value	Unit / note
dilution factor	5	Explicit context; see value Method and sample context; reference facts are in Identity Reference.
maximum valid dilution if used	20	Explicit context; see value Method and sample context; reference facts are in Identity Reference.

56 / Subvisible particles >= 10um

Field	Reported value	Unit / note
packaging sample count	10	Explicit context; see value Method and sample context; reference facts are in Identity Reference.

END OF REPORT

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