

**Client Sample Number** 

#### **Cover Page**

Order ID:	Q3158
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Q3158-01

**Project ID:** Semi-Annual 2025

**Client:** Tanagro Corp.

Lab Sample Number

EFFLUENT-DAY-1-METALS

Q3158-02 EFF-DAY-1-1-4CN

I certify that the data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the laboratory manager or his designee, as verified by the following signature.

Signature :		
Signature .	 Date:	9/24/2025

NYDOH CERTIFICATION NO - 11376

NJDEP CERTIFICATION NO - 20012



#### DATA REPORTING QUALIFIERS- INORGANIC

For reporting results, the following "Results Qualifiers" are used:

J	Indicates the reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL), but greater than or equal to the Instrument Detection Limit (IDL).							
U	Indicates the analyte was analyzed for, but not detected.							
ND	Indicates the analyte was analyzed for, but not detected							
E	Indicates the reported value is estimated because of the presence of interference							
M	Indicates Duplicate injection precision not met.							
N	Indicates the spiked sample recovery is not within control limits.							
S	Indicates the reported value was determined by the Method of Standard Addition (MSA).							
*	Indicates that the duplicate analysis is not within control limits.							
+	Indicates the correlation coefficient for the MSA is less than 0.995.							
D	Indicates the reported value is from a secondary analysis with a dilution factor. The original analysis exceeded the calibration range.							
M OR	Method qualifiers  "P" for ICP instrument  "PM" for ICP when Microwave Digestion is used  "CV" for Manual Cold Vapor AA  "AV" for automated Cold Vapor AA  "CA" for MIDI-Distillation Spectrophotometric  "AS" for Semi – Automated Spectrophotometric  "C" for Manual Spectrophotometric  "T" for Titrimetric  "NR" for analyte not required to be analyzed  Indicates the analyte's concentration exceeds the calibrated range of the instrument for that specific analysis.							
Q	Indicates the LCS did not meet the control limits requirements							
Н	Sample Analysis Out Of Hold Time							





APPENDIX A

#### **QA REVIEW GENERAL DOCUMENTATION**

Project #: Q3158

	Completed
For thorough review, the report must have the following:	
GENERAL:	
Are all original paperwork present (chain of custody, record of communication, airbill, sample management lab chronicle, login page)	✓
Check chain-of-custody for proper relinquish/return of samples	<b>→</b>
Is the chain of custody signed and complete	✓
Check internal chain-of-custody for proper relinquish/return of samples /sample extracts	<del>'</del> <del>'</del> <del>'</del> <del>'</del>
Collect information for each project id from server. Were all requirements followed	<u>✓</u>
COVER PAGE:	
Do numbers of samples correspond to the number of samples in the Chain of Custody on login page	<u> </u>
Do lab numbers and client Ids on cover page agree with the Chain of Custody	<u> </u>
CHAIN OF CUSTODY:	
Do requested analyses on Chain of Custody agree with form I results	<u> </u>
Do requested analyses on Chain of Custody agree with the log-in page	
Were the correct method log-in for analysis according to the Analytical Request and Chain of Castody	<u> </u>
Were the samples received within hold time	<u> </u>
Were any problems found with the samples at arrival recorded in the Sample Management Laboratory Chronicle	<u> </u>
ANALYTICAL:	
Was method requirement followed?	<u> </u>
Was client requirement followed?	<u> </u>
Does the case narrative summarize all QC failure?	<u>'</u> <u>'</u> <u>'</u> _'
All runlogs and manual integration are reviewed for requirements	<u> </u>
All manual calculations and /or hand notations verified	<u> </u>

QA Review Signature:	KETAN PATEL	Date:	09/24/2025
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#### LAB CHRONICLE

OrderID: Q3158

Client: Tanagro Corp.
Contact: Marcelo Pittari

**OrderDate:** 9/19/2025 4:04:00 PM

**Project:** Semi-Annual 2025

Location: D31

LabID	ClientID	Matrix	Test	Method	Sample Date	Prep Date	Anal Date	Received
Q3158-01	EFFLUENT-DAY-1-MET ALS	Water			09/22/25			09/19/25
			Mercury	245.1		09/23/25	09/23/25	
			Metals ICP-Group1	200.7		09/22/25	09/23/25	



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#### Hit Summary Sheet SW-846

**SDG No.:** Q3158 **Order ID:** Q3158

Client: Tanagro Corp. Project ID: Semi-Annual 2025

Sample ID	Client ID	Matrix	Parameter	Concentration	С	MDL	RDL	Units
Client ID :	EFFLUENT-DAY-1-METALS							
Q3158-01	EFFLUENT-DAY-1-METALS	Water	Cadmium	0.00093	J	0.00031	0.0030	mg/L
Q3158-01	EFFLUENT-DAY-1-METALS	Water	Chromium	0.0032	J	0.00053	0.0050	mg/L
Q3158-01	EFFLUENT-DAY-1-METALS	Water	Copper	0.18		0.0019	0.010	mg/L
Q3158-01	EFFLUENT-DAY-1-METALS	Water	Lead	0.0077		0.0012	0.0060	mg/L
Q3158-01	EFFLUENT-DAY-1-METALS	Water	Mercury	0.000053	J	0.000027	0.00020	mg/L
Q3158-01	EFFLUENT-DAY-1-METALS	Water	Nickel	0.0040	J	0.0019	0.020	mg/L
Q3158-01	EFFLUENT-DAY-1-METALS	Water	Silver	0.020		0.00081	0.0050	mg/L
Q3158-01	EFFLUENT-DAY-1-METALS	Water	Zinc	0.20		0.0020	0.020	mg/L



# SAMPLE DATA



#### **Report of Analysis**

Client: Tanagro Corp. Date Collected: 09/22/25 Project: Semi-Annual 2025 Date Received: 09/19/25 Client Sample ID: **EFFLUENT-DAY-1-METALS** SDG No.: Q3158 Lab Sample ID: Q3158-01 Matrix: Water % Solid: Level (low/med): low 0

Cas	Parameter	Conc.	Qua.	DF	MDL	LOQ / CRQL	Units	Prep Date	Date Ana.	Ana Met. Prep Met.
7440-43-9	Cadmium	0.00093	J	1	0.00031	0.0030	mg/L	09/22/25 14:15	09/23/25 15:51	EPA 200.7
7440-47-3	Chromium	0.0032	J	1	0.00053	0.0050	mg/L	09/22/25 14:15	09/23/25 15:51	EPA 200.7
7440-50-8	Copper	0.18	N	1	0.0019	0.010	mg/L	09/22/25 14:15	09/23/25 15:51	EPA 200.7
7439-92-1	Lead	0.0077		1	0.0012	0.0060	mg/L	09/22/25 14:15	09/23/25 15:51	EPA 200.7
7439-97-6	Mercury	0.000053	J	1	0.000027	0.00020	mg/L	09/23/25 08:40	09/23/25 15:18	E245.1
7439-98-7	Molybdenum	0.0088	U	1	0.0088	0.10	mg/L	09/22/25 14:15	09/23/25 15:51	EPA 200.7
7440-02-0	Nickel	0.0040	J	1	0.0019	0.020	mg/L	09/22/25 14:15	09/23/25 15:51	EPA 200.7
7440-22-4	Silver	0.020	N*	1	0.00081	0.0050	mg/L	09/22/25 14:15	09/23/25 15:51	EPA 200.7
7440-66-6	Zinc	0.20	N	1	0.0020	0.020	mg/L	09/22/25 14:15	09/23/25 15:51	EPA 200.7

Color Before: Colorless Clarity Before: Clear Texture:

Color After: Colorless Clarity After: Clear Artifacts:

Comments: Metals Group1

U = Not Detected

LOQ = Limit of Quantitation

MDL = Method Detection Limit

LOD = Limit of Detection

D = Dilution

Q = indicates LCS control criteria did not meet requirements

J = Estimated Value

B = Analyte Found in Associated Method Blank

\* = indicates the duplicate analysis is not within control limits.

E = Indicates the reported value is estimated because of the presence of interference.

OR = Over Range

N =Spiked sample recovery not within control limits



# METAL CALIBRATION DATA



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#### Metals

- 2a -

#### INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client:	Tanagro Corp.		SDG No.:	Q3158
Contract:	TANA01		_ Lab Code	e: ACE
Initial Ca	libration Source:	EPA	_	
Continuin	g Calibration Source:	PLASMA-PURE	_	

		Result ug/L	True Value	%	Acceptance		Analysis	Analysis	Run
Sample ID	Analyte			Recovery	Window (%R)	M	Date	Time	Number
ICV42	Mercury	4.08	4.0	102	95 - 105	CV	09/23/2025	14:45	LB137278



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#### Metals

# - 2a - INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client:	Tanagro Corp.	SDG No.:	Q3158	
Contract:	TANA01	Lab Code:	ACE	

Initial Calibration Source: EPA

Continuing Calibration Source: PLASMA-PURE

Sample ID	Analyte	Result ug/L	True Value	% Recovery	Acceptance Window (%R)	M	Analysis Date	Analysis Time	Run Number
CCV28 CCV29	Mercury Mercury	5.14 5.11	5.0 5.0	103 102	90 - 110 90 - 110	CV CV	09/23/2025 09/23/2025	14:50 15:20	LB137278 LB137278
CCV30	Mercury	5.18	5.0	104	90 - 110	CV	09/23/2025	15:29	LB137278



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#### Metals

# - 2a - INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client:	Tanagro Corp.		_	SDG No.:	Q3158
Contract:	TANA01		<u> </u>	Lab Code:	ACE
Initial Cal	ibration Source:	EPA	_		
Continuin	g Calibration Source:	Inorganic Ventures			

		Result ug/L	True Value	%	Acceptance			Analysis	Analysis	Run
Sample ID	Analyte			Recovery	Window (%R	3)	M	Date	Time	Number
ICV01	Cadmium	1900	2000	95	95 - 105	P		09/23/2025	13:50	LB137283
	Chromium	765	800	96	95 - 105	P		09/23/2025	13:50	LB137283
	Copper	956	1000	96	95 - 105	P		09/23/2025	13:50	LB137283
	Lead	3800	4000	95	95 - 105	P		09/23/2025	13:50	LB137283
	Molybdenum	3850	4000	96	95 - 105	P		09/23/2025	13:50	LB137283
	Nickel	1940	2000	97	95 - 105	P		09/23/2025	13:50	LB137283
	Silver	1010	1000	101	95 - 105	P		09/23/2025	13:50	LB137283
	Zinc	1910	2000	96	95 - 105	P		09/23/2025	13:50	LB137283



**Continuing Calibration Source:** 

Silver

Zinc

284 Sheffield Street, Mountainside, New Jersey 07092, Phone: 908 789 8900,

Fax: 908 789 8922

#### Metals

## - 2a - INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client:	Tanagro Corp.		SDG	No.: Q3158	
Contract:	TANA01		Lab	Code: ACE	
Initial Cali	hration Source	EPA			

Inorganic Ventures

10.7

37.1

Result ug/L **True Value %** Acceptance Analysis Analysis Run Sample ID Analyte Recovery Window (%R) M Date Time Number LLICV01 Cadmium 5.78 6.0 96 80 - 120 P 09/23/2025 14:03 LB137283 Chromium 8.97 10.0 90 80 - 120 P 09/23/2025 14:03 LB137283 20.0 94 P 14:03 Copper 18.7 80 - 120 09/23/2025 LB137283 96 Lead 11.5 12.0 80 - 120 P 09/23/2025 14:03 LB137283 Molybdenum 176 200 88 80 - 120 P 09/23/2025 14:03 LB137283 40.0 80 - 120 P Nickel 35.3 88 09/23/2025 14:03 LB137283

107

93

80 - 120

80 - 120

P

P

09/23/2025

09/23/2025

14:03

14:03

LB137283

LB137283

10.0

40.0



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#### Metals

# - 2a - INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client:	Tanagro Corp.			SDG No.:	Q3158
Contract:	TANA01			Lab Code:	ACE
Initial Cali	bration Source:	EPA			

Continuing Calibration Source: Inorganic Ventures

		Result ug/L	True Value	%	Acceptance		Analysis	Analysis	Run
Sample ID	Analyte			Recovery	Window (%R	) M	•	Time	Number
CCV01	Cadmium	2410	2500	96	90 - 110	P	09/23/2025	15:19	LB137283
CCV01	Chromium	981	1000	98	90 - 110	P	09/23/2025	15:19	LB137283
	Copper	1220	1250	98	90 - 110	P	09/23/2025	15:19	LB137283
	Lead	4790	5000	96	90 - 110	P	09/23/2025	15:19	LB137283
	Molybdenum	4890	5000	98	90 - 110	P	09/23/2025	15:19	LB137283
	Nickel	2410	2500	96	90 - 110	P	09/23/2025	15:19	LB137283
	Silver	1230	1250	98	90 - 110	P	09/23/2025	15:19	LB137283
	Zinc	2440	2500	98	90 - 110	P	09/23/2025	15:19	LB137283
CCV02	Cadmium	2740	2500	110	90 - 110	P	09/23/2025	16:49	LB137283
	Chromium	928	1000	93	90 - 110	P	09/23/2025	16:49	LB137283
	Copper	1140	1250	91	90 - 110	P	09/23/2025	16:49	LB137283
	Lead	4810	5000	96	90 - 110	P	09/23/2025	16:49	LB137283
	Molybdenum	4590	5000	92	90 - 110	P	09/23/2025	16:49	LB137283
	Nickel	2380	2500	95	90 - 110	P	09/23/2025	16:49	LB137283
	Silver	1180	1250	94	90 - 110	P	09/23/2025	16:49	LB137283
	Zinc	2320	2500	93	90 - 110	P	09/23/2025	16:49	LB137283
CCV03	Cadmium	2710	2500	108	90 - 110	P	09/23/2025	18:06	LB137283
	Chromium	918	1000	92	90 - 110	P	09/23/2025	18:06	LB137283
	Copper	1140	1250	91	90 - 110	P	09/23/2025	18:06	LB137283
	Lead	5160	5000	103	90 - 110	P	09/23/2025	18:06	LB137283
	Molybdenum	4610	5000	92	90 - 110	P	09/23/2025	18:06	LB137283
	Nickel	2720	2500	109	90 - 110	P	09/23/2025	18:06	LB137283
	Silver	1160	1250	92	90 - 110	P	09/23/2025	18:06	LB137283
	Zinc	2280	2500	91	90 - 110	P	09/23/2025	18:06	LB137283



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# Metals - 2b CRDL STANDARD FOR AA & ICP

Client:	Tanagro Corp.	SDG No.:	Q3158
Contract:	TANA01	Lab Code:	ACE
Initial Cal	ibration Source:		
Continuin	g Calibration Source:		

Sample II	) Analyte	Result ug/L	True Value ug/L	% Recovery	Acceptance Window (%R)	M	Analysis Date	Analysis Time	Run Number
CRI01	Cadmium	6.18	6.0	103	65 - 135	P	09/23/2025	14:13	LB137283
	Chromium	9.43	10.0	94	65 - 135	P	09/23/2025	14:13	LB137283
	Copper	20.0	20.0	100	65 - 135	P	09/23/2025	14:13	LB137283
	Lead	12.3	12.0	103	65 - 135	P	09/23/2025	14:13	LB137283
	Molybdenum	190	200	95	65 - 135	P	09/23/2025	14:13	LB137283
	Nickel	37.9	40.0	95	65 - 135	P	09/23/2025	14:13	LB137283
	Silver	11.1	10.0	111	65 - 135	P	09/23/2025	14:13	LB137283
	Zinc	36.3	40.0	91	65 - 135	P	09/23/2025	14:13	LB137283
CRA	Mercury	0.059	0.05	118	60 - 140	CV	09/23/2025	14:54	LB137278



#### Metals

## - 3a - INITIAL AND CONTINUING CALIBRATION BLANK SUMMARY

 Client:
 Tanagro Corp.
 SDG No.:
 Q3158

 Contract:
 TANA01
 Lab Code:
 ACE

Sample ID	Analyte	Result ug/L	Acceptance Limit	Conc Qual	CRQL	M	Analysis Date	Analysis Time	Run Number
ICB42	Mercury	0.027	+/-0.2	U	0.20	CV	09/23/2025	14:47	LB137278



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#### Metals

# - 3a - INITIAL AND CONTINUING CALIBRATION BLANK SUMMARY

Client: Tanagro Corp. SDG No.: Q3158

Sample ID	Analyte	Result ug/L	Acceptance Limit	Conc Qual	CRQL	M	Analysis Date	Analysis Time	Run Number
CCB28	Mercury	0.027	+/-0.2	U	0.20	CV	09/23/2025	14:52	LB137278
CCB29	Mercury	0.027	+/-0.2	U	0.20	CV	09/23/2025	15:23	LB137278
CCB30	Mercury	0.027	+/-0.2	U	0.20	CV	09/23/2025	15:32	LB137278





#### Metals

# - 3a - INITIAL AND CONTINUING CALIBRATION BLANK SUMMARY

Client: Tanagro Corp. SDG No.: Q3158

Sample ID	Analyte	Result ug/L	Acceptance Limit	Conc Qual	CRQL	M	Analysis Date	Analysis Time	Run Number
ICB01	Cadmium	0.51	+/-3	J	6.00	P	09/23/2025	14:07	LB137283
	Chromium	2.12	+/-5	U	10.0	P	09/23/2025	14:07	LB137283
	Copper	4.60	+/-10	U	20.0	P	09/23/2025	14:07	LB137283
	Lead	3.01	+/-6	J	12.0	P	09/23/2025	14:07	LB137283
	Molybdenum	18.7	+/-100	U	200	P	09/23/2025	14:07	LB137283
	Nickel	3.06	+/-20	U	40.0	P	09/23/2025	14:07	LB137283
	Silver	1.62	+/-5	U	10.0	P	09/23/2025	14:07	LB137283
	Zinc	16.7	+/-20	U	40.0	P	09/23/2025	14:07	LB137283



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#### Metals

# - 3a - INITIAL AND CONTINUING CALIBRATION BLANK SUMMARY

Client: Tanagro Corp. SDG No.: Q3158

Sample ID	Analyte	Result ug/L	Acceptance Limit	Conc Qual	CRQL	M	Analysis Date	Analysis Time	Run Number
CCB01	Cadmium	0.50	+/-3	U	6.00	P	09/23/2025	15:23	LB137283
	Chromium	2.12	+/-5	U	10.0	P	09/23/2025	15:23	LB137283
	Copper	4.60	+/-10	U	20.0	P	09/23/2025	15:23	LB137283
	Lead	2.30	+/-6	U	12.0	P	09/23/2025	15:23	LB137283
	Molybdenum	18.7	+/-100	U	200	P	09/23/2025	15:23	LB137283
	Nickel	3.06	+/-20	U	40.0	P	09/23/2025	15:23	LB137283
	Silver	1.62	+/-5	U	10.0	P	09/23/2025	15:23	LB137283
	Zinc	16.7	+/-20	U	40.0	P	09/23/2025	15:23	LB137283
CCB02	Cadmium	0.50	+/-3	U	6.00	P	09/23/2025	17:09	LB137283
	Chromium	2.12	+/-5	U	10.0	P	09/23/2025	17:09	LB137283
	Copper	4.60	+/-10	U	20.0	P	09/23/2025	17:09	LB137283
	Lead	2.30	+/-6	U	12.0	P	09/23/2025	17:09	LB137283
	Molybdenum	18.7	+/-100	U	200	P	09/23/2025	17:09	LB137283
	Nickel	3.06	+/-20	U	40.0	P	09/23/2025	17:09	LB137283
	Silver	1.62	+/-5	U	10.0	P	09/23/2025	17:09	LB137283
	Zinc	16.7	+/-20	U	40.0	P	09/23/2025	17:09	LB137283
CCB03	Cadmium	0.50	+/-3	U	6.00	P	09/23/2025	18:12	LB137283
	Chromium	2.12	+/-5	U	10.0	P	09/23/2025	18:12	LB137283
	Copper	4.60	+/-10	U	20.0	P	09/23/2025	18:12	LB137283
	Lead	2.66	+/-6	J	12.0	P	09/23/2025	18:12	LB137283
	Molybdenum	18.7	+/-100	U	200	P	09/23/2025	18:12	LB137283
	Nickel	3.06	+/-20	U	40.0	P	09/23/2025	18:12	LB137283
	Silver	1.62	+/-5	U	10.0	P	09/23/2025	18:12	LB137283
	Zinc	16.7	+/-20	U	40.0	P	09/23/2025	18:12	LB137283



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#### Metals - 3b -PREPARATION BLANK SUMMARY

Client: Tanagro Corp. SDG No.: Q3158

**Instrument:** CV1

Sample ID	Analyte	Result (ug/L)	Acceptance Limit	Conc Qual	CRQL ug/L	M	Analysis Date	Analysis Time	Run
PB169802BL		WATER		Batch Number:	PB169802		Prep Date:	09/23/20	025
	Mercury	0.027	< 0.2	U	0.20	CV	09/23/2025	15:01	LB137278





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#### Metals - 3b -PREPARATION BLANK SUMMARY

Client: Tanagro Corp. SDG No.: Q3158

**Instrument:** P4

		Result	Acceptance	Conc	CRQL		Analysis	Analysis	
Sample ID	Analyte	(ug/L)	Limit	Qual	ug/L	M	Date	Time	Run
PB169785BL		WATER		Batch Number:	PB169785		Prep Date:	09/22/20	)25
	Cadmium	0.31	<1.5	U	3.00	P	09/23/2025	17:50	LB137283
	Chromium	0.53	<2.5	U	5.00	P	09/23/2025	17:50	LB137283
	Copper	1.89	<5	U	10.0	P	09/23/2025	17:50	LB137283
	Lead	1.21	<3	U	6.00	P	09/23/2025	17:50	LB137283
	Molybdenum	8.80	< 50	U	100	P	09/23/2025	17:50	LB137283
	Nickel	1.90	<10	U	20.0	P	09/23/2025	17:50	LB137283
	Silver	0.85	<2.5	J	5.00	P	09/23/2025	17:50	LB137283
	Zinc	7.58	<10	J	20.0	P	09/23/2025	17:50	LB137283





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#### Metals - 4 -INTERFERENCE CHECK SAMPLE

Client: Tanagro Corp. SDG No.: Q3158

Contract: TANA01 Lab Code: ACE

ICS Source: EPA Instrument ID: P4

							_		
Sample ID	Analyte	Result ug/L	True Value ug/L	% Recovery	Low Limit (ug/L)	High Limit (ug/L)	Analysis Date	Analysis Time	Run Number
	~				_	_			
ICSA01	Cadmium	2.52	1.0	252	-5	7	09/23/2025	14:23	LB137283
	Chromium	48.0	52.0	92	42	62	09/23/2025	14:23	LB137283
	Copper	8.40	2.0	420	-18	22	09/23/2025	14:23	LB137283
	Lead	3.11			-12	12	09/23/2025	14:23	LB137283
	Molybdenum	11.6	1000	1	-200	200	09/23/2025	14:23	LB137283
	Nickel	5.70	2.0	285	-38	42	09/23/2025	14:23	LB137283
	Silver	4.17			-10	10	09/23/2025	14:23	LB137283
	Zinc	-1.32			-40	40	09/23/2025	14:23	LB137283
ICSAB01	Cadmium	898	972	92	826	1120	09/23/2025	14:27	LB137283
	Chromium	506	542	93	460	624	09/23/2025	14:27	LB137283
	Copper	438	511	86	434	588	09/23/2025	14:27	LB137283
	Lead	44.9	49.0	92	37	61	09/23/2025	14:27	LB137283
	Molybdenum	902	1000	90	850	1150	09/23/2025	14:27	LB137283
	Nickel	894	954	94	810	1100	09/23/2025	14:27	LB137283
	Silver	198	201	98	170	232	09/23/2025	14:27	LB137283
	Zinc	936	952	98	809	1095	09/23/2025	14:27	LB137283
ICSA	Cadmium	13.6	1.0	1360	-5	7	09/23/2025	14:31	LB137283
10011	Chromium	40.7	52.0	78	42	62	09/23/2025	14:31	LB137283
	Copper	25.6	2.0	1280	-18	22	09/23/2025	14:31	LB137283
	Lead	48.4			-12	12	09/23/2025	14:31	LB137283
	Molybdenum	28.3	1000	3	-200	200	09/23/2025	14:31	LB137283
	Nickel	15.4	2.0	770	-38	42	09/23/2025	14:31	LB137283
	Silver	27.1			-10	10	09/23/2025	14:31	LB137283
	Zinc	-242			-40	40	09/23/2025	14:31	LB137283
ICSAB	Cadmium	814	972	84	826	1120	09/23/2025	14:43	LB137283
ICSAB	Chromium	476	542	88	460	624	09/23/2025	14:43	LB137283
	Copper	442	511	86	434	588	09/23/2025	14:43	LB137283
	Lead	47.2	49.0	96	37	61	09/23/2025	14:43	LB137283 LB137283
	Molybdenum	867	1000	87	850	1150	09/23/2025	14:43	LB137283 LB137283
	Nickel	867 819	954	87 86	830 810	1100	09/23/2025	14:43	LB137283 LB137283
	Silver	201	201		170	232	09/23/2025		
		621	952	100 65	170 809	1095		14:43	LB137283
	Zinc	621	932	03	809	1093	09/23/2025	14:43	LB137283



# METAL QC DATA



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#### metals - 5a -MATRIX SPIKE SUMMARY

client:	Tanagro Corp.		level	:	low		sdg no.:	Q3158			
contract:	TANA01						lab code:	ACE			
matrix:	Water		sample id	:	Q3125-02		client id:	CompMS	•		
Percent Solids for Sample: NA		Spiked ID:		Q3125-02MS		Percent Solid	Percent Solids for Spike Sample:		NA		
Analyte	Units	Acceptance Limit %R	Spiked Result	C	Sample Result	C	Spike Added	% Recovery	Qual	M	
Mercury	ug/L	75 - 125	3.82		0.10	J	4.0	93		CV	



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#### metals - 5a -MATRIX SPIKE DUPLICATE SUMMARY

client:	Tanagro Corp.		lev	vel:	low		sdg no.:	Q3158			
contract:	TANA01						lab code	: ACE		<u></u>	
matrix:	Water		sample	id:	Q3125-02		client id:	CompMS	SD		
Percent Solids for Sample: NA		Spiked ID:		Q3125-02MSD		Percent Soli	ids for Spike Sa	for Spike Sample:			
Analyte	Units	Acceptance Limit %R	MSD Result	C	Sample Result	C	Spike Added	% Recovery	Qual	M	
Mercury	ug/L	75 - 125	3 88	3	0.10	I	4 0	94		CV	



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#### metals - 5a -MATRIX SPIKE SUMMARY

client: Tanagro Corp. level: low sdg no.: Q3158

contract: TANA01 lab code: ACE

matrix: Water sample id: Q3158-01 client id: EFFLUENT-DAY-1-METALSMS

Percent Solids for Sample:		NA	Spiked ID:		Q3158-01MS		Percent Solids for Spike Sample:			NA	
Analyte	Units	Acceptance Limit %R	Spiked Result	C	Sample Result	C	Spike Added	% Recovery	Qual	M	
Cadmium	ug/L	75 - 125	97.7		0.93	J	100	97		P	
Chromium	ug/L	75 - 125	172		3.16	J	200	84		P	
Copper	ug/L	75 - 125	312		180		150	88		P	
Lead	ug/L	75 - 125	480		7.73		500	94		P	
Molybdenum	ug/L	75 - 125	184		100	U	200	92		P	
Nickel	ug/L	75 - 125	250		4.01	J	250	98		P	
Silver	ug/L	75 - 125	33.7		19.6		37.5	37	N	P	
Zinc	ug/L	75 - 125	357		198		100	158	N	P	



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#### metals - 5a -MATRIX SPIKE DUPLICATE SUMMARY

 client:
 Tanagro Corp.
 level:
 low
 sdg no.:
 Q3158

contract: TANA01 lab code: ACE

matrix: Water sample id: Q3158-01 client id: EFFLUENT-DAY-1-METALSMSD

Percent Solids for Sample:		NA	Spiked ID:		Q3158-01	Q3158-01MSD		Percent Solids for Spike Sample:			
Analyte	Units	Acceptance Limit %R	MSD Result	C	Sample Result	C	Spike Added	% Recovery	Qual	M	
Cadmium	ug/L	75 - 125	93.4		0.93	J	100	92		P	
Chromium	ug/L	75 - 125	167		3.16	J	200	82		P	
Copper	ug/L	75 - 125	290		180		150	74	N	P	
Lead	ug/L	75 - 125	461		7.73		500	91		P	
Molybdenum	ug/L	75 - 125	178		100	U	200	89		P	
Nickel	ug/L	75 - 125	240		4.01	J	250	94		P	
Silver	ug/L	75 - 125	47.6		19.6		37.5	75		P	
Zinc	ug/L	75 - 125	332		198		100	134	N	P	



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#### Metals - 5b -POST DIGEST SPIKE SUMMARY

Client: Tanagro Corp. SDG No.: Q3158

Contract: TANA01 Lab Code: ACE

Matrix: Water Level: LOW Client ID: EFFLUENT-DAY-1-METALSA

**Sample ID:** Q3158-01 **Spiked ID:** Q3158-01A

Analyte	Units	Acceptance Limit %R	Spiked Result	C	Sample Result	C	Spike Added	% Recovery	Qual	M
Copper	ug/L	85 - 115	310		180		150	87		P
Silver	ug/L	85 - 115	34.8		19.6		37.5	40	N	P
Zinc	ug/L	85 - 115	355		198		100	156	N	P



**Contract:** 

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Metals

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#### **DUPLICATE SAMPLE SUMMARY**

Client: Tanagro Corp. Level: LOW SDG No.: Q3158

TANA01 Lab Code: ACE

Matrix:WaterSample ID:Q3125-02Client ID:CompDUP

Percent Solids for Sample: NA Duplicate ID Q3125-02DUP Percent Solids for Spike Sample: NA

		Acceptance	Sample		Duplicate				
Analyte	Units	Limit	Result	C	Result	C	RPD	Qual	M
Mercury	ug/L	20	0.10	J	0.10	J	2		CV



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#### Metals

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#### **DUPLICATE SAMPLE SUMMARY**

**Client:** Tanagro Corp. LOW Q3158 Level: SDG No.: **Contract:** TANA01 Lab Code: ACE Water CompMSD Matrix: **Sample ID:** Q3125-02MS **Client ID:** 

Percent Solids for Sample: NA Duplicate ID Q3125-02MSD Percent Solids for Spike Sample: NA

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M
Mercury	ug/L	20	3.82		3.88	8	2		CV



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#### Metals

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#### **DUPLICATE SAMPLE SUMMARY**

 Client:
 Tanagro Corp.
 Level:
 LOW
 SDG No.:
 Q3158

Contract: TANA01 Lab Code: ACE

Matrix: Water Sample ID: Q3158-01 Client ID: EFFLUENT-DAY-1-METALSDUP

NA **Duplicate ID** Q3158-01DUP Percent Solids for Sample: **Percent Solids for Spike Sample: Duplicate** Acceptance Sample Analyte Units Limit Result  $\mathbf{C}$ Result  $\mathbf{C}$ **RPD** Qual M J P Cadmium ug/L 20 0.93 1.25 J 30 20 3.16 J 1.17 92 P Chromium ug/L J ug/L 20 180 176 2 P Copper 77 P Lead 20 7.73 ug/L 3.42 J ug/L Molybdenum 20 100 U 100 U P 4.01 12 P Nickel 20 J 4.51 J ug/L Silver ug/L 20 19.6 18.0 9 P 198 Zinc 20 20 P ug/L 241



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#### Metals

#### - 6 -DUPLICATE SAMPLE SUMMARY

Client: Tanagro Corp. Level: LOW SDG No.: Q3158

Contract: TANA01 Lab Code: ACE

Matrix: Water Sample ID: Q3158-01MS Client ID: EFFLUENT-DAY-1-METALSMSD

NA **Duplicate ID** Q3158-01MSD Percent Solids for Sample: Percent Solids for Spike Sample: **Duplicate** Acceptance Sample Analyte Units Limit Result  $\mathbf{C}$ Result  $\mathbf{C}$ **RPD** Qual M P Cadmium ug/L 20 97.7 93.4 5 20 172 167 3 P Chromium ug/L ug/L Copper 20 312 290 7 P 4 P Lead 20 480 ug/L 461 ug/L Molybdenum 20 184 178 3 P 250 4 P Nickel 20 240 ug/L Silver ug/L 20 33.7 47.6 34 P Zinc 20 357 332 7 P ug/L



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#### Metals

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#### LABORATORY CONTROL SAMPLE SUMMARY

Client: Tanagro Corp. SDG No.: Q3158

Analyte	Units	True Value	Result C	% Recovery	Acceptance Limits	M
PB169785BS						
Cadmium	ug/L	100	102	102	85 - 115	P
Chromium	ug/L	200	174	87	85 - 115	P
Copper	ug/L	150	135	90	85 - 115	P
Lead	ug/L	500	510	102	85 - 115	P
Molybdenum	ug/L	200	181	90	85 - 115	P
Nickel	ug/L	250	257	103	85 - 115	P
Silver	ug/L	37.5	33.4	89	85 - 115	P
Zinc	ug/L	100	104	104	85 - 115	P



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#### Metals

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#### LABORATORY CONTROL SAMPLE SUMMARY

Client: Tanagro Corp. SDG No.: Q3158

Analyte	Units	True Value	Result	C	% Recovery	Acceptance Limits	M
PB169802BS Mercury	ug/L	4.0	4.36		109	85 - 115	CV



Alliance

Water

ACE

Lab Name:

Lab Code:

Matrix (soil/water):

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#### Metals

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#### ICP SERIAL DILUTIONS

			SAMPLE NO.	
			CompL	
Contract:	TAN.	A01	_	
Lab Sample ID: Q3125-02L		SDG No.:	Q3158	
Level (low/med):		LOW		
ug/L				
		11		

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	С	% Differ- ence	Q	М
Mercury		0.10 J		0.17 J	67		CV

**Lb No.:** lb137278

**Concentration Units:** 



Metals

#### -9 -ICP SERIAL DILUTIONS

SAMPLE NO.

EFFLUENT-DAY-1-METALSL

Lab Name:	Alliance					Contract:	TANA01		_
Lab Code:	ACE		Lb No.:	lb137283	Lab Sample ID:	Q3158-01L		SDG No.:	Q3158
Matrix (soil/	water):	Water			Level (low/	med):	LC	OW	
			Concen	tration Units:	ug/L				

Analyte	Initial Sample Result (I) C			Serial Dilution Result (S)	1	% Differ- ence	Q	M
Cadmium	0.93	J	П	2.40	J	159		P
Chromium	3.16	J	П	25.0	U	100.0		P
Copper	180		П	202		12		P
Lead	7.73		П	30.0	U	100.0		P
Molybdenum	100	U	П	500	U			P
Nickel	4.01	J	П	100	U	100.0		P
Silver	19.6		$\prod$	26.1		33		P
Zinc	198		П	254		28		P



# METAL PREPARATION & INSTRUMENT DATA



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# Metals - 11 -ICP INTERELEMENT CORRECTION FACTORS

Client:	Tanagro Corp.	SDG No.:	Q3158
Contract:	TANA01	Lab Code:	ACE
Instrument	ID:	Date:	

	Wave-	ICP In	ICP Interelement Correction Factors For:					
Analyte	Length (nm)	Al	Ca	Fe	Mg	Ag		
Cadmium	226.502	0.0000000	0.0000000	0.0000930	0.0000000	0.0000000		
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000		
Copper	224.700	0.0000000	0.0000000	0.0007850	0.0000000	0.0000000		
Lead	220.353	-0.0000920	0.0000000	0.0000380	0.0000000	0.0000000		
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000		
Silver	328.068	0.0000000	0.0000000	-0.0001490	0.0000000	0.0000000		
Zinc	213.800	0.0000000	0.0000000	0.0001050	0.0000000	0.0000000		



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# Metals - 11 -ICP INTERELEMENT CORRECTION FACTORS

Client:	Tanagro Corp.	SDG No.:	Q3158	
Contract:	TANA01	Lab Code:	ACE	
Instrument	ID:	Date:		
Intovolomon	t Correction Factors (annaront nnh analyta)	anm interferent		

	Wave-	ICP In	ICP Interelement Correction Factors For:						
Analyte	Length (nm)	As	Ba	Be	Cd	Со			
Cadmium	226.502	0.0000000	0.0000000	0.0000000	0.0000000	0.0002870			
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000			
Copper	224.700	0.0000000	0.0000000	0.0000000	0.0000000	0.0009530			
Lead	220.353	0.0000000	0.0003170	0.0000000	0.0000000	0.0000000			
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000			
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000			
Zinc	213.800	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000			



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# Metals - 11 -ICP INTERELEMENT CORRECTION FACTORS

Client:	Tanagro Corp.	SDG No.:	Q3158
Contract:	TANA01	Lab Code:	ACE
Instrument	ID:	Date:	

	Wave-	ICP In	ICP Interelement Correction Factors For:						
Analyte	Length (nm)	Cr	Cu	K	Mn	Mo			
Cadmium	226.502	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000			
Chromium	267.716	0.0000000	0.0000000	0.0000070	0.0002200	0.0000000			
Copper	224.700	0.0000000	0.0000000	0.0000000	0.0006510	0.0020500			
Lead	220.353	0.0000000	0.0000000	0.0000000	0.0001400	-0.0008600			
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000			
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	-0.0000120			
Zinc	213.800	0.0000000	0.0009010	0.0000000	0.0000000	0.0000000			



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# Metals - 11 -ICP INTERELEMENT CORRECTION FACTORS

Client:	Tanagro Corp.	SDG No.:	Q3158
Contract:	TANA01	Lab Code:	ACE
Instrument	ID:	Date:	

	Wave-	ICP In	ICP Interelement Correction Factors For:					
Analyte	Length (nm)	Na	Ni	Pb	Sb	Se		
Cadmium	226.502	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000		
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000		
Copper	224.700	0.0000000	-0.0047000	0.0036100	0.0000000	0.0000000		
Lead	220.353	0.0000000	0.0006580	0.0000000	0.0000000	0.0001290		
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000		
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000		
Zinc	213.800	0.0000000	0.0067600	0.0000000	0.0000000	0.0000000		



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# Metals - 11 -ICP INTERELEMENT CORRECTION FACTORS

Client:	Tanagro Corp.	SDG No.:	Q3158
Contract:	TANA01	Lab Code:	ACE
Instrument	t <b>ID</b> :	Date:	
Interelemen	t Correction Factors (apparent ppb analyte/p	opm interferent )	

	Wave-	ICP In	terelement Corre	ection Factors For	:	
Analyte	Length (nm)	Sn	Ti	Tl	V	Zn
Cadmium	226.502	0.0000000	0.0000630	0.0001280	0.0000000	0.0000000
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0001110	0.0000000
Copper	224.700	0.0000000	0.0003840	0.0000000	0.0000000	0.0000000
Lead	220.353	0.0000000	-0.0003610	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.068	0.0000000	-0.0007420	0.0000000	0.0000000	0.0000000
Zinc	213.800	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000



# METAL PREPARATION & ANALYICAL SUMMARY



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# Metals - 13 -SAMPLE PREPARATION SUMMARY

Client:	Tanagro Corp.	SDG No.:	Q3158	
Contract:	TANA01	Lab Code:	ACE	Method:

Sample ID	Client ID	Sample Type	Matrix	Prep Date	Initial Sample Size(mL)	Final Sample Volume (mL)	Percent Solids
Batch Number:	PB169785						
PB169785BL	PB169785BL	MB	WATER	09/22/2025	50.0	25.0	
PB169785BS	PB169785BS	LCS	WATER	09/22/2025	50.0	25.0	
Q3158-01	EFFLUENT-DAY-1-METALS	SAM	WATER	09/22/2025	50.0	25.0	
Q3158-01DUP	EFFLUENT-DAY-1-METALSDUP	DUP	WATER	09/22/2025	50.0	25.0	
Q3158-01MS	EFFLUENT-DAY-1-METALSMS	MS	WATER	09/22/2025	50.0	25.0	
Q3158-01MSD	EFFLUENT-DAY-1-METALSMSD	MSD	WATER	09/22/2025	50.0	25.0	



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# Metals - 13 -SAMPLE PREPARATION SUMMARY

Client:	Tanagro Corp.	SDG No.:	Q3158	•	
Contract:	TANA01	Lab Code:	ACE	Method:	

Sample ID	Client ID	Sample Type	Matrix	Prep Date	Initial Sample Size(mL)	Final Sample Volume (mL)	Percent Solids
Batch Number:	PB169802						
PB169802BL	PB169802BL	MB	WATER	09/23/2025	30.0	30.0	
PB169802BS	PB169802BS	LCS	WATER	09/23/2025	30.0	30.0	
Q3125-02DUP	CompDUP	DUP	WATER	09/23/2025	30.0	30.0	
Q3125-02MS	CompMS	MS	WATER	09/23/2025	30.0	30.0	
Q3125-02MSD	CompMSD	MSD	WATER	09/23/2025	30.0	30.0	
Q3158-01	EFFLUENT-DAY-1-METALS	SAM	WATER	09/23/2025	30.0	30.0	



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# metals - 14 -ANALYSIS RUN LOG

Client:	Tanagro Corp.		Contract:	TANA01
Lab code:	ACE		Sdg no.:	Q3158
Instrument	id number:	Method:	Run numbe	r: <u>LB137278</u>

**Start date:** 09/23/2025 **End date:** 09/23/2025

-			_	
Lab sample id.	Client Sample Id	d/f	Time	Parameter list
S0	S0	1	1351	HG
S0.05	S0.05	1	1359	HG
S0.2	S0.2	1	1401	HG
S2.5	S2.5	1	1404	HG
S5	S5	1	1411	HG
S7.5	S7.5	1	1420	HG
S10	S10	1	1439	HG
ICV42	ICV42	1	1445	HG
ICB42	ICB42	1	1447	HG
CCV28	CCV28	1	1450	HG
CCB28	CCB28	1	1452	HG
CRA	CRA	1	1454	HG
PB169802BL	PB169802BL	1	1501	HG
PB169802BS	PB169802BS	1	1503	HG
Q3125-02DUP	CompDUP	1	1508	HG
Q3125-02MS	CompMS	1	1510	HG
Q3125-02MSD	CompMSD	1	1516	HG
Q3158-01	EFFLUENT-DAY-1-METALS	1	1518	HG
CCV29	CCV29	1	1520	HG
CCB29	CCB29	1	1523	HG
CCV30	CCV30	1	1529	HG
CCB30	CCB30	1	1532	HG



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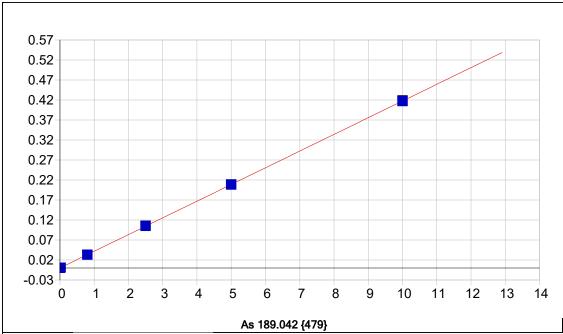
# metals - 14 -ANALYSIS RUN LOG

Client:	Tanagro Corp.			Contract:	TANA01
Lab code:	ACE			Sdg no.:	23158
Instrument id number:		Method:	Method:		LB137283
Start date:	09/23/2025	End date:	09/23/2025		

start date:	09/23/2023 End d	ate:	<u>u</u>	9/23/2023
Lab sample id.	Client Sample Id	d/f	Time	Parameter list
S0	S0	1	1254	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn
S1	S1	1	1258	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn
S2	S2	1	1302	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn
S3	S3	1	1306	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn
S4	S4	1	1310	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn
S5	S5	1	1315	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn
ICV01	ICV01	1	1350	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn
LLICV01	LLICV01	1	1403	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn
ICB01	ICB01	1	1407	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn
CRI01	CRI01	1	1413	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn
ICSA01	ICSA01	1	1423	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn
ICSAB01	ICSAB01	1	1427	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn
ICSA	ICSA	20	1431	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn
ICSAB	ICSAB	20	1443	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn
CCV01	CCV01	1	1519	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn
CCB01	CCB01	1	1523	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn
Q3158-01	EFFLUENT-DAY-1-METALS	1	1551	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn
CCV02	CCV02	1	1649	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn
CCB02	CCB02	1	1709	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn
Q3158-01DUP	EFFLUENT-DAY-1-METALSD	1	1730	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn
Q3158-01MSD	EFFLUENT-DAY-1-METALSM	1	1742	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn
Q3158-01A	EFFLUENT-DAY-1-METALSA	1	1746	Ag,Cu,Zn
PB169785BL	PB169785BL	1	1750	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn
Q3158-01MS	EFFLUENT-DAY-1-METALSM	1	1755	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn
PB169785BS	PB169785BS	1	1759	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn
CCV03	CCV03	1	1806	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn
CCB03	CCB03	1	1812	Ag,Cd,Cr,Cu,Mo,Ni,Pb,Zn



# METAL RAW DATA



A0 (Offset): 0.000116 Re-Slope: 1.000000 A1 (Gain): 0.041730 Y-int: 0.000000

A2 (Curvature): 0.000000 n (Exponent): 1.000000

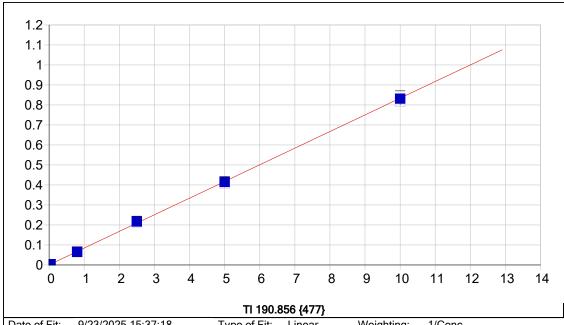
Correlation: 0.999960 Status: OK.

 Std Error of Est:
 0.000009

 Predicted MDL:
 0.003155

 Predicted MQL:
 0.010518

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00000	000	.000	.00012	.000	1
S1	.02000	.02484	.005	24.2	.00115	.000	1
S3	2.5000	2.5156	.016	.625	.10499	.000	1
S4	5.0000	4.9920	008	161	.20822	.000	1
S5	10.000	9.9993	001	007	.41696	.001	1
S2	.80000	.78824	012	-1.47	.03297	.000	1



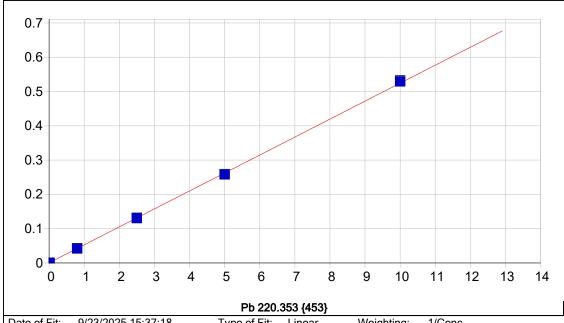
A0 (Offset): 0.001024 Re-Slope: 1.000000 Y-int: 0.000000 A1 (Gain): 0.083260

A2 (Curvature): 0.000000 n (Exponent): 1.000000

Correlation: 0.999858 OK. Status:

Std Error of Est: 0.000046 Predicted MDL: 0.002493 Predicted MQL: 0.008310

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00000	000	.000	.00102	.000	1
S1	.04000	.04286	.003	7.15	.00438	.000	1
S3	2.5000	2.5923	.092	3.69	.21306	.002	1
S4	5.0000	4.9671	033	657	.40700	.003	1
S5	10.000	9.9674	033	326	.81573	.015	1
S2	.80000	.77052	029	-3.68	.06396	.001	1



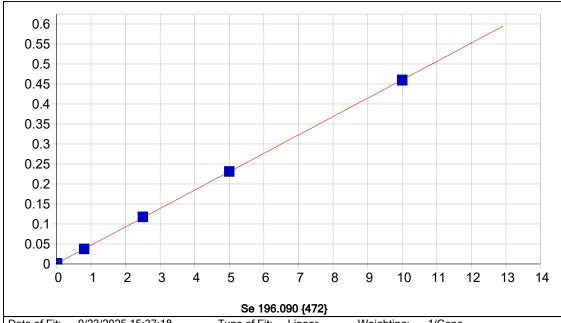
A0 (Offset): 0.000406 Re-Slope: 1.000000 Y-int: 0.000000 A1 (Gain): 0.052371

A2 (Curvature): 0.000000 n (Exponent): 1.000000

Correlation: 0.999929 OK. Status:

Std Error of Est: 0.000011 Predicted MDL: 0.007177 Predicted MQL: 0.023922

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00000	000	.000	.00041	.000	1
S1	.01200	.01378	.002	14.8	.00112	.000	1
S3	2.5000	2.4840	016	639	.13035	.001	1
S4	5.0000	4.9227	077	-1.55	.25792	.001	1
S5	10.000	10.098	.098	.984	.52869	.003	1
S2	.80000	.79314	007	858	.04190	.001	1



A0 (Offset): 0.000875 Re-Slope: 1.000000 A1 (Gain): 0.045957 Y-int: 0.000000

A2 (Curvature): 0.000000 n (Exponent): 1.000000

Correlation: 0.999970 Status:

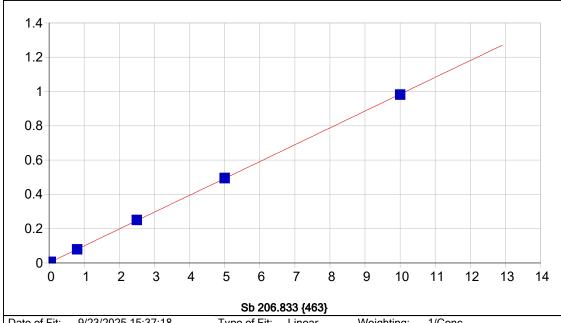
 Std Error of Est:
 0.000008

 Predicted MDL:
 0.003706

 Predicted MQL:
 0.012353

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00000	000	.000	.00087	.000	1
S1	.02000	.02273	.003	13.6	.00192	.000	1
S3	2.5000	2.5346	.035	1.39	.11733	.000	1
S4	5.0000	5.0067	.007	.134	.23090	.000	1
S5	10.000	9.9650	035	350	.45871	.001	1
S2	.80000	.79095	009	-1.13	.03721	.000	1

OK.



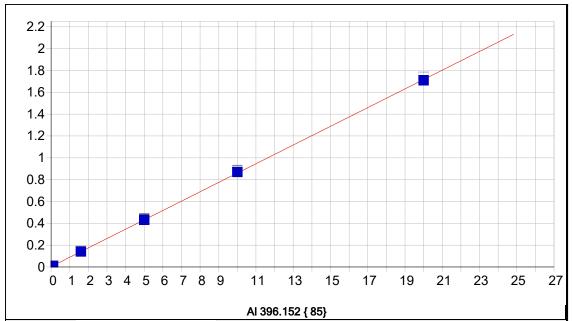
A0 (Offset): 0.001459 Re-Slope: 1.000000 Y-int: 0.000000 A1 (Gain): 0.098276

A2 (Curvature): 0.000000 n (Exponent): 1.000000

Correlation: 0.999988 OK. Status:

Std Error of Est: 0.000018 Predicted MDL: 0.002253 Predicted MQL: 0.007510

Sto	d. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
SO	)	.00000	00000	000	.000	.00146	.000	1
S1		.05000	.05056	.001	1.13	.00644	.000	1
S3	3	2.5000	2.5261	.026	1.04	.25038	.000	1
S4	ļ	5.0000	5.0116	.012	.232	.49532	.001	1
S5	)	10.000	9.9676	032	324	.98371	.001	1
S2	2	.80000	.79414	006	732	.07972	.000	1



A0 (Offset): 0.003161 Re-Slope: 1.000000 A1 (Gain): 0.085691 Y-int: 0.000000

A2 (Curvature): 0.000000 n (Exponent): 1.000000

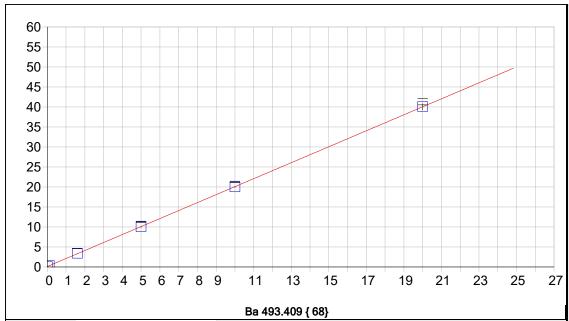
Correlation: 0.999959 Status: OK.

 Std Error of Est:
 0.000059

 Predicted MDL:
 0.012887

 Predicted MQL:
 0.042958

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00001	.000	.000	.00316	.001	1
S1	.10000	.08721	013	-12.8	.01130	.001	1
S3	5.0000	4.9944	006	113	.43944	.004	1
S4	10.000	10.099	.099	.994	.88521	.001	1
S5	20.000	19.908	092	460	1.7423	.001	1
S2	1.6000	1.6118	.012	.738	.14394	.001	1



A0 (Offset): 0.118688 Re-Slope: 1.000000 A1 (Gain): 1.995844 Y-int: 0.000000

A2 (Curvature): 0.000000 n (Exponent): 1.000000

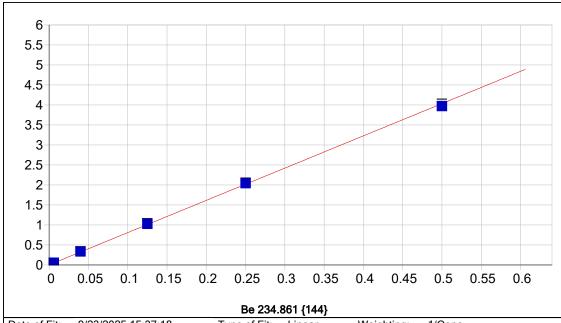
Correlation: 0.999978 Status: OK.

 Std Error of Est:
 0.000978

 Predicted MDL:
 0.001410

 Predicted MQL:
 0.004700

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00001	000	.000	.11867	.004	1
S1	.10000	.10693	.007	6.93	.33210	.002	1
S3	5.0000	4.9776	022	448	10.053	.157	1
S4	10.000	9.9650	035	350	20.007	.178	1
S5	20.000	20.013	.013	.064	40.061	.789	1
S2	1.6000	1.6378	.038	2.36	3.3874	.019	1



A0 (Offset): 0.001359 Re-Slope: 1.000000 A1 (Gain): 8.065439 Y-int: 0.000000

A2 (Curvature): 0.000000 n (Exponent): 1.000000

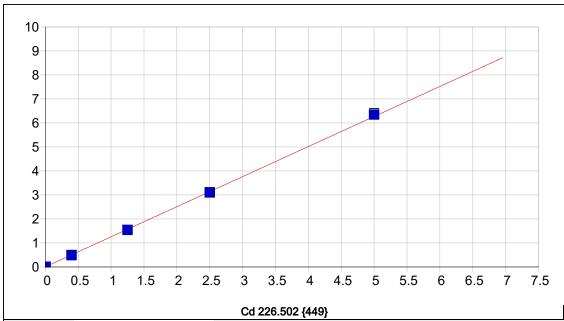
Correlation: 0.999837 Status: OK.

 Std Error of Est:
 0.000417

 Predicted MDL:
 0.000081

 Predicted MQL:
 0.000270

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00000	000	.000	.00135	.001	1
S1	.00600	.00654	.001	9.02	.05376	.000	1
S3	.12500	.12752	.003	2.02	1.0254	.013	1
S4	.25000	.25312	.003	1.25	2.0339	.012	1
S5	.50000	.49247	008	-1.51	3.9553	.055	1
S2	.04000	.04135	.001	3.38	.33344	.000	1



A0 (Offset): 0.003412 Re-Slope: 1.000000 A1 (Gain): 1.253179 Y-int: 0.000000

A2 (Curvature): 0.000000 n (Exponent): 1.000000

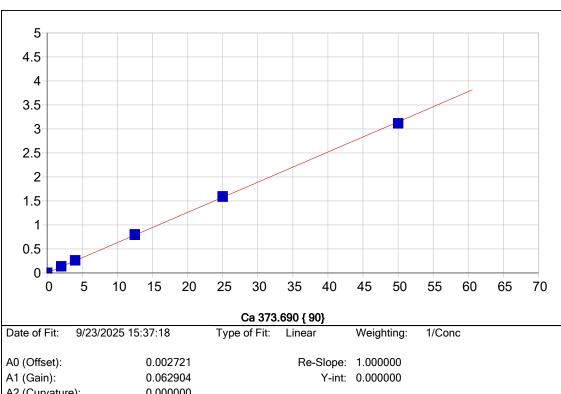
Correlation: 0.999896 Status: OK.

 Std Error of Est:
 0.000164

 Predicted MDL:
 0.000222

 Predicted MQL:
 0.000742

ļ	Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
	S0	.00000	.00000	.000	.000	.00341	.000	1
	S1	.00600	.00607	.000	1.11	.01104	.000	1
	S3	1.2500	1.2281	022	-1.75	1.5434	.003	1
1	S4	2.5000	2.4712	029	-1.15	3.1023	.004	1
	S5	5.0000	5.0631	.063	1.26	6.3525	.046	1
	S2	.40000	.38757	012	-3.11	.48943	.002	1



A2 (Curvature): 0.000000 n (Exponent): 1.000000

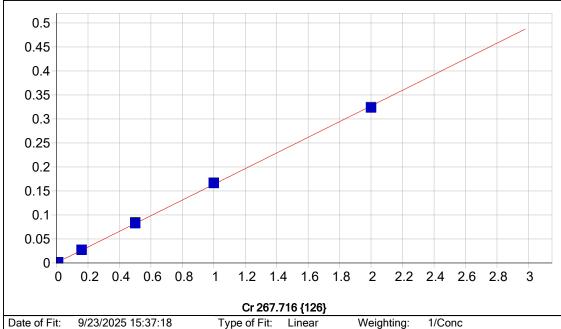
Correlation: 0.999903 Status: OK.

 Std Error of Est:
 0.000464

 Predicted MDL:
 0.013839

 Predicted MQL:
 0.046131

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00019	000	.000	.00271	.001	1
S2	4.0000	4.1091	.109	2.73	.26120	.002	1
S3	12.500	12.565	.065	.522	.79313	.009	1
S4	25.000	25.207	.207	.828	1.5883	.004	1
S5	50.000	49.493	507	-1.01	3.1160	.005	1
S1	2.0000	2.1261	.126	6.30	.13646	.001	1



A0 (Offset): 0.000398 Re-Slope: 1.000000 Y-int: 0.000000 A1 (Gain): 0.163371

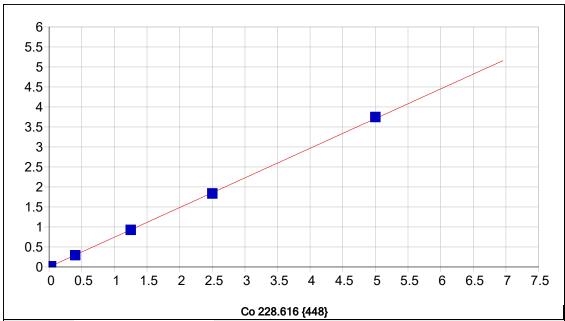
A2 (Curvature): 0.000000

n (Exponent): 1.000000

Correlation: 0.999921 OK. Status:

Std Error of Est: 0.000015 Predicted MDL: 0.000489 Predicted MQL: 0.001631

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00000	000	.000	.00040	.000	1
S1	.01000	.00991	000	946	.00202	.000	1
S3	.50000	.50287	.003	.575	.08262	.002	1
S4	1.0000	1.0151	.015	1.51	.16637	.001	1
S5	2.0000	1.9782	022	-1.09	.32384	.001	1
S2	.16000	.16389	.004	2.43	.02719	.000	1



A0 (Offset): 0.002151 Re-Slope: 1.000000 A1 (Gain): 0.741447 Y-int: 0.000000

A2 (Curvature): 0.000000 n (Exponent): 1.000000

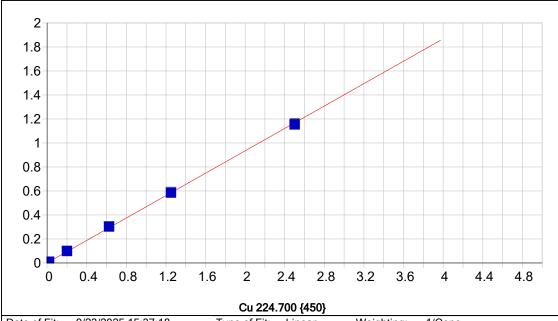
Correlation: 0.999940 Status: OK.

 Std Error of Est:
 0.000165

 Predicted MDL:
 0.000304

 Predicted MQL:
 0.001014

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00000	.000	.000	.00215	.000	1
S1	.03000	.03007	.000	.236	.02435	.000	1
S3	1.2500	1.2423	008	615	.92483	.001	1
S4	2.5000	2.4690	031	-1.24	1.8359	.002	1
S5	5.0000	5.0479	.048	.958	3.7512	.007	1
S2	.40000	.39069	009	-2.33	.29233	.000	1



A0 (Offset): 0.001361 Re-Slope: 1.000000 A1 (Gain): 0.466643 Y-int: 0.000000

A2 (Curvature): 0.000000 n (Exponent): 1.000000

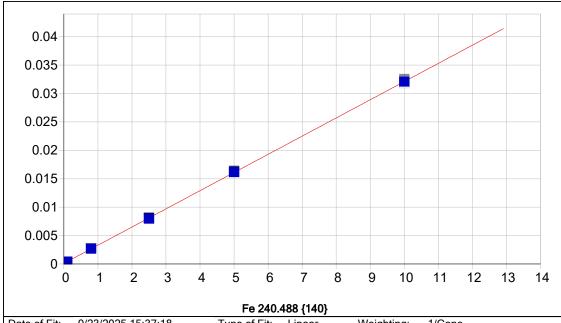
Correlation: 0.999826 Status: OK.

 Std Error of Est:
 0.000103

 Predicted MDL:
 0.000659

 Predicted MQL:
 0.002195

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00000	000	.000	.00136	.000	1
S1	.02000	.02227	.002	11.3	.01186	.000	1
S3	.62500	.64522	.020	3.23	.30488	.000	1
S4	1.2500	1.2520	.002	.159	.59045	.001	1
S5	2.5000	2.4678	032	-1.29	1.1627	.002	1
S2	.20000	.20775	.008	3.87	.09908	.000	1



A0 (Offset): 0.000095 Re-Slope: 1.000000 A1 (Gain): V-int: 0.000000

A2 (Curvature): 0.000000 n (Exponent): 1.000000

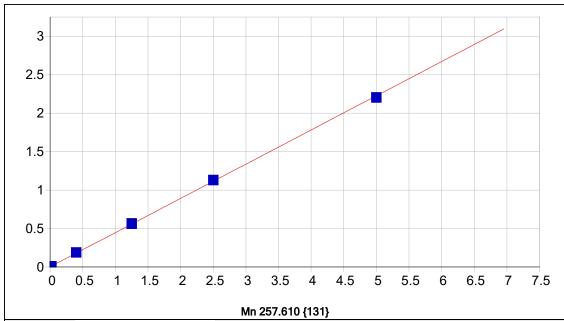
Correlation: 0.999953 Status: OK.

 Std Error of Est:
 0.000002

 Predicted MDL:
 0.008158

 Predicted MQL:
 0.027195

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00001	.000	.000	.00009	.000	1
S1	.10000	.09057	009	-9.43	.00038	.000	1
S3	2.5000	2.4671	033	-1.32	.00792	.000	1
S4	5.0000	5.0325	.033	.651	.01607	.000	1
S5	10.000	9.9988	001	012	.03183	.000	1
S2	.80000	.81097	.011	1.37	.00267	.000	1



A0 (Offset): 0.001720 Re-Slope: 1.000000 A1 (Gain): 0.445079 Y-int: 0.000000

A2 (Curvature): 0.000000 n (Exponent): 1.000000

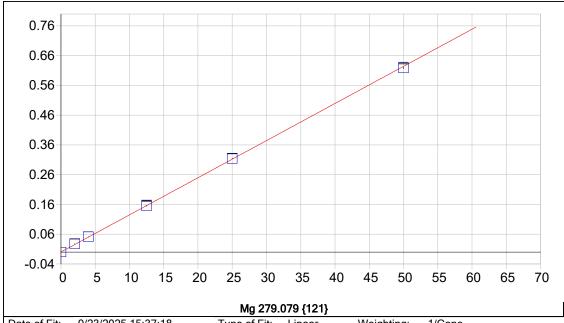
Correlation: 0.999899 Status: OK.

 Std Error of Est:
 0.000105

 Predicted MDL:
 0.000713

 Predicted MQL:
 0.002375

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00000	000	.000	.00172	.000	1
S1	.02000	.02227	.002	11.3	.01163	.000	1
S3	1.2500	1.2550	.005	.403	.56042	.008	1
S4	2.5000	2.5312	.031	1.25	1.1285	.002	1
S5	5.0000	4.9459	054	-1.08	2.2035	.003	1
S2	.40000	.41560	.016	3.90	.18673	.001	1



A0 (Offset): 0.000180 Re-Slope: 1.000000 A1 (Gain): 0.012479 Y-int: 0.000000

A2 (Curvature): 0.000000 n (Exponent): 1.000000

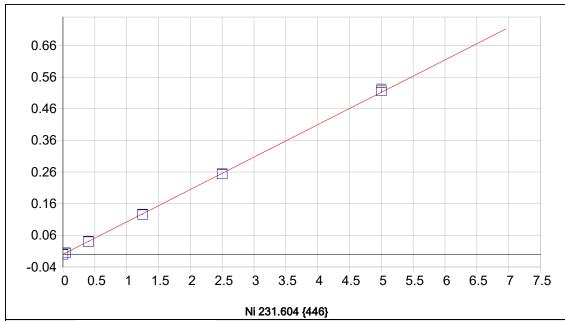
Correlation: 0.999836 Status: OK.

 Std Error of Est:
 0.000119

 Predicted MDL:
 0.032477

 Predicted MQL:
 0.108258

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00025	000	.000	.00018	.000	1
S2	4.0000	4.0990	.099	2.47	.05133	.000	1
S3	12.500	12.456	044	355	.15561	.002	1
S4	25.000	25.181	.181	.725	.31442	.001	1
S5	50.000	49.551	449	897	.61854	.003	1
S1	2.0000	2.2126	.213	10.6	.02779	.000	1



A0 (Offset): -0.000079 Re-Slope: 1.000000 A1 (Gain): 0.102424 Y-int: 0.000000

A2 (Curvature): 0.000000 n (Exponent): 1.000000

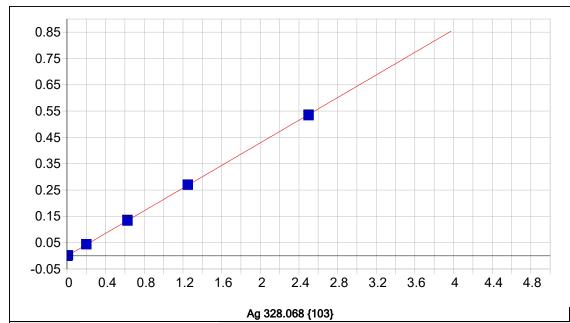
Correlation: 0.999938 Status: OK.

 Std Error of Est:
 0.000027

 Predicted MDL:
 0.002956

 Predicted MQL:
 0.009852

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00000	.000	.000	00008	.000	1
S1	.04000	.04120	.001	3.00	.00414	.000	1
S3	1.2500	1.2293	021	-1.65	.12584	.001	1
S4	2.5000	2.4788	021	848	.25381	.001	1
S5	5.0000	5.0479	.048	.957	.51694	.006	1
S2	.40000	.39279	007	-1.80	.04015	.001	1



A0 (Offset): -0.000622 Re-Slope: 1.000000 A1 (Gain): 0.214958 Y-int: 0.000000

A2 (Curvature): 0.000000

n (Exponent): 1.000000

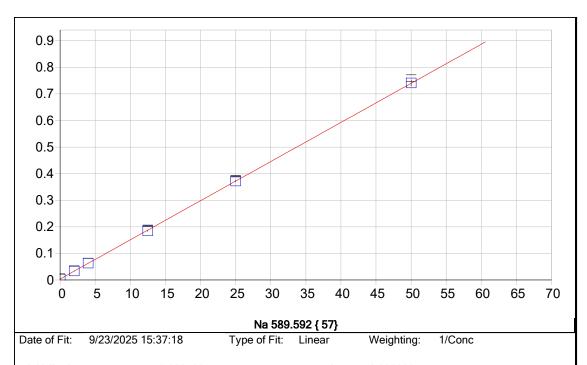
Correlation: 0.999972 Status: OK.

 Std Error of Est:
 0.000013

 Predicted MDL:
 0.000630

 Predicted MQL:
 0.002100

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00000	000	.000	00062	.000	1
S1	.01000	.01062	.001	6.22	.00164	.000	1
S3	.62500	.62432	001	108	.13293	.003	1
S4	1.2500	1.2571	.007	.572	.26831	.001	1
S5	2.5000	2.4881	012	474	.53162	.002	1
S2	.20000	.20477	.005	2.38	.04319	.000	1



A0 (Offset): 0.003702 Re-Slope: 1.000000 A1 (Gain): 0.014725 Y-int: 0.000000

A2 (Curvature): 0.000000 n (Exponent): 1.000000

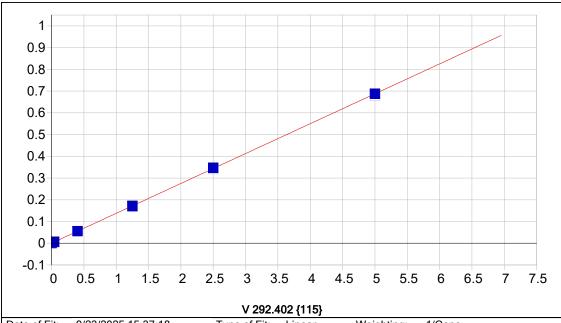
Correlation: 0.999981 Status: OK.

 Std Error of Est:
 0.000048

 Predicted MDL:
 0.013107

 Predicted MQL:
 0.043691

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00002	000	.000	.00370	.000	1
S2	4.0000	4.0258	.026	.644	.06298	.000	1
S3	12.500	12.319	181	-1.45	.18509	.003	1
S4	25.000	25.030	.030	.121	.37227	.003	1
S5	50.000	50.094	.094	.188	.74132	.012	1
S1	2.0000	2.0313	.031	1.57	.03361	.000	1



A0 (Offset): 0.000102 Re-Slope: 1.000000 A1 (Gain): 0.137500 Y-int: 0.000000

A2 (Curvature): 0.000000

n (Exponent): 1.000000

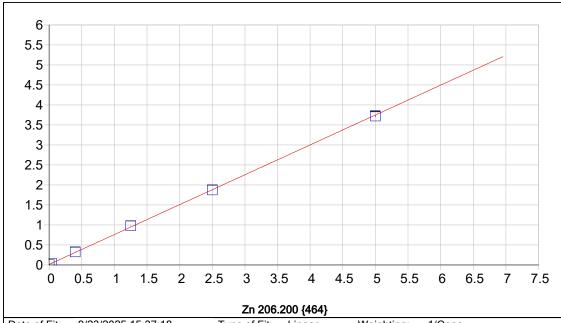
Correlation: 0.999980 Status: OK.

 Std Error of Est:
 0.000020

 Predicted MDL:
 0.003488

 Predicted MQL:
 0.011625

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00000	.000	.000	.00010	.000	1
S1	.04000	.03813	002	-4.68	.00514	.001	1
S3	1.2500	1.2360	014	-1.12	.16755	.002	1
S4	2.5000	2.5147	.015	.589	.34086	.001	1
S5	5.0000	4.9978	002	044	.67727	.001	1
S2	.40000	.40329	.003	.822	.05475	.000	1



A0 (Offset): 0.013161 Re-Slope: 1.000000 A1 (Gain): 0.747147 Y-int: 0.000000

A2 (Curvature): 0.000000 n (Exponent): 1.000000

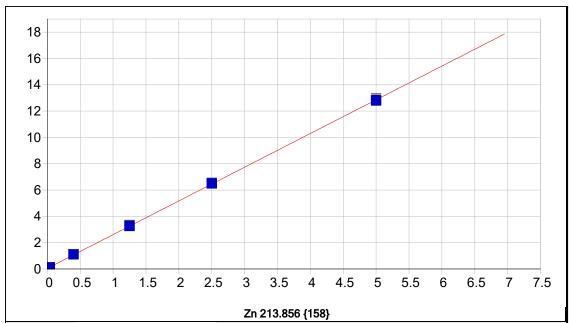
Correlation: 0.999753 Status: OK.

 Std Error of Est:
 0.000390

 Predicted MDL:
 0.000242

 Predicted MQL:
 0.000807

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00001	.000	.000	.01317	.000	1
S1	.04000	.03092	009	-22.7	.03626	.000	1
S3	1.2500	1.2917	.042	3.34	.97826	.002	1
S4	2.5000	2.4902	010	391	1.8737	.004	1
S5	5.0000	4.9601	040	799	3.7191	.014	1
S2	.40000	.41707	.017	4.27	.32477	.000	1



A0 (Offset): 0.045783 Re-Slope: 1.000000 A1 (Gain): 2.562917 Y-int: 0.000000

A2 (Curvature): 0.000000 n (Exponent): 1.000000

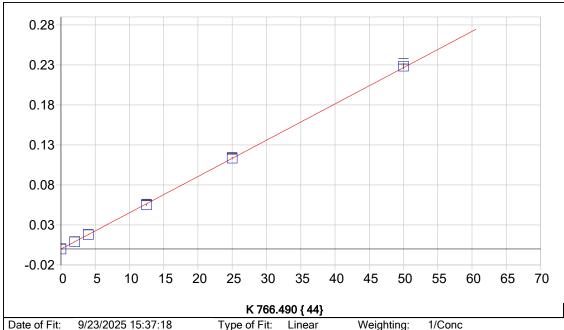
Correlation: 0.999838 Status: OK.

 Std Error of Est:
 0.001090

 Predicted MDL:
 0.000301

 Predicted MQL:
 0.001005

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00001	.000	.000	.04580	.001	1
S1	.04000	.03058	009	-23.5	.12488	.001	1
S3	1.2500	1.2522	.002	.173	3.2772	.053	1
S4	2.5000	2.5158	.016	.633	6.5382	.022	1
S5	5.0000	4.9762	024	477	12.888	.055	1
S2	.40000	.41527	.015	3.82	1.1172	.002	1



Type of Fit: Linear Weighting: 1/Conc

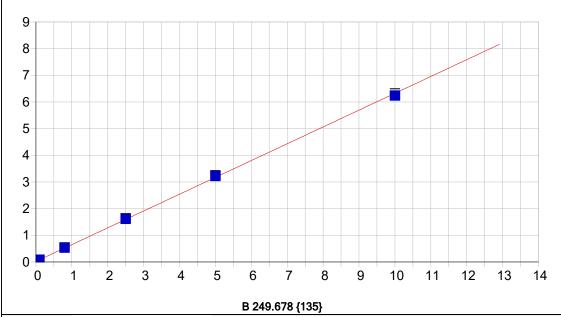
A0 (Offset): -0.000118 Re-Slope: 1.000000 A1 (Gain): Y-int: 0.000000 0.004534

A2 (Curvature): 0.000000 n (Exponent): 1.000000

Correlation: 0.999920 OK. Status:

Std Error of Est: 0.000030 Predicted MDL: 0.049291 Predicted MQL: 0.164305

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00008	.000	.000	00012	.000	1
S2	4.0000	3.9388	061	-1.53	.01774	.000	1
S3	12.500	12.137	363	-2.91	.05491	.001	1
S4	25.000	25.023	.023	.093	.11334	.001	1
S5	50.000	50.411	.411	.823	.22846	.003	1
S1	2.0000	1.9899	010	506	.00890	.000	1



A0 (Offset): 0.018434 Re-Slope: 1.000000 A1 (Gain): 0.630549 Y-int: 0.000000

A2 (Curvature): 0.000000 n (Exponent): 1.000000

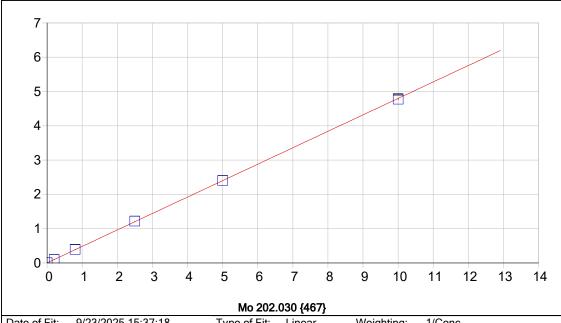
Correlation: 0.999890 Status: OK.

 Std Error of Est:
 0.000489

 Predicted MDL:
 0.001083

 Predicted MQL:
 0.003611

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00001	000	.000	.01843	.001	1
S1	.10000	.10517	.005	5.17	.08437	.001	1
S3	2.5000	2.5263	.026	1.05	1.6057	.027	1
S4	5.0000	5.0768	.077	1.54	3.2083	.024	1
S5	10.000	9.8699	130	-1.30	6.2192	.083	1
S2	.80000	.82175	.022	2.72	.53477	.004	1



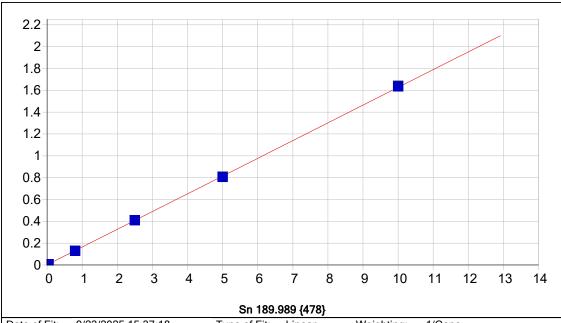
A0 (Offset): 0.003378 Re-Slope: 1.000000 Y-int: 0.000000 0.479516 A1 (Gain):

A2 (Curvature): 0.000000 n (Exponent): 1.000000

Correlation: 0.999976 OK. Status:

Std Error of Est: 0.000248 Predicted MDL: 0.000431 Predicted MQL: 0.001437

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00000	000	.000	.00338	.000	1
S1	.20000	.20016	.000	.081	.09936	.000	1
S3	2.5000	2.5367	.037	1.47	1.2198	.001	1
S4	5.0000	5.0011	.001	.023	2.4015	.003	1
S5	10.000	9.9520	048	480	4.7755	.023	1
S2	.80000	.80999	.010	1.25	.39178	.001	1



A0 (Offset): 0.001595 Re-Slope: 1.000000 A1 (Gain): 0.162510 Y-int: 0.000000

A2 (Curvature): 0.000000 n (Exponent): 1.000000

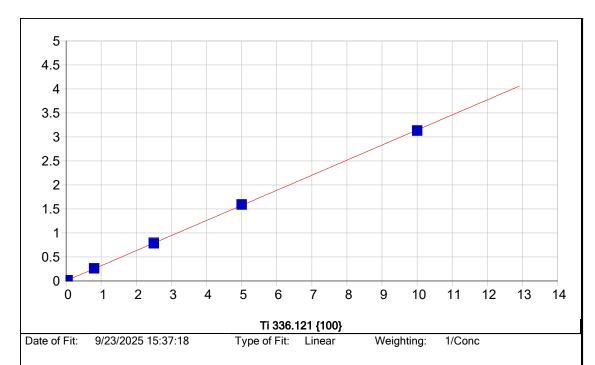
Correlation: 0.999969 Status: OK.

 Std Error of Est:
 0.000043

 Predicted MDL:
 0.000721

 Predicted MQL:
 0.002405

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00000	.000	.000	.00160	.000	1
S1	.04000	.04006	.000	.157	.00810	.000	1
S3	2.5000	2.5074	.007	.298	.40866	.000	1
S4	5.0000	4.9503	050	995	.80523	.001	1
S5	10.000	10.058	.058	.577	1.6344	.004	1
S2	.80000	.78456	015	-1.93	.12896	.000	1



A0 (Offset): 0.003762 Re-Slope: 1.000000 A1 (Gain): 0.314098 Y-int: 0.000000

A2 (Curvature): 0.000000 n (Exponent): 1.000000

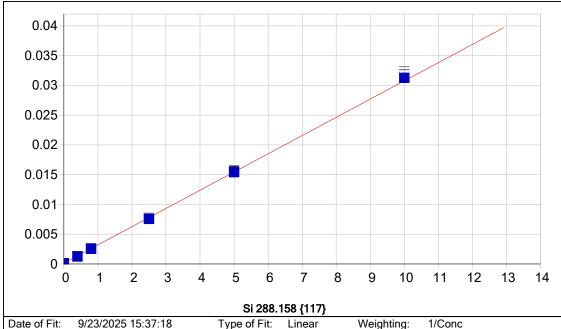
Correlation: 0.999973 Status: OK.

 Std Error of Est:
 0.000077

 Predicted MDL:
 0.002005

 Predicted MQL:
 0.006684

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00000	000	.000	.00376	.000	1
S1	.04000	.04075	.001	1.86	.01655	.000	1
S3	2.5000	2.4865	014	542	.78447	.009	1
S4	5.0000	5.0459	.046	.918	1.5881	.003	1
S5	10.000	9.9526	047	474	3.1287	.005	1
S2	.80000	.81432	.014	1.79	.25945	.002	1



9/23/2025 15:37:18 Type of Fit: Linear Weighting: 1/Conc

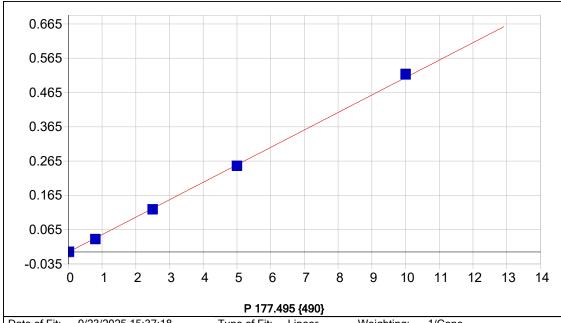
A0 (Offset): 0.000137 Re-Slope: 1.000000 Y-int: 0.000000 A1 (Gain): 0.003063

A2 (Curvature): 0.000000 n (Exponent): 1.000000

Correlation: 0.999714 OK. Status:

Std Error of Est: 0.000008 Predicted MDL: 0.015356 Predicted MQL: 0.051188

Std. I	Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0		.00000	.00006	.000	.000	.00014	.000	1
S1		.40000	.35490	045	-11.3	.00123	.000	1
S3		2.5000	2.4191	081	-3.23	.00766	.000	1
S4		5.0000	4.9882	012	237	.01565	.000	1
S5		10.000	10.161	.161	1.61	.03172	.001	1
S2		.80000	.77633	024	-2.96	.00255	.000	1



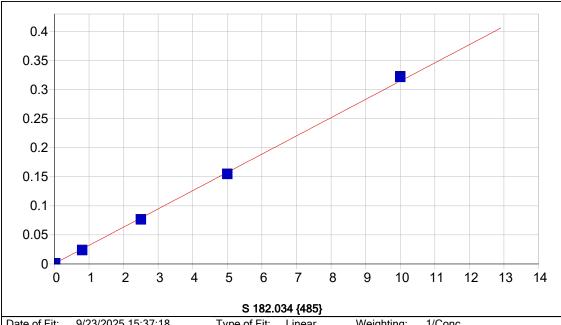
A0 (Offset): -0.000521 Re-Slope: 1.000000 Y-int: 0.000000 A1 (Gain): 0.050903

A2 (Curvature): 0.000000 n (Exponent): 1.000000

Correlation: OK. 0.999745 Status:

Std Error of Est: 0.000027 Predicted MDL: 0.001867 Predicted MQL: 0.006223

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00000	.000	.000	00052	.000	1
S1	.02000	.01748	003	-12.6	.00037	.000	1
S3	2.5000	2.4509	049	-1.96	.12422	.000	1
S4	5.0000	4.9413	059	-1.17	.25097	.000	1
S5	10.000	10.170	.170	1.70	.51709	.002	1
S2	.80000	.74019	060	-7.48	.03715	.000	1



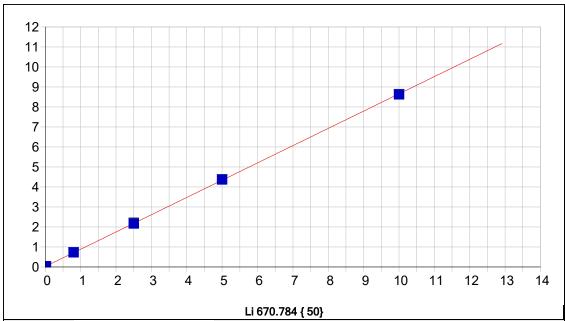
A0 (Offset): 0.000627 Re-Slope: 1.000000 Y-int: 0.000000 A1 (Gain): 0.031386

A2 (Curvature): 0.000000 n (Exponent): 1.000000

Correlation: 0.999581 OK. Status:

Std Error of Est: 0.000021 Predicted MDL: 0.003354 Predicted MQL: 0.011181

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00000	.000	.000	.00063	.000	1
S1	.02000	.02140	.001	7.02	.00127	.000	1
S3	2.5000	2.4203	080	-3.19	.07639	.000	1
S4	5.0000	4.9106	089	-1.79	.15435	.000	1
S5	10.000	10.234	.234	2.34	.32103	.001	1
S2	.80000	.73335	067	-8.33	.02358	.000	1



A0 (Offset): 0.022321 Re-Slope: 1.000000 A1 (Gain): 0.863298 Y-int: 0.000000

A2 (Curvature): 0.000000 n (Exponent): 1.000000

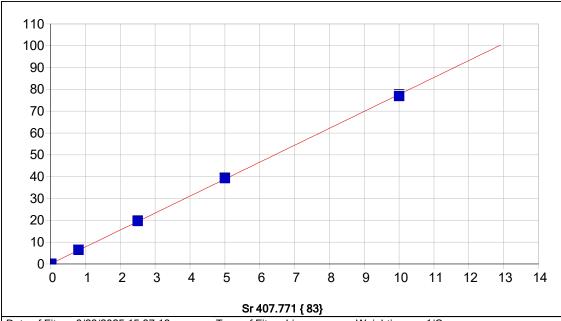
Correlation: 0.999970 Status: OK.

 Std Error of Est:
 0.000157

 Predicted MDL:
 0.002359

 Predicted MQL:
 0.007863

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00000	000	.000	.02232	.001	1
S5	10.000	9.9592	041	408	8.6270	.010	1
S4	5.0000	5.0383	.038	.765	4.3753	.008	1
S3	2.5000	2.4828	017	686	2.1675	.032	1
S1	.02000	.02143	.001	7.17	.04113	.001	1
S2	.80000	.81826	.018	2.28	.72928	.001	1



A0 (Offset): 0.048310 Re-Slope: 1.000000 A1 (Gain): 7.764851 Y-int: 0.000000

A2 (Curvature): 0.000000 n (Exponent): 1.000000

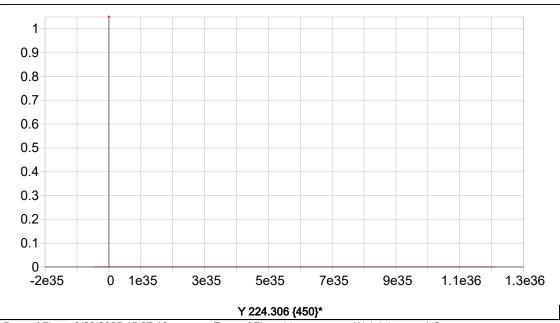
Correlation: 0.999933 Status: OK.

 Std Error of Est:
 0.002103

 Predicted MDL:
 0.000139

 Predicted MQL:
 0.000464

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00000	000	.000	.04829	.001	1
S1	.02000	.02169	.002	8.46	.21749	.001	1
S3	2.5000	2.5211	.021	.846	19.643	.221	1
S4	5.0000	5.0512	.051	1.02	39.308	.151	1
S5	10.000	9.9030	097	970	77.018	.640	1
S2	.80000	.82295	.023	2.87	6.4444	.010	1



A0 (Offset): 0.000000 Re-Slope: 1.000000 A1 (Gain): 0.000000 Y-int: 0.000000

A2 (Curvature): 0.000000

n (Exponent): 1.000000

Correlation: 0.000000 Status: Warning Zero Gain

Std Error of Est: 0.000000

Predicted MDL: n/a

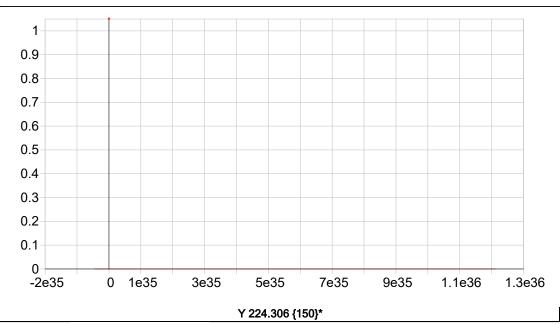
Predicted MQL: n/a

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
4							
1							
0.9							
8.0							
0.7							
0.6							
0.5							
0.4							
0.3							
0.2							
0.1							
0							
-2e35	0	1e35	3e35 5e3	35 7e	e35 9e3	5 1.1e36	1.3e36
			Y 360.	.073 { 94}*			

Date of Fit: <not fit> Type of Fit: Linear Weighting: 1/Conc

A0 (Offset): 0.000000 Re-Slope: 1.000000 A1 (Gain): 7-int: 0.000000

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
Predicted M	QL:	n/a					
Predicted M		n/a					
Correlation: Std Error of	Est:	0.000000 0.000000		Status:	Warning	Zero Gain	
n (Exponent	):	1.000000		0	144	7 0 :	
A2 (Curvatu	re):	0.000000			2.20000		
A0 (Offset): A1 (Gain):		0.000000 0.000000			nt: 0.000000		
\0 (Off+)		0.000000		D - 0'	1.000000		
Date of Fit:	<not fit=""></not>		Type of Fit:		Weighting:	1/Conc	
			Y 371	030 { 91}*			
-2e35	0	1e35 3	e35 5e3	35 7e	35 9e35	1.1e36	1.3e36
0.1							
0.1							
0.2							
0.3							
0.4							
0.5							
0.6							
0.7							
8.0							
0.9							
1							
Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
Predicted Mi Predicted Mi		n/a n/a					
Std Error of		0.000000					
Correlation:	<i>,</i> .	0.000000		Status:	Warning	Zero Gain	
2 (Curvatu (Exponent		0.000000 1.000000					



Date of Fit: <not fit> Type of Fit: Linear Weighting: 1/Conc

A0 (Offset): 0.000000 Re-Slope: 1.000000 A1 (Gain): 0.000000 Y-int: 0.000000

Found

A2 (Curvature): 0.000000

n (Exponent): 1.000000

Correlation: 0.000000 Status: Warning Zero Gain

Difference

Std Error of Est: 0.000000

Predicted MDL: n/a

Predicted MQL: n/a

Stated

Std. Name

Date of Fit:

<not fit>

1										
-										
0.9				+						-
8.0									+'	-
0.7									'	
0.6					i				'	
0.5				+		+				1
0.4				-						-
0.3						4			'	-
0.2									'	
0.1									+	
0	$\overline{}$	1e35	3e35		35 7	7e35	9e3	 1.1e36	1.3	4

% Diff.

(S)IR

Weighting:

1/Conc

Std Dev

**Emphasis** 

A0 (Offset): 0.000000 Re-Slope: 1.000000 A1 (Gain): 0.000000 Y-int: 0.000000

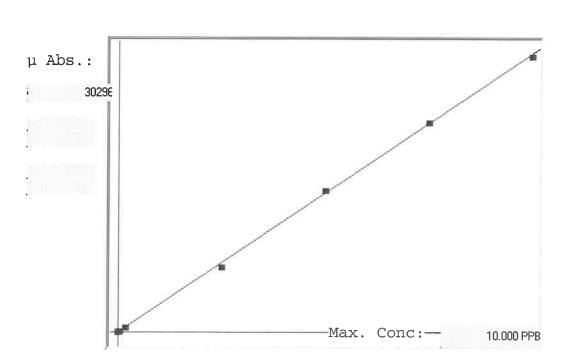
Type of Fit: Linear

Reviewed By:JANVI On:9/24/2025 11:10:48 AM Inst Id :P4 LB :LB137283

A2 (Curvature): 0.000000 n (Exponent): 1.000000 Zero Gain Correlation: 0.000000Status: Warning Std Error of Est: 0.000000 Predicted MDL: n/a Predicted MQL: n/a Std. Name Stated Found Difference % Diff. (S)IR Std Dev **Emphasis** Conc. Conc.

# LB137278

245.1 INSTRUMENT ID' CYL



Linear	▼
A=	0.0000e+000
B=	3.2767e-004
C=	1.3821e-002
Rho=	0.9998441
Accept	-Accepted

Std ID	Conc.	Calc.	Dev.	Mean	SD or %RSD	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	0/eD
0.0	0.000	0.012	0.012	-7	0.000	-7					Para San San San San San San San San San Sa
0.05	0.050	0.063	0.013	149	0.0 %	149					16
0.2	0.200	0.206	0.006	588	0.0 %	588					, 0
2.5	2.500	2.381	-0.119	7225	0.0 %	7225					3
5.0	5.000	5.099	0.099	15520	0.0 %	15520					~5
7.5	7.500	7.548	0.048	22993	0.0 %	22993					2
10.0	10.000	9.941	-0.059	30296	0.0 %	30296					-
			•			7.5		12.	*//		
											-1

Reviewed By:jaswal On:9/24/2025 10:55:19 AM Inst Id :CV1

Metho	d: 245.1	Operator: Admin	Date of Analysis:	23 Sep 2025	13:07:	14		LB :LB137278
Type	Sample ID	Extended ID	Conc.	μ Abs.	Units	Type	Stnd ConcMethod	Date
S	0.0 - 1	20		-7	PPB	Std	0.0000245.1	23 Sep 2025 13:51:36
S	0.05 - 1	5009	-1	149	PPB	Std	0.0500245.1	23 Sep 2025 13:59:35
S	0.2 - 1	502	-1	588	PPB	Std	0.2000245.1	23 Sep 2025 14:01:51
S	2 <b>.5 - 1</b>	52.5	-	7225	PPB	Std	2.5000245.1	23 Sep 2025 14:04:09
S	5.0 - 1	22	-	15520	PPB	Std	5.0000245.1	23 Sep 2025 14:11:56
S	7.5 - 1	59.5	-	22993	PPB	Std	7.5000245.1	23 Sep 2025 14:20:13
S	10.0 - 1	SIV	-	30296	PPB	Std	10.0000245.1	23 Sep 2025 14:39:44
U	ICV42 - 1	ICV42	4.0750	12394	PPB	SMPL	-245.1	23 Sep 2025 14:45:30
U	ICB42 - 1	ICB42	-0.0527	-203	PPB	SMPL	-245.1	23 Sep 2025 14:47:46
U	CCV28 - 1	CCV28	5.1402	15645	PPB	SMPL	-245.1	23 Sep 2025 14:50:03
U	CCB28 - 1	CCB28	-0.0573	-217	PPB	SMPL	-245.1	23 Sep 2025 14:52:18
U	CRA - 1	CRA	0.0590	138	PPB	SMPL	-245.1	23 Sep 2025 14:54:37
U	HighStd - 1	HighStd	9.9170	30223	PPB	SMPL	-245.1	23 Sep 2025 14:56:52
U	ChkStd - 1	ChkStd	7.0895	21594	PPB	SMPL	-245.1	23 Sep 2025 14:59:07
U	PB169802BL - 1	PBW	-0.0756	-273	PPB	SMPL	-245.1	23 Sep 2025 15:01:30
U	PB169802BS - 1	LCSW	4.3600	13264	PPB	SMPL	-245.1	23 Sep 2025 15:03:52
U	Q3125-02 - 1	Comp	0.1020	269	PPB	SMPL	-245.1	23 Sep 2025 15:06:08
U	Q3125-02DUP - 1	CompDUP	0.1000	263	PPB	SMPL	-245.1	23 Sep 2025 15:08:27
U	Q3125-02MS - 1	CompMS	3.8236	11627	PPB	SMPL	-245.1	23 Sep 2025 15:10:43
U	Q3125-02MSD - 1	The state of the s	3.8784	11794	PPB	SMPL	-245.1	23 Sep 2025 15:16:13
U	Q3158-01 - 1	EFFLUENT-DAY-1-METALS	0.0528	119	PPB	SMPL	-245.1	23 Sep 2025 15:18:28
U	CCV29 - 1	CCV29	5.1114	15557	PPB	SMPL	-245.1	23 Sep 2025 15:20:46
U	CCB29 - 1	CCB29	-0.0570	-216	PPB	SMPL	-245.1	23 Sep 2025 15:23:02
U	Q3125-02LX5 - 1		0.0341	62	PPB	SMPL	-245.1	23 Sep 2025 15:25:20
U	Q3125-02A - 1		3.8073	11577	PPB	SMPL	-245.1	23 Sep 2025 15:27:35
U	CCV30 - 1	CCV30	5.1769	15757	PPB	SMPL	-245.1	23 Sep 2025 15:29:51
U	CCB30 - 1	CCB30	-0.0596	-224	PPB	SMPL	-245.1	23 Sep 2025 15:32:09





TECHNICAL

SOP ID: M200.7-Trace Elements-22

SDG No:

N/A

Start Digest Date:

09/22/2025

Time: 14:15

Temp: 95 °C

PB169785

Matrix:

WATER

End Digest Date:

Digestion tube ID:

09/22/2025

Time: 17:20

Temp: 95 °C

Pippete ID:

ICP A N/A

M5595

Balance ID:

**Block thermometer ID:** 

MET-DIG. #1

Filter paper ID:

N/A

#3

Dig Technician Signature:

pH Strip ID:

M6069

Supervisor Signature: Temp:

1. 95°C

2.

**Hood ID:** Block ID:

1. HOT BLOCK #1

2. N/A

Standared Name	MLS USED	STD REF. # FROM LOG
LFS-1	0.25	M6180
LFS-2	0.25	M6181
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

Chemical Used	ML/SAMPLE USED	Lot Number
Conc. HNO3	3.00	M6158
1:1 HCL	5.00	MP87148
N/A	N/A	N/A

Extraction Conformance/Non-Conformance Comment	Extraction	Conformance	/Non-Conformance	Comments
------------------------------------------------	------------	-------------	------------------	----------

HOT BLOCK#1 CELL#50 96C

Date / Time	Prepped Sample Relinguished By/Location	Received By/Location
09/22/25 18:20	SKS met dia	meta Rs Cot
	Preparation Group	Analysis Group



Lab Sample ID	Client Sample ID	рН	Initial Voi (mi)	Final Vol (ml)	Color Before	Color After	Clarity Before	Clarity After	Comment	Prep Pos
PB169785BL	PBW785	<2	50	25	Colorless	Colorless	Clear	Clear	N/A	1
PB169785BS	LCS785	<2	50	25	Colorless	Coloriess	Clear	Clear	M6180,M6181	2
Q3158-01MS	EFFLUENT-DAY-1-METALSMS	<2	50	25	Colorless	Colorless	Clear	Clear	M6180,M6181	5
Q3158-01MSD	EFFLUENT-DAY-1-METALSMS	<2	50	25	Colorless	Colorless	Clear	Clear	M6180,M6181	6
Q3158-01DUP	EFFLUENT-DAY-1-METALSDU	<2	50	25	Colorless	Colorless	Clear	Clear	N/A	4
Q3158-01	EFFLUENT-DAY-1-METALS	<2	50	25	Coloriess	Colorless	Clear	Clear	N/A	3

# WORKLIST(Hardcopy Internal Chain)

WorkList Name: PB169785

WorkList ID: 192007

Department: Digestion

Date: 09-22-2025 13:46:39

Sample Q3158-01 **EFFLUENT-DAY-1-METALS Customer Sample** Water Matrix Test Metals ICP-Group1 Preservative 1:1 HNO3 to pH < 2 Customer TANA01 Storage D31 Location Raw Sample Collect Date Method 09/22/2025 200.7

Raw Sample Received by: 5 K3 mc+ dis Raw Sample Relinquished by: Date/Time 09/22/25 14:05 Cos Su

Raw Sample Received by: Date/Time 09/22/25

Raw Sample Relinquished by:

6.19 July 18

Page 1 of 1



**SOP ID:** M245.1-Mercury-20

**SDG No:** N/A **Start Digest Date:** 09/23/2025 **Time:** 08:40 **Temp:** 95 °C

Matrix: WATER End Digest Date: 09/23/2025 Time: 10:41 Temp: 95 °C

Pippete ID: HG A Digestion tube ID: M5595

Balance ID: N/A Block thermometer ID: HG-DIG#3

Filter paper ID: N/A Dig Technician Signature:

pH Strip ID: M6069 Supervisor Signature:

**Hood ID:** #1 **Temp:** 1. 95°C 2. N/A

Block ID: 1. HG HOT BLOCK#3 2. N/A

Standared Name	MLS USED	STD REF. # FROM LOG	
ICV	30mL	MP87311	
CCV	30mL	MP87314	
CRA	30mL	MP87315	
Blank Spike	0.48mL	MP87303	
Matrix Spike	0.48mL	MP87303	

Chemical Used	ML/SAMPLE USED	Lot Number
HNO3/H2SO4(1:2)	1.5MI	MP85892
KMnO4 (5%)	4.5mL	MP85893
K2S2O8 (5%)	2.4mL	MP85894
Hydroxylamine HCL (12%)	1.8mL	MP85895
N/A	N/A	N/A

LAB SAMPLE ID	CLIENT SAMPLE ID	Wt(g)/Vol(ml)	Comment
0.0 ppb	50	30MI	MP87304
0.05 ppb	S0.05	30MI	MP87305
0.2 ppb	S0.2	30MI	MP87306
2.5 ppb	S2.5	30MI	MP87307
5.0 ppb	S5.0	30MI	MP87308
7.5 ppb	S7.5	30MI	MP87309
10.0 ppb	S10.0	30MI	MP87310
ICV	ICV	30MI	MP87311
ICB	ICB	30MI	MP87312
CCV	ccv	30MI	MP87314
ССВ	ССВ	30MI	MP87313
CRI	CRI	30MI	MP87315
CHK STD	CHK STD	30MI	MP87316

### **Extraction Conformance/Non-Conformance Comments:**

I/A		
Date / Time	Prepped Sample Relinquished By/Location	Received By/Location
7/23/25 611:25	organ Doig. Cons	pg-metal Lus
	Preparation Group	Analysis Group



Lab Sample ID	Client Sample ID	Initial Vol (ml)	Final Vol (ml)	рH	Comment	Prep Pos
B169802BL	PBW802	30	30	<2	N/A	3-1
B169802BS	LCS802	30	30	<2	MP87303	2
3125-02DUP	COMPDUP	30	30	<2	N/A	4
23125-02MS	сомрмѕ	30	30	<2	MP87303	5
23125-02MSD	COMPMSD	30	30	<2	MP87303	6
23125-02	СОМР	30	30	<2	N/A	3
3158-01	EFFLUENT-DAY-1-METALS	30	30	<2	N/A	7

# WORKLIST(Hardcopy Internal Chain)

WorkList ID: 192004 WorkList Name: 092225\_245.1

Department: Digestion

Date: 09-22-2025 12:02:37

Sample	Customer Sample	Matrix Test	Test	Preservative	Customer	Raw Sample Storage Location	Collect Date Method	Wethod
			THE STREET	And the second second			100 00	A
Q3125-02	Comp	Water Mercur	Mercury	1:1 HNO3 to pH < 2	ARAM01 J21	121	09/17/2025 245.1	245.1
Q3158-01	EFFLUENT-DAY-1-METALS Water Mercui	Water	Mercury	1:1 HNO3 to pH < 2	TANA01	D31	09/22/2025 245.1	245.1

Date/Time 9/23/25 0 9:01

Raw Sample Received by: 185 -177 8, 1995

Raw Sample Relinquished by: AST - Dieg King-

Page 1 of 1

Raw Sample Relinquished by: JAS DIT 122 Raw Sample Received by: 083-019'CM

Date/Time 9/23/25 / 8:18



**Instrument ID:** CV1

Review By	mohan	Review On	9/24/2025 10:25:09 AM			
Supervise By	jaswal	Supervise On	9/24/2025 10:55:19 AM			
STD. NAME	STD REF.#					
ICAL Standard	MP87304,MP873	MP87304,MP87305,MP87306,MP87307,MP87308,MP87309,MP87310				
ICV Standard	MP87311	MP87311				
CCV Standard	MP87314					
ICSA Standard						
CRI Standard	MP87315	MP87315				
LCS Standard						
Chk Standard	MP87312,MP873	MP87312,MP87313,MP87316,MP87301				

Sr#	SampleId	ClientID	QcType	Date	Comment	Operator	Status
1	S0	S0	CAL1	09/23/25 13:51		mohan	ОК
2	S0.05	S0.05	CAL2	09/23/25 13:59		mohan	ОК
3	S0.2	S0.2	CAL3	09/23/25 14:01		mohan	ок
4	S2.5	S2.5	CAL4	09/23/25 14:04		mohan	ок
5	S5	S5	CAL5	09/23/25 14:11		mohan	ок
6	S7.5	S7.5	CAL6	09/23/25 14:20		mohan	ок
7	S10	S10	CAL7	09/23/25 14:39		mohan	ок
8	ICV42	ICV42	ICV	09/23/25 14:45		mohan	ок
9	ICB42	ICB42	ICB	09/23/25 14:47		mohan	ок
10	CCV28	CCV28	CCV	09/23/25 14:50		mohan	ок
11	CCB28	CCB28	ССВ	09/23/25 14:52		mohan	ок
12	CRA	CRA	CRDL	09/23/25 14:54		mohan	ОК
13	HighStd	HighStd	HIGH STD	09/23/25 14:56		mohan	ОК
14	ChkStd	ChkStd	SAM	09/23/25 14:59		mohan	ок
15	PB169802BL	PB169802BL	МВ	09/23/25 15:01		mohan	ок
16	PB169802BS	PB169802BS	LCS	09/23/25 15:03		mohan	ок
17	Q3125-02	Comp	SAM	09/23/25 15:06		mohan	ок
18	Q3125-02DUP	CompDUP	DUP	09/23/25 15:08		mohan	OK



**Instrument ID:** CV1

Review By	mol	han	Review On	9/24/2025 10:25:09 AM		
Supervise By	jasv	wal	Supervise On	9/24/2025 10:55:19 AM		
STD. NAME		STD REF.#				
ICAL Standard		MP87304,MP87305,MP87306,MP87307,MP87308,MP87309,MP87310				
ICV Standard		MP87311				
CCV Standard		MP87314				
ICSA Standard						
CRI Standard		MP87315				
LCS Standard						
Chk Standard		MP87312,MP87313,MF	87316,MP87301			

19	Q3125-02MS	CompMS	MS	09/23/25 15:10	mohan	ок
20	Q3125-02MSD	CompMSD	MSD	09/23/25 15:16	mohan	ок
21	Q3158-01	EFFLUENT-DAY-1-MI	SAM	09/23/25 15:18	mohan	OK
22	CCV29	CCV29	CCV	09/23/25 15:20	mohan	OK
23	CCB29	CCB29	ССВ	09/23/25 15:23	mohan	OK
24	Q3125-02L	CompL	SD	09/23/25 15:25	mohan	OK
25	Q3125-02A	CompA	PS	09/23/25 15:27	mohan	OK
26	CCV30	CCV30	CCV	09/23/25 15:29	mohan	OK
27	CCB30	CCB30	ССВ	09/23/25 15:32	mohan	ок



**Instrument ID:** P4

Review By	jaswal	Review On	9/24/2025 11:04:05 AM				
Supervise By	JANVI	Supervise On	9/24/2025 11:10:48 AM				
STD. NAME	STD REF.#						
ICAL Standard	MP87031,MP870	038,MP87035,MP87034,MP87033,MP	287032				
ICV Standard	MP87039,MP870	MP87039,MP87035					
CCV Standard	MP87042						
ICSA Standard	MP87041,MP870	042					
CRI Standard	MP87035						
LCS Standard							
Chk Standard	MP87043,MP870	044,MP87045,MP87046,MP87049					

Sr#	Sampleld	ClientID	QcType	Date	Comment	Operator	Status
1	S0	S0	CAL1	09/23/25 12:54		Jaswal	ок
2	S1	S1	CAL2	09/23/25 12:58		Jaswal	ок
3	S2	S2	CAL3	09/23/25 13:02		Jaswal	ок
4	S3	S3	CAL4	09/23/25 13:06		Jaswal	ок
5	S4	S4	CAL5	09/23/25 13:10		Jaswal	ок
6	S5	S5	CAL6	09/23/25 13:15		Jaswal	ок
7	ICV01	ICV01	ICV	09/23/25 13:50		Jaswal	ок
8	LLICV01	LLICV01	LLICV	09/23/25 14:03		Jaswal	ОК
9	ICB01	ICB01	ICB	09/23/25 14:07		Jaswal	ок
10	CRI01	CRI01	CRDL	09/23/25 14:13		Jaswal	ок
11	ICSA01	ICSA01	ICSA	09/23/25 14:23		Jaswal	ОК
12	ICSAB01	ICSAB01	ICSAB	09/23/25 14:27		Jaswal	ОК
13	ICSADL	ICSADL	ICSA	09/23/25 14:31		Jaswal	ОК
14	ICSABDL	ICSABDL	ICSAB	09/23/25 14:43		Jaswal	ОК
15	CCV01	CCV01	CCV	09/23/25 15:19		Jaswal	ОК
16	CCB01	CCB01	ССВ	09/23/25 15:23		Jaswal	ОК
17	Q3135-01	MH-121	SAM	09/23/25 15:43	Na high	Jaswal	Dilution
18	Q3152-01	EO-02-091925	SAM	09/23/25 15:47		Jaswal	ОК



**Instrument ID:** P4

Review By	jaswal		Review On	9/24/2025 11:04:05 AM		
Supervise By	JANVI		Supervise On	9/24/2025 11:10:48 AM		
STD. NAME	ST	D REF.#				
ICAL Standard	MP8	7031,MP87038,MP	87035,MP87034,MP87033,MP87032			
ICV Standard	MP8	MP87039,MP87035				
CCV Standard	MP8	7042				
ICSA Standard	MP8	7041,MP87042				
CRI Standard	MP8	MP87035				
LCS Standard						
Chk Standard	MP8	7043,MP87044,MP	87045,MP87046,MP87049			

19	Q3158-01	EFFLUENT-DAY-1-MI	SAM	09/23/25 15:51		Jaswal	OK
20	Q3135-01DL	MH-121DL	SAM	09/23/25 16:10	5x for Na	Jaswal	Confirms
21	LR-3	LR-3	HIGH STD	09/23/25 16:14		Jaswal	ОК
22	CCV02	CCV02	CCV	09/23/25 16:49		Jaswal	ОК
23	CCB02	CCB02	ССВ	09/23/25 17:09		Jaswal	ОК
24	LR-1	LR-1	HIGH STD	09/23/25 17:14		Jaswal	ОК
25	LR-2	LR-2	HIGH STD	09/23/25 17:18		Jaswal	ОК
26	Q3158-01DUP	EFFLUENT-DAY-1-MI	DUP	09/23/25 17:30		Jaswal	ОК
27	Q3158-01L	EFFLUENT-DAY-1-MI	SD	09/23/25 17:34		Jaswal	ОК
28	Q3158-01MSD	EFFLUENT-DAY-1-MI	MSD	09/23/25 17:42		Jaswal	ОК
29	Q3158-01A	EFFLUENT-DAY-1-MI	PS	09/23/25 17:46		Jaswal	ОК
30	PB169785BL	PB169785BL	MB	09/23/25 17:50		Jaswal	ОК
31	Q3158-01MS	EFFLUENT-DAY-1-MI	MS	09/23/25 17:55		Jaswal	ОК
32	PB169785BS	PB169785BS	LCS	09/23/25 17:59		Jaswal	ОК
33	CCV03	CCV03	CCV	09/23/25 18:06		Jaswal	ОК
34	CCB03	CCB03	ССВ	09/23/25 18:12		Jaswal	ОК



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### **Prep Standard - Chemical Standard Summary**

Order ID: Q3158

Test: Mercury, Metals ICP-Group1

**Prepbatch ID:** PB169785,PB169802,

Sequence ID/Qc Batch ID: LB137278,LB137283,

### Standard ID:

MP85892,MP85893,MP85894,MP85895,MP87031,MP87032,MP87033,MP87034,MP87035,MP87036,MP87038,MP87039,MP87041,MP87042,MP87043,MP87044,MP87045,MP87046,MP87049,MP87148,MP87301,MP87303,MP87304,MP87305,MP87306,MP87307,MP87308,MP87309,MP87310,MP87311,MP87312,MP87313,MP87314,MP87315,MP87316,

### Chemical ID:

M4371,M4465,M4916,M5062,M5467,M5658,M5748,M5751,M5798,M5799,M5800,M5801,M5814,M5820,M5882,M5884,M5962,M5969,M5971,M5979,M5985,M5998,M6021,M6023,M6026,M6027,M6028,M6030,M6032,M6041,M6077,M6128,M6137,M6138,M6140,M6142,M6144,M6145,M6151,M6158,M6159,M6160,M6161,M6162,M6163,M6164,M6165,M6171,M6174,M6176,M6177,M6178,M6179,M6180,M6181,M6182,M6184,M6187,M6200,W3112,





### **Metals STANDARD PREPARATION LOG**

Recipe ID	NAME.	NO.	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipetteID</u>	Supervised By Sarabjit Jaswal
3965	2:1 H2SO4 : HNO3	MP85892	06/05/2025	11/27/2025	Mohan Bera	None	None	06/14/2025
								00/14/2023

FROM 1600.0000ml of M6041 + 800.0000ml of M6162 = Final Quantity: 3200.000 ml

Recipe ID	NAME.	NO.	Prep Date	Expiration Date	<u>Prepared</u> <u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Supervised By Sarabjit Jaswal
65	POTASSIUM PERMANGANATE SOLUTION 5 %	MP85893	06/05/2025	12/05/2025		METALS_SCA LE_3 (M SC-3)		06/14/2025

**FROM** 100.00000gram of M4916 + 2000.00000ml of W3112 = Final Quantity: 2000.000 ml



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### **Metals STANDARD PREPARATION LOG**

Recipe ID	NAME.	<u>NO.</u>	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipetteID</u>	Supervised By Sarabjit Jaswal
66	POTASSIUM PERSULFATE SOLUTION 5 %	MP85894	06/05/2025	09/30/2025		METALS_SCA LE_3 (M SC-3)		06/14/2025

Recipe ID	<u>NAME</u>	<u>NO.</u>	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipetteID</u>	Supervised By Sarabjit Jaswal
67	SODIUM CHLORIDE - HYDROXYL- CHLORIDE SOLUTION	MP85895	06/05/2025	09/30/2025		METALS_SCA LE_3 (M SC-3)		06/14/2025

| SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | | SOLUTION | SOLUTION | SOLUTION | SOLUTION | SOLUTION | | SOLUTION |

2000.00000ml of W3112 + 240.00000gram of M4371 + 240.00000gram of M5884 = Final Quantity: 2000.000 ml





### Metals STANDARD PREPARATION LOG

Recipe ID	NAME	<u>NO.</u>	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipetteID</u>	Supervised By Janvi Patel
902	ICP AES CAL BLK ( SO/ICB/CCB)	MP87031	09/02/2025	10/03/2025	Sarabjit Jaswal	None	None	09/04/2025
								09/04/2023

FROM 125.00000ml of M6151 + 2350.00000ml of W3112 + 25.00000ml of M6187 = Final Quantity: 2500.000 ml

Recipe				Expiration	<u>Prepared</u>			Supervised By
<u>ID</u>	NAME	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Janvi Patel
907	ICP AES STD S ( S5 )	MP87032	09/02/2025	10/03/2025	Sarabjit Jaswal	None	None	
								09/04/2025

**FROM** 

5.00000ml of M5467 + 5.00000ml of M5820 + 5.00000ml of M5969 + 5.00000ml of M5971 + 5.00000ml of M6077 + 5.00000ml of M6160 + 5.00000ml of M6174 + 5.00000ml of M6176 + 455.00000ml of MP87031 = Final Quantity: 500.000 ml





**Metals STANDARD PREPARATION LOG** 

Recipe ID	NAME	NO.	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipetteID</u>	Supervised By Janvi Patel
910	ICP AES STD S4	MP87033	09/02/2025	10/03/2025	Sarabjit Jaswal	None	None	
								09/04/2025

FROM	50.00000ml of MP87031	+ 50.0000ml of MP87032	= Final Quantity: 100.000 ml
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Recipe				Expiration	Prepared			Supervised By
<u>ID</u>	<u>NAME</u>	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Janvi Patel
909	ICP AES STD S3	MP87034	09/02/2025	10/03/2025	Sarabjit Jaswal	None	METALS_PIP	
							ETTE_3 (A)	09/04/2025

**FROM** 25.00000ml of MP87032 + 75.00000ml of MP87031 = Final Quantity: 100.000 ml



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### **Metals STANDARD PREPARATION LOG**

Recipe				Expiration	<u>Prepared</u>			Supervised By
<u>ID</u>	NAME	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Janvi Patel
3913	ICP AES STD S2	MP87035	09/02/2025	10/03/2025	Sarabjit Jaswal	None	METALS_PIP ETTE 3 (A)	
							_	03/04/2023

FROM 16.00000ml of MP87032 + 184.00000ml of MP87031 = Final Quantity: 200.000 ml

Recipe				Expiration	Prepared			Supervised By
<u>ID</u>	<u>NAME</u>	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Janvi Patel
2950	ICP AES S1/CRI STOCK STD	MP87036	09/02/2025	10/03/2025	Sarabjit Jaswal	None	None	
								09/04/2025

### **FROM**

 $0.03000 \text{ml of M5798} + 0.03000 \text{ml of M6028} + 0.04000 \text{ml of M6137} + 0.05000 \text{ml of M5658} + 0.05000 \text{ml of M6030} + 0.05000 \text{ml of M6140} + 0.05000 \text{ml of M6159} + 0.06000 \text{ml of M6177} + 0.10000 \text{ml of M5751} + 0.10000 \text{ml of M5801} + 0.10000 \text{ml of M5801} + 0.10000 \text{ml of M5800} + 0.20000 \text{ml of M5962} + 0.10000 \text{ml of M5971} + 0.10000 \text{ml of M6128} + 0.10000 \text{ml of M6176} + 0.15000 \text{ml of M5800} + 0.20000 \text{ml of M5799} + 0.20000 \text{ml of M6021} + 0.20000 \text{ml of M6023} + 0.20000 \text{ml of M6027} + 0.20000 \text{ml of M6145} + 0.25000 \text{ml of M5814} + 0.50000 \text{ml of M6032} + 1.00000 \text{ml of M5979} + 1.00000 \text{ml of M6138} + 1.00000 \text{ml of M6142} + 1.00000 \text{ml of M6144} + 1.00000 \text{ml of M6171} + 1.00000 \text{ml of M6178} + 2.00000 \text{ml of M5969} + 88.29000 \text{ml of MP87031} = \text{Final Quantity: 100.000} \quad \text{ml}$ 



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### Metals STANDARD PREPARATION LOG

Recipe				Expiration	<u>Prepared</u>			Supervised By
<u>ID</u>	<u>NAME</u>	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Janvi Patel
2951	ICP AES S1/CRI WORK STD	MP87038	09/02/2025	10/03/2025	Sarabjit Jaswal	None	METALS_PIP	
							ETTE_3 (A)	09/04/2025

Recipe				Expiration	Prepared			Supervised By
<u>ID</u>	<u>NAME</u>	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Janvi Patel
4163	NEW ICV-060925	MP87039	09/02/2025	10/03/2025	Sarabjit Jaswal	None	METALS_PIP	
							ETTE_3 (A)	09/04/2025

FROM 0.40000ml of M6163 + 0.40000ml of M6164 + 0.40000ml of M6165 + 48.80000ml of MP87031 = Final Quantity: 50.000 ml





## **Metals STANDARD PREPARATION LOG**

Recipe				Expiration	<u>Prepared</u>			Supervised By
<u>ID</u>	NAME	NO.	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Janvi Patel
3494	ICP AES ICSAB SOLN-1	MP87041	09/02/2025	10/03/2025	Sarabjit Jaswal	None	METALS_PIP	
							ETTE_3 (A)	09/04/2025
FDOM	10 00000ml of M6182 ± 10 00000ml	of M6104 ±	90 00000ml c	of MD97021 =	Final Quantity: 1	00 000 ml		

FROM	10.00000ml of M6182	+ 10.00000ml of M6184 -	+ 80.00000ml of MP87031	= Final Quantity: 100.000 mi
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Recipe				Expiration	<u>Prepared</u>			Supervised By
<u>ID</u>	NAME	NO.	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Janvi Patel
911	ICP AES CCV SOLN	MP87042	09/02/2025	10/03/2025	Sarabjit Jaswal	None	None	
								09/04/2025

**FROM** 50.00000ml of MP87031 + 50.00000ml of MP87032 = Final Quantity: 100.000 ml



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### Metals STANDARD PREPARATION LOG

919 ICP AES INTERNAL STD MP87043 09/02/2025 10/03/2025 Sarabjit Jaswal None None	Recipe ID	NAME	NO.	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipetteID</u>	Supervised By Janvi Patel
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	919	ICP AES INTERNAL STD	MP87043	09/02/2025	10/03/2025	Sarabjit Jaswal	None	None	09/04/2025

FROM	1.00000ml of M6179 +	- 10.00000ml of M5985 +	1969.00000ml of W3112 -	+ 20.00000ml of M6187	= Final Quantity: 2000.000 ml
------	----------------------	-------------------------	-------------------------	-----------------------	-------------------------------

Recipe				Expiration	Prepared			Supervised By
<u>ID</u>	NAME	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Janvi Patel
903	ICP AES RINSE SOLN	MP87044	09/02/2025	10/03/2025	Sarabjit Jaswal	None	None	
								09/04/2025

**FROM** 200.00000ml of M6187 + 9800.00000ml of W3112 = Final Quantity: 10000.000 ml



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### Metals STANDARD PREPARATION LOG

Recipe	NAME	NO	Draw Data	Expiration	Prepared	SaalalD	DinettelD	Supervised By
<u>ID</u> 4225	NAME LR-1	NO. MP87045	Prep Date 09/02/2025		<u><b>By</b></u> Sarabjit Jaswal	<u>ScaleID</u> None	PipetteID  METALS PIP	Janvi Patel
1220		<u> </u>	00/02/2020	10,00,2020	ourusjit oustrui		ETTE_3 (A)	

FROM 11.50000ml of M6138 + 11.50000ml of M6144 + 11.50000ml of M6171 + 15.50000ml of MP87031 = Final Quantity: 5	50.000	ml
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Recipe				Expiration	<u>Prepared</u>			Supervised By
<u>ID</u>	NAME	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Janvi Patel
4226	LR-2	MP87046	09/02/2025	10/03/2025	Sarabjit Jaswal	None	METALS_PIP	
							ETTE_3 (A)	09/04/2025

FROM 13.50000ml of M6140 + 9.00000ml of M6142 + 9.50000ml of M6159 + 18.00000ml of MP87031 = Final Quantity: 50.000 ml



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### Metals STANDARD PREPARATION LOG

Recipe ID 4227	NAME LR-3	NO. MP87049	Prep Date 09/02/2025		<u>Prepared</u> <u>By</u> Sarabjit Jaswal	ScaleID None	PipetteID None	Supervised By Janvi Patel	
								09/04/2025	
FROM 1.15000ml of M6026 + 1.25000ml of M5658 + 1.25000ml of M5748 + 1.50000ml of M6145 + 2.50000ml of M5751 + 2.50000ml									

 $1.15000 ml \ of \ M6026 + 1.25000 ml \ of \ M5658 + 1.25000 ml \ of \ M5748 + 1.5000 ml \ of \ M6145 + 2.5000 ml \ of \ M5751 + 2.5000 ml$ of M6128 + 39.85000ml of MP87031 = Final Quantity: 50.000 ml

Recipe ID	NAME	<u>NO.</u>	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipetteID</u>	Supervised By Sarabjit Jaswal
170	1:1HCL	MP87148	09/09/2025	02/17/2026	Sagar Kanani	None	None	09/10/2025

**FROM** 1250.00000ml of M6151 + 1250.00000ml of W3112 = Final Quantity: 2500.000 ml





### Metals STANDARD PREPARATION LOG

Recipe ID	NAME.	<u>NO.</u>	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipetteID</u>	Supervised By Sarabjit Jaswal
68	STANNOUS CHLORIDE SOLUTION	MP87301	09/23/2025	09/24/2025		METALS_SCA LE_3 (M SC-3)		09/25/2025

Recipe ID	NAME	<u>NO.</u>	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipettelD</u>	Supervised By Sarabjit Jaswal
871	MERCURY INTERMEDIATE B 250PPB WORKING STD.	MP87303	09/23/2025	09/24/2025	Mohan Bera		METALS_PIP ETTE_5 (HG	,

FROM 1.00000ml of M6187 + 2.50000ml of M5062 + 96.50000ml of W3112 = Final Quantity: 100.000 ml



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### **Metals STANDARD PREPARATION LOG**

	Recipe				Expiration	Prepared			Supervised By
	<u>ID</u>	<u>NAME</u>	NO.	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Sarabjit Jaswal
	1340	Hg 0.00 PPB STD	MP87304	09/23/2025	09/24/2025	Mohan Bera	None	METALS_PIP	
l								ETTE_5 (HG	09/25/2025
ı								A)	

**FROM** 2.50000ml of M6187 + 247.50000ml of W3112 = Final Quantity: 250.000 ml

Recipe				Expiration	Prepared			Supervised By
<u>ID</u>	<u>NAME</u>	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Sarabjit Jaswal
2750	Hg 0.05ppb	MP87305	09/23/2025	09/24/2025	Mohan Bera		METALS_PIP	
							ETTE_5 (HG	09/25/2025

FROM 2.50000ml of M6187 + 247.50000ml of W3112 + 0.05000ml of MP87303 = Final Quantity: 250.000 ml





**Metals STANDARD PREPARATION LOG** 

Recipe ID	NAME	NO.	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipettelD</u>	Supervised By Sarabjit Jaswal
1341	Hg 0.2 PPB STD	MP87306	09/23/2025	09/24/2025	Mohan Bera	None	METALS_PIP ETTE_5 (HG	09/25/2025
	0.50000   [	514/0440	0.00000 1.5	MD07000 F			<del>' A)</del>	

**FROM** 2.50000ml of M6187 + 247.30000ml of W3112 + 0.20000ml of MP87303 = Final Quantity: 250.000 ml

Recipe ID	NAME	<u>NO.</u>	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipetteID</u>	Supervised By Sarabjit Jaswal
1342	Hg 2.5 PPB STD	MP87307	09/23/2025	09/24/2025	Mohan Bera		METALS_PIP ETTE_5 (HG	•

FROM 2.50000ml of M6187 + 245.0000ml of W3112 + 2.50000ml of MP87303 = Final Quantity: 250.000 ml





### **Metals STANDARD PREPARATION LOG**

Recipe ID	NAME	<u>NO.</u>	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipettelD</u>	Supervised By Sarabiit Jaswal		
1343	Hg 5.0 PPB STD	MP87308	09/23/2025	09/24/2025	Mohan Bera	None	METALS_PIP ETTE_5 (HG	,		
FDOM	A)  2 50000ml of M6197 + 242 50000ml of W2112 + 5 00000ml of MD97202 - Final Quantity: 250 000 ml									

Recipe ID	<u>NAME</u>	NO.	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipetteID</u>	Supervised By Sarabjit Jaswal
1344	Hg 7.5 PPB STD	MP87309	09/23/2025	09/24/2025	Mohan Bera		METALS_PIP ETTE_5 (HG	•

**FROM** 2.50000ml of M6187 + 240.00000ml of W3112 + 7.50000ml of MP87303 = Final Quantity: 250.000 ml





**Metals STANDARD PREPARATION LOG** 

Recipe ID	NAME	<u>NO.</u>	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipettelD</u>	Supervised By Sarabiit Jaswal		
1345	Hg 10.0 PPB STD	MP87310	09/23/2025	09/24/2025	Mohan Bera	None	METALS_PIP ETTE_5 (HG	,		
FDOM	A)									

<b>FROM</b> 2.50000m	l of M6187 + 237.50000ml of W3112	+ 10.00000ml of MP87303	= Final Quantity: 250.000 ml
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Recipe				Expiration	Prepared			Supervised By
<u>ID</u>	<u>NAME</u>	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Sarabjit Jaswal
1346	Hg ICV SOLUTION	MP87311	09/23/2025	09/24/2025	Mohan Bera		METALS_PIP	
							ETTE_5 (HG	09/25/2025

**FROM** 2.50000ml of M6161 + 2.50000ml of M6187 + 245.00000ml of W3112 = Final Quantity: 250.000 ml



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### **Metals STANDARD PREPARATION LOG**

Recipe ID	NAME	NO.	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipetteID</u>	Supervised By Sarabjit Jaswal
1351	ICB (Hg 0.00 PPB SOLUTION)	MP87312	09/23/2025	09/24/2025	Mohan Bera		METALS_PIP ETTE_5 (HG	
							A)	

**FROM** 2.50000ml of M6187 + 247.50000ml of W3112 = Final Quantity: 250.000 ml

Recipe ID	NAME	<u>NO.</u>	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipettelD</u>	Supervised By Sarabjit Jaswal
1352	CCB (Hg 0.00 PPB SOLUTION)	MP87313	09/23/2025	09/24/2025	Mohan Bera		METALS_PIP ETTE_5 (HG	•

**FROM** 495.00000ml of W3112 + 5.00000ml of M6187 = Final Quantity: 500.000 ml



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### **Metals STANDARD PREPARATION LOG**

Recipe ID	NAME	NO.	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipettelD</u>	Supervised By Sarabjit Jaswal
1358	CCV (Hg 5.0 PPB SOLUTION)	MP87314	09/23/2025	09/24/2025	Mohan Bera		METALS_PIP ETTE_5 (HG	
							A)	

Recipe ID	NAME	<u>NO.</u>	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipettelD</u>	Supervised By Sarabjit Jaswal
1349	CRA/CRI (Hg 0.2 PPB SOLUTION)	MP87315	09/23/2025	09/24/2025	Mohan Bera		METALS_PIP ETTE_5 (HG	,

FROM 2.50000ml of M6187 + 247.30000ml of W3112 + 0.20000ml of MP87303 = Final Quantity: 250.000 ml



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### **Metals STANDARD PREPARATION LOG**

Recipe ID 1350	NAME CHK STD (Hg 7.0 PPB SOLUTION)	NO. MP87316	Prep Date 09/23/2025	Expiration Date 09/24/2025	Prepared By Mohan Bera	<u>ScaleID</u> None	PipettelD  METALS_PIP ETTE_5 (HG	Supervised By Sarabjit Jaswal 09/25/2025
FROM	2.50000ml of M6187 + 240.50000ml	of W3112 +	7.00000ml of	MP87303 = Fi	inal Quantity: 25	50.000 ml	. A)	



Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	BA-2196-01 / Hydroxylamine Hydrochloride, Crystal (cs/4x500g)	0000215387	06/25/2025	07/01/2019 / RICHARD	06/07/2019 / RICHARD	M4371
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	BA-3238-05 / Potassium Persulfate (2.5kg)	0000234156	08/06/2025	07/23/2019 /	07/25/2019 / manojkumar	M4465
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	BA-3227-05 / Potassium Permanganate (2.5kg)	210800	03/31/2026	11/30/2022 / mohan	07/28/2021 / mohan	M4916
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date /	Chemtech Lot #
Inorganic Ventures	MSHG-10PPM / MERCURY HCI 125mL 10ug/mL	S2-HG709270	09/22/2026	05/28/2022 / mohan	01/27/2022 / mohan	M5062
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57058 / Cerium, 1000PPM, 100ML	020623	02/06/2026	03/06/2023 / bin	03/01/2023 / bin	M5467
	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Supplier						



Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	/ Nickel (Ni) 1000PPM	091223	09/12/2026	01/02/2024 / bin	12/20/2023 / jaswal	M5748
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58029 / Cu, 1000 PPM, 500 ml	071723	07/17/2026	10/01/2024 / Jaswal	08/25/2023 / jaswal	M5751
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57004 / Be, 1000 PPM, 125 ml	102523	10/25/2026	02/09/2024 / bin	02/09/2024 / bin	M5798
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57050 / Sn, 1000 PPM, 125 ml	071123	07/11/2026	02/09/2024 / bin	02/09/2024 / bin	M5799
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date /	Chemtech Lot #
Absolute Standards, Inc.	57027 / CO, 1000 PPM, 125 ml	091923	09/19/2026	05/31/2024 / bin	02/09/2024 / bin	M5800
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57033 / As, 1000 PPM, 125 ml	111323	11/13/2026	02/09/2024 / bin	02/09/2024 / bin	M5801



Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57005 / B, 1000 PPM, 125 ml	071123	07/11/2026	03/26/2024 / Sohil	01/03/2024 / jaswal	M5814
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57015 / P, 1000 PPM, 125 ml	091123	09/11/2026	05/01/2024 / jaswal	02/09/2024 / jaswal	M5820
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	BA-3980-01 / Stannous Chloride (cs/4x500g)	232820	08/31/2028	04/30/2024 / mohan	04/25/2024 / mohan	M5882
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	BA-3624-05 / Sodium Chloride, Crystal	0000281938	07/06/2026	04/30/2024 / mohan	04/25/2024 / mohan	M5884
	(cs/4x2.5kg)					
Supplier	(cs/4x2.5kg)  ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date /	Chemtech Lot #
Supplier  Absolute Standards, Inc.	<u> </u>	Lot # 060624	1 -	-		
Absolute	ItemCode / ItemName 57034 / Se, 1000 PPM,		Date	Opened By 07/02/2024 /	Received By 06/14/2024 /	Lot #



Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57003 / Li, 1000 PPM, 125 ml	061224	06/21/2027	06/06/2025 / Janvi	07/01/2024 / Jaswal	M5971
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CGTI1-1 / TITANIUM 125mL 1000ug/mL	T2-TI719972	08/05/2026	08/06/2025 / Janvi	02/22/2024 / Jaswal	M5979
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CGIN10-5 / INDIUM 1 x 500 ml	U2-IN729349	02/21/2028	10/08/2024 / Jaswal	06/14/2024 / Jaswal	M5985
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic	CLPP-CAL-3 / CLP CAL	T2-MEB727800	07/30/2026	07/30/2025 /	02/22/2024 /	MEOOO
Ventures	SOLUTION #3, 125mL		07/30/2020	Janvi	kareem	M5998
•		Lot #	Expiration Date		kareem  Received Date / Received By	Chemtech
Ventures	SOLUTION #3, 125mL	Lot # 062424	Expiration	Janvi  Date Opened /	Received Date /	Chemtech
Supplier Absolute	SOLUTION #3, 125mL  ItemCode / ItemName  57023 / V, 1000 PPM, 125		Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #



Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57182 / Pb, 10000 PPM, 125 ml	110923	11/09/2026	12/05/2024 / janvi	08/05/2024 / Jaswal	M6026
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57028 / Ni, 1000 PPM, 125 ml	062024	06/20/2027	06/04/2025 / Janvi	08/05/2024 / Jaswal	M6027
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57048 / Cd, 1000 PPM, 125 ml	070124	07/01/2027	08/05/2024 / kareem	08/05/2024 / Jaswal	M6028
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57047 / Ag, 1000 PPM, 125 ml	122823	12/28/2026	08/05/2024 / kareem	08/05/2024 / Jaswal	M6030
		•	1			
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Supplier  Absolute Standards, Inc.	ItemCode / ItemName  57056 / Ba, 1000 PPM, 125 ml	Lot # 010924	1 -	-		
Absolute	57056 / Ba, 1000 PPM,	1	Date	Opened By 01/14/2025 /	<b>Received By</b> 08/05/2024 /	Lot #



Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	Z9651Q / CHEM-CLP-4/.25L	V2-MEB746762	09/06/2029	01/23/2025 / kareem	09/19/2024 / kareem	M6077
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date /	Chemtech Lot #
Absolute Standards, Inc.	58025 / Mn, 1000 PPM, 500 ml	101124	10/11/2027	01/13/2025 / kareem	01/13/2025 / kareem	M6128
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date /	Chemtech Lot #
Inorganic Ventures	CGSI1-1 / SILICON 125mL 1000ug/mL	V2-SI744713	07/10/2029	01/14/2025 / Jaswal	10/03/2024 / Jaswal	M6137
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date /	Chemtech Lot #
Absolute Standards, Inc.	58120 / Ca, 10000 PPM, 500 ml	121824	12/18/2027	04/17/2025 / Janvi	01/13/2025 / Jaswal	M6138
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date /	Chemtech Lot #
Absolute Standards, Inc.	58126 / Fe, 10000 PPM, 500 ml	011025	01/10/2028	06/25/2025 / Janvi	01/13/2025 / Jaswal	M6140
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date /	Chemtech Lot #
Absolute Standards, Inc.	58119 / K, 10000 PPM, 500 ml	103024	10/30/2027	05/06/2025 / JANVI	01/13/2025 / Jaswal	M6142



Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58111 / Na, 10000 PPM, 500 ml	072424	07/24/2027	01/23/2025 / kareem	01/13/2025 / Jaswal	M6144
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58030 / Zinc, Zn, 500 ml, 1000 PPM	121724	12/17/2027	02/04/2025 /	01/13/2025 / Jaswal	M6145
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	BA-9530-33 / Hydrochloric Acid, Instra-Analyzed (cs/6x2.5L)	22G2862015	02/17/2026	02/18/2025 / Sagar	01/15/2025 / Sagar	M6151
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	BA-9598-34 / Nitric Acid, Instra-Analyzed (cs/4x2.5L)	24D1062002	10/09/2025	03/10/2025 / Eman	02/02/2025 / Sagar	M6158
		Lot #	Expiration	Date Opened /	Received Date /	Chemtech
Supplier	ItemCode / ItemName	LOT #	Date	Opened By	Received By	Lot #
Supplier  Absolute Standards, Inc.	58113 / AI, 10000 PPM, 500 ml	011325	<b>Date</b> 03/18/2026	03/18/2025 / kareem	02/09/2025 / kareem	M6159
Absolute	58113 / AI, 10000 PPM,			03/18/2025 /	02/09/2025 /	



Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
EPA	ICV-5 / ICV (HG)STOCK SOLN	ICV 5 0415	12/31/2025	05/01/2025 / mohan	03/30/2024 / mohan	M6161
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	BA-9598-34 / Nitric Acid, Instra-Analyzed (cs/4x2.5L)	24H0162012	11/27/2025	05/27/2025 / Sagar	04/27/2025 / Sagar	M6162
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	QCP-CICV-1-125ML / EPA CLP ICP Verification Standard1	V2-MEB744107	06/08/2026	06/09/2025 / jaswal	06/06/2025 / jaswal	M6163
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	QCP-CICV-2-125ML / EPA CLP ICP Verification Standard2	U2-MEB733713	06/08/2026	06/09/2025 / jaswal	06/09/2025 / jaswal	M6164
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	QCP-CICV-3-125ML / EPA CLP ICP Verification Standard3	V2-MEB749572	06/08/2026	06/09/2025 / jaswal	06/09/2025 / jaswal	M6165
	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date /	Chemtech Lot #
Supplier	nemodac / nemitanic		Date		110001100.23	

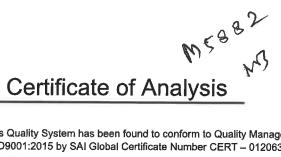


Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CLPP-CAL-1 / CLP CAL SOLUTION #1, 125mL	V2-MEB742428	07/31/2026	07/31/2025 / Janvi	05/05/2025 / Janvi	M6174
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57038 / Sr, 1000 PPM, 125 ml	092724	09/27/2027	08/06/2025 / Janvi	08/06/2025 / Janvi	M6176
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date /	Chemtech Lot #
Absolute Standards, Inc.	/ Lead (Pb) 1000PPM	031525	03/15/2028	08/06/2025 / Janvi	08/06/2025 / Janvi	M6177
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57042 / Mo, 1000 PPM, 125 ml	080528	08/05/2028	08/06/2025 / Janvi	08/06/2025 / Janvi	M6178
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date /	Chemtech Lot #
Inorganic Ventures	CGY10-1 / YTTRIUM 125mL 10,000ug/mL	V2-Y740548	08/05/2026	08/06/2025 / Janvi	06/02/2024 / Janvi	M6179
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date /	Chemtech Lot #
Inorganic Ventures	WW-LFS-1 / Laboratory Fortified Stock Solution 1, 125 ml	W2-MEB752149	02/05/2026	08/06/2025 / Janvi	07/22/2025 / Janvi	M6180



Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	WW-LFS-2 / Laboratory Fortified Stock Solution 2, 125 ml	V2-MEB7433480	02/05/2026	08/06/2025 / Janvi	07/22/2025 / Janvi	M6181
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
EPA	PART A / ICSA (ICP) STOCK SOLN	ICSA-1211	02/05/2026	08/06/2025 / Janvi	03/06/2024 / Janvi	M6182
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
EPA	PART B / ICSAB (ICP) STOCK SOLN	ICSB-0710	02/05/2026	08/06/2025 / Janvi	03/06/2024 / Janvi	M6184
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	BA-9598-34 / Nitric Acid, Instra-Analyzed (cs/4x2.5L)	24H0162012	01/28/2026	08/29/2025 / Sagar	08/08/2025 / Sagar	M6187
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
• •			<b>-</b>			
Seidler Chemical	BA-9530-33 / Hydrochloric Acid, Instra-Analyzed (cs/6x2.5L)	24D1562005	02/10/2026	09/11/2025 / Sagar	08/25/2025 / Sagar	M6200
	Acid, Instra-Analyzed	24D1562005		09/11/2025 /		M6200  Chemtech Lot #





1 Reagent Lane Fair Lawn, NJ 07410 201,796,7100 tel

Thermo Fisher Scientific's Quality System has been found to conform to Quality Management System

Standard ISO9001:2015 by SAI Global Certificate Number CERT - 0120633 201,796,1329 fax

This is to certify that units of the lot number below were tested and found to comply with the specifications of the grade listed. Certain data have been supplied by third parties. Thermo Fisher Scientific expressly disclaims all warranties, expressed or implied, including the implied warranties of merchantability and fitness for a particular purpose. Products are for research use or further manufacturing. Not for direct administration to humans or animals. It is the responsibility of the final formulator and end user to determine suitability based upon the intended use of the end product. Products are tested to meet the analytical requirements of the noted grade. The following information is the actual analytical results obtained.

Catalog Number	T142	Quality Test / Release Date	08/17/2023			
Lot Number	232820					
Description	STANNOUS CHLORIDE, DIHYDRATE CERTIFIED ACS (Suitable for Mercury Determination)					
Country of Origin	United States	Suggested Retest Date	Aug/2028			
Chemical Origin	Inorganic-non animal					
BSE/TSE Comment	No animal products are used as sta processing aids, or any other mater	arting raw material ingredients, or used rial that might migrate to the finished pr	in processing, including lubricants, oduct.			

N/A	H. M. C. S. C.		Was I was a state of
Result Name	Units	Specifications	Test Value
APPEARANCE		REPORT	Clear crystals
ASSAY	%	Inclusive Between 98 - 103	100.65
CALCIUM	%	<= 0.005	0.0017
IDENTIFICATION	PASS/FAIL	= PASS TEST	PASS TEST
IRON (Fe)	%	<= 0.003	0.0011
LEAD (Pb)	%	<= 0.01	0.0006
MERCURY (Hg)	ppm	<= 0.05	<0.05
POTASSIUM (K)	%	<= 0.005	0.0001
SODIUM (Na)	%	<= 0.01	<0.01
SOLUBILITY IN HCL	PASS/FAIL	= PASS TEST	PASS TEST
SULFATE (SO4)	PASS/FAIL	= P.T. (ABOUT 0.003%)	P.T. (ABOUT 0.003%)

Harout Sahagian - Quality Control Supervisor - Fair Lawn



ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com

R1815/24

CERTIFIED WEIGHT REPORT: 1. Barium nitrate (Ba) Nominal Concentration (µg/mL): Weight shown below was diluted to (mL): Recommended Storage: **NIST Test Number: Expiration Date:** Part Number: Lot Number: Description: IN023 BAD022019A1 RV# 57056 010924 Barium (Ba) **6UTB** 1000 Ambient (20 °C) 010927 Number Pot Conc. (µg/mL) 2000.02 Nominal 1000 0.058 Flask Uncertainty 99.999 5E-05 Balance Uncertainty Purity Uncertainty Assay 3 Purity (%) 0,10 Solvent: 24002546 52.3 8 2% Weight (g) 3.82417 Target Lot # 40.0 Nitric Acid Weight (g) Conc. (µg/mL) 3.82441 Nitric Acid Actual 1000.1 Actual +/- (µg/mL) Reviewed By: Formulated By: Uncertainty Expanded Giovannie 2.0 10022-31-B CAS# (Solvent Safety Info. On Attached pg.)
# OSHA PEL (TWA) LD50 Giovanni Esposito Pedro L. Rentas であるとん SDS Information 0.5 mg/m3 orl-rat 355 mg/kg 3104a 010924 010924 NIST SRM

m/z->	N En En	m/z-> 5.0E6	1.055	m/z-> 2.0E5	1.0EG	2.0E6
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# Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

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### Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- \* The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- \* Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- \* All standard containers are meticulously cleaned prior to use.
- \* Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- \* Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated.
- \* All Standards should be stored with caps tight and under appropriate laboratory conditions.

  \* Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

Absolute Standards, Inc. 800-368-1131

www.absolutestandards.com



## Certified Reference Material CRM

R 815/24

Solvent:

24002546

Nitric Acid

Lot #

M6028

https://Absolutestandards.com ANAB ISO 17034 Accredited AR-1539 Certificate Number

CERTIFIED WEIGHT REPORT:

Part Number:

57048 070124

Lot Number: Description:

Cadmium (Cd)

Nominal Concentration (µg/mL):

NIST Test Number:

6UTB

1000

Recommended Storage:

**Expiration Date:** 

070127 Ambient (20 °C)

Weight shown below was dliuted to (mL):

2000.07

0.100 Flask Uncertainty 5E-05 Balance Uncertainty

2%

40.0 (mL) Nitric Acid

Formulated By:

Alban PROBAN

Aleah O'Brady

070124

Reviewed By:

Pedro L. Rentas

070124

Expanded

Weight (g) Conc. (µg/mL) Uncertainty

Cadmium nitrate tetrahydrate (Cd)

IN024 CDM092021A1

1000

99.999

0.10

36.5

5.4797

5.4804

1000.1

2.0

10022-68-1

0.01 mg/m3

orl-rat 60.2mg/kg

3108

RM#

Number Lot

Conc. (µg/mL)

8

8

Weight (g)

Target

Actual

Actual

Nominal

Purity

Uncertainty Assay Purity (%)

+/- (µg/mL)

CAS#

**SDS Information** 

(Solvent Safety Info. On Attached pg.)
# OSHA PEL (TWA) LD50

**NIST** SRM

m/z-> -z/m m/z-> 1.0E7 2.0E7 5.OE4 1.0E5 2.5E4 5.0M4 [1] Spectrum No.1 010 110 0 220 120 20 [ 12.514 sec]:58148.D# [Count] [Linear] 230 130 30 240 140 40 N00 150 50 2000 160 60 170 70 180 80 061 Ö 200 100

1 of 2

www.absolutestandards.com

https://Absolutestandards.com ANAB ISO 17034 Accredited AR-1539 Certificate Number

# Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

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## Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

\* The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated. \* Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.

\* All standard containers are meticulously cleaned prior to use.

\* Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).

\* Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated.

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Part # 57048

2 of 2

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www.absolutestandards.com



## Certified Reference Material CRM

M6026

https://Absolutestandards.com ANAB ISO 17034 Accredited AR-1539 Certificate Number

R: 8/5/24

CERTIFIED WEIGHT REPORT: Part Number: 57182 Solvent: 24002546 Lot# Nitric Acid

Description: Lot Number: 110923 Lead (Pb)

2%

Nitric Acid

Formulated By:

Lawence Barry

110923

Revenue

1 40.0

Recommended Storage: **Expiration Date:** 10000 110926 Ambient (20 °C)

Nominal Concentration (µg/mL): Weight shown below was diluted to (mL): NIST Test Number: **6UTB** Cot 2000.02 0.058 Flask Uncertainty 5E-05 Balance Uncertainty Reviewed By: Expanded

RW#

Nominal

Purity

Uncertainty Assay

 Lead(II) nitrate (Pb) IN029 PBD122016A1 10000 99.999 0.10 62.5 32.0006 32.0040 10001.1 20.0 10099-74-8 0.05 mg/m3 intryns-rat 93 mg/kg 3128

Number Conc. (µg/mL) 38 Purity (%) 36

Weight (g) Target Weight (g) Conc. (µg/mL) Actual Actual +/- (µg/mL) Uncertainty CAS# (Solvent Safety Info. On Attached pg.)

# OSHA PEL (TWA) LD50 OSHA PEL (TWA) SDS information TSIN SRM

Pedro L. Rentas

110923

1.0E7 [1] Spectrum No.1 [ 17.284 sec]:58182.D# [Count] [Linear]

180

190

200

70

80

90

100

Part # 57182

1 of 2



https://Absolutestandards.com ANAB ISO 17034 Accredited AR-1539 Certificate Number

# Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

							Trace Me	Metals	Verifica	Tti-	by ICP-	NS (	µg/mL)				Ш		
≥	40.02	8	40.02	Dy	40.02	Hf	<b>40.02</b>	E	<b>₹</b> 0.02	Z:	A),02	P	-0	<0.02	4	Se	Se	Se   <0.2   Tb	Se   <0.2   Tb
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## Physical Characterization:

(T)= Target analyte

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Sor I Mill

- \* The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated. \*Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in
- the preparation of all standards.
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- \* Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
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  Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

M4371

Hydroxylamine Hydrochloride, Crystal BAKER ANALYZED® A.C.S. Reagent

Suitable for Mercury Determination (hydroxylammonium chloride)

Rec - 06.07.12





Material No.: 2196-01

Batch No.: 0000215387

Manufactured Date: 2018/06/27 Retest Date: 2025/06/25

Revision No: 1

### Certificate of Analysis

Meets ACS Reagent Chemical Requirements,

Test	Specification	Result
Assay (NH2OH·HCl) (by KMnO4 titrn)	>= 96.0 %	99.1
Clarity of Alcohol Solution	Passes Test	PT
Residue after Ignition	<= 0.050 %	0.017
Titrable Free Acid (meq/g)	<= 0.25	0.19
Ammonium (NH4)	Passes Test	PT
Sulfur Compounds (as SO <sub>4</sub> )	<= 0.005 %	< 0.003
Trace Impurities - ACS - Heavy Metals (as Pb)	<= 5 ppm	4
Trace Impurities - Iron (Fe)	<= 5 ppm	< 3
Trace Impurities - Mercury (Hg)	<= 0.050 ppm	< 0.005

For Laboratory, Research or Manufacturing Use

Country of Origin:

CN

Packaging Site:

Paris Mfg Ctr & DC



Phillipsburg, NJ 9001:2015, FSSC22000
Paris, KY 9001:2008
Mexico City, Mexico 9001:2008
Gliwice, Poland 9001:2015, 13485:2012
Selangor, Malaysia 9001:2008
Dehradun, India, 9001:2008, 14001:2004, 13485:2003
Mumbai, India, 9001:2015, 17025:2005
Panoli, India 9001:2015

Jamie Ethier
Vice President Global Quality



M4913- 16



### Certificate of Analysis

1 Reagent Lane Fair Lawn, NJ 07410 201.796.7100 tel 201.796.1329 fax

Thermo Fisher Scientific's Quality System has been found to conform to Quality Management System Standard ISO9001:2015 by SAI Global Certificate Number CERT – 0120632

This is to certify that units of the lot number below were tested and found to comply with the specifications of the grade listed. Certain data have been supplied by third parties. Thermo Fisher Scientific expressly disclaims all warranties, expressed or implied, including the implied warranties of merchantability and fitness for a particular purpose. Products are for research use or further manufacturing. Not for direct administration to humans or animals. It is the responsibility of the final formulator and end user to determine suitability based upon the intended use of the end product. Products are tested to meet the analytical requirements of the noted grade. The following information is the actual analytical results obtained.

Catalog Number	P279	Quality Test / Release Date	01/12/2021
Lot Number	210306		
Description	POTASSIUM PERMANGANATE, A.C.S.		
Country of Origin	United States	Suggested Retest Date	Jan/2026

N/A			
Result Name	Units	Specifications	Test Value
APPEARANCE		REPORT	Dark purple to purple green crystals
ASSAY	%	>= 99	99.3
CHLORIDE & CHLORATE	%	<= 0.005	<0.005
IDENTIFICATION	PASS/FAIL	= PASS TEST	pass test
INSOLUBLE MATTER	%	<= 0.2	<0.2
MERCURY (Hg)	ppm	<= 0.05	<0.004
SULFATE (SO4)	%	<= 0.02	<0.02

Julian Burton

Julian Burton - Quality Control Manager - Fair Lawn



### Certificate of Analysis

300 Technology Drive Christiansburg, VA 24073 USA inorganicventures.com M5062 M5063

P: 800-669-6799/540-585-3030 F: 540-585-3012 info@inorganicventures.com

### 1.0 ACCREDITATION / REGISTRATION

**INORGANIC VENTURES** is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Ventures is also an ISO 9001 registered manufacturer (QSR Certificate Number QSR-1034).



### 2.0 PRODUCT DESCRIPTION

Product Code:

Single Analyte Mass Spec Solution

Catalog Number:

MSHG-10PPM

Lot Number:

S2-HG709270

Matrix:

10% (v/v) HCI

Value / Analyte(s):

10 μg/mL ea:

Mercury

Starting Material:

Hg metal

Starting Material Lot#:

1959

Starting Material Purity:

99.9994%

### 3.0 CERTIFIED VALUES AND UNCERTAINTIES

**Certified Value:** 

 $10.001 \pm 0.053 \,\mu g/mL$ 

Density:

1.020 g/mL (measured at 20 ± 4 °C)

### **Assay Information:**

ANALYTE	METHOD	NIST SRM#	SRM LOT#
Hg	ICP Assay	3133	160921
Hg	EDTA	928	928
Ha	Calculated		See Sec. 4.2

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

### Characterization of CRM/RM by Two or More Methods

Certified Value, X<sub>CRM/RM</sub>, where two or more methods of characterization are used is the weighted mean of the results:

 $X_{CRM/RM} = \Sigma(w_i) (X_i)$ 

 $\mathbf{X_i}$  = mean of Assay Method i with standard uncertainty  $\mathbf{u_{char}}$  i

w<sub>i</sub> = the weighting factors for each method calculated using the inverse square of

the variance.

 $\mathbf{w_i} = (1/u_{chari})^2 / (\Sigma (1/(u_{chari})^2)$ 

CRM/RM Expanded Uncertainty (±) =  $U_{CRM/RM} = k (u_{char}^2 + u_{bb}^2 + u_{its}^2 + u_{ts}^2)^{1/2}$ 

k = coverage factor = 2

 $u_{char} = [\Sigma((w_i)^2 (u_{char})^2)]^{\frac{1}{2}}$  where  $u_{char}$  i are the errors from each characterization method

u<sub>bb</sub> = bottle to bottle homogeneity standard uncertainty

ults = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

### Characterization of CRM/RM by One Method

Certified Value,  $X_{CRM/RM}$ , where one method of characterization is used is the mean of individual results:

X<sub>CRM/RM</sub> = (X<sub>a</sub>) (u<sub>char a</sub>)

Xa = mean of Assay Method A with

uchar a = the standard uncertainty of characterization Method A

CRM/RM Expanded Uncertainty (±) = U<sub>CRM/RM</sub> = k (u<sup>2</sup>char a + u<sup>2</sup>bb + u<sup>2</sup>lts + u<sup>2</sup>ts) 1/2

k = coverage factor = 2

u<sub>char a</sub> = the errors from characterization

ubb = bottle to bottle homogeneity standard uncertainty

u<sub>lts</sub> = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

### 4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

### 4.1 Thermometer Calibration

- All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

### 4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

### 4.3 Glassware Calibration

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM/RMs.

### 5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES (µg/mL)

CRM/RMs are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

```
O Ag
          0.000011 M Eu <
                            0.000201 O Na
                                              0.000004 M Se <
                                                               0.015915 O Zn <
                                                                                 0.001510
0
   Al
          0.000001 O Fe
                            0.000001 M Nb <
                                              0.000201 O Si
                                                                0.000005 M Zr <
                                                                                 0.000201
M
   As <
          0.000402 M Ga <
                            0.000201 M Nd <
                                              0.000201 M Sm <
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   Au <
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   B <
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                                             0.000201 M Yb <
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```

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

### 6.0 INTENDED USE

- For the calibration of analytical instruments and validation of analytical methods as appropriate.

### 7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

### 7.1 Storage and Handling Recommendations

- Store between approximately 4° 30° C while in sealed TCT bag.
- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.
- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between  $4^{\circ}$   $24^{\circ}$  C to minimize the effects of transpiration. Use at  $20^{\circ} \pm 4^{\circ}$  C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.
- For more information, visit www.inorganicventures.com/TCT

**Atomic Weight; Valence; Coordination Number; Chemical Form in Solution -** 200.59 +2 4 Hg(OH)(aq) 1+ **Chemical Compatibility -** Stable in HNO3. Avoid basic media forming insoluble carbonate. The sulfide, basic carbonate, oxalate, phosphate, arsenite, arsenate and iodide are insoluble in water.

**Stability -** 2-100 ppb levels not stable in 1% HNO3 / LDPE container, stable in 10% HNO3 packaged in borosilicate glass. 1-100 ppm levels stable in 7% HNO3 packaged in borosilicate glass. 1000-10,000 ppm solutions are chemically stable for years in 5-10% HNO3 / LDPE container.

**Hg Containing Samples (Preparation and Solution) -** Metal (soluble in HNO3); Oxide (Soluble in HNO3); Ores and Organic based (The literature has more references to the preparation of Hg containing samples than any other element. Please consult the literature for your specific sample type, since such preparations are prone to error. Or e-mail our technical staff and we will contact you to discuss your particular sample preparation questions in further detail.).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Interferences (underlined indicates severe)
ICP-MS 202 amu	9 ppt	n/a	186W16O
ICP-OES 184.950 nm	0.03 / 0.005 μg/mL	1	
ICP-OES 194.227 nm	0.03 / 0.005 µg/mL	1	V
ICP-OES 253.652 nm	0.1 / 0.03 µg/mL	1	Ta, Co, Th, Rh, Fe,
			U

### 8.0 HAZARDOUS INFORMATION

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.

### 9.0 HOMOGENEITY

- This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous. Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

### 10.0 QUALITY STANDARD DOCUMENTATION

### 10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

### 10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

### 10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

Inorganic Ventures, 300 Technology Drive, Christiansburg, Va. 24073, USA; Telephone: 800.669.6799; 540.585.3030, Fax: 540.585.3012; inorganicventures.com; info@inorganicventures.com

### 11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

### 11.1 Certification Issue Date

September 22, 2021

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

### 11.2 Lot Expiration Date

- September 22, 2026
- The date after which this CRM/RM should not be used.
- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

### 11.3 Period of Validity

Sealed TCT	Bag	Open Date:		

- This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.

### 12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS Certificate Prepared By:

Uyen Truong
Supervisor, Product Documentation

Mya Truong

### Certificate Approved By:

Michael Booth Director, Quality Control Michael 2 Booth

### Certifying Officer:

Paul Gaines Chairman / Senior Technical Director Paul R Laines

Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com



## Certified Reference Material CRM

R: 03/01/23(13)



ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com

									-			
CENTIFIED WEIGHT REPORT:						Lot #			)			
Part Number: Lot Number:		57058			Solven	t: 2111022	Solvent: 21110221 Nitric Acid		T	Errore Br		
Description:		Cerlum (Ce)	3							0	K	
Section 2		00000			2%		Nitric Acid	-	Formulated By.	: Lawrence Barry	020623	Lon
Recommended Storage: Nominal Concentration (ug/mL):		020626 Ambient (20 °C) 1000	(Ç)			(JE)			1/2	to Herris	1	
NIST Test Number: 6UTB Weight shown below was diluted to (mL):	dilute	6UTB of to (mL):	1000.12	3E-05 E	5E-05 Balance Uncertainty 0.058 Flask Uncertainty		:		Reviewed By:	Pedro L. Rentas	29020	
		Ę		Purity 1	Nominal Purity Uncertainty Assay.	y Target	Actual	Actual	Expanded Uncertainty	SDS Information (Solvent Safety Info. On Attached pg.)	ation Attached pg.)	NIST
Compound	25. 25.		Number Conc. (ug/mL) (%) Purity (%) (%)	3	Purity (%) (%)		Weight (g)	Conc. (ug/mL)	Weight (g) Weight (g) Conc. (ug/ml.) +/- (ug/ml.) CAS#	CAS# OSHA PEL (TWA)	1D50	SRM

Compound	RM#	Lot Number	Nominal Conc. (vg/mL)	Purity (%)	Purity Uncertainty Assay (%) Purity (%) (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Actual Uncertainty Weight (g) Conc. (ug/mt.) +/- (ug/mt.)	Uncertainty +/- (ug/mL)	SS	(Solvent Safety Info. On Attached pg.) CAS# OSHA PEL (TWA) LD50	ched pg.) LD50	NIST
Cerium nitrate hexahydrate (Ce)	IN146	IN146 Z512CEB1	1000	88.988	0.10	32.8	3.04919	3.04921 1000.0	1000.0	20	II ==	¥.	ď.	AN AN
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## Certified Reference Material CRM





ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com

# Instrumental Analysis by Inductively Coupled Plasma Mass Spectroscopy (ICP-MS):

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Physical Characterization:

(T)= Target analyte

Certified by:

Homogeneity: No heterogeneity was observed in the preparation of this standard.



\* Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.

All standard containers are meticulously cleaned prior to use.

Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above). Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated.

\* All standards should be stored with caps tight and under appropriate laboratory conditions.
\* Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

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## Certified Reference Material CRM

https://Absolutestandards.com ANAB ISO 17034 Accredited AR-1539 Certificate Number

CERTIFIED WEIGHT REPORT: Nominal Concentration (µg/mL): Recommended Storage: Volume shown below was diluted to (mL): NIST Test Number: **Expiration Date:** Part Number: Lot Number: Description: Part **BTU9** 1000 58024 060523 Ambient (20 °C) 060526 Chromium (Cr) Lot 2000.02 Dilution 0.058 5E-05 Initial Flask Uncertainty **Balance Uncertainty** Uncertainty 21110221 Nominal Lot # 2.0% Nitric Acid Solvent: (III) Initial 40.0 Nitric Acid Final Formulated By: Reviewed By: Uncertainty Expanded Lavense (Solvent Safety Info. On Attached pg.) Pedro L. Rentas Lawrence Barry **SDS Information** 060523 060523

Chromium(III) nitrate nonahydrate (Cr) 58124

071122

0.1000

200.0

0.084

1000

10000.1

1000.0

12

7789-02-8

0.5 mg(Cr)/m3

ori-rat 3250 mg/kg 3112a

Compound

Number

Number

Factor

Vol. (mL) Pipette (mL) Conc. (µg/mL)

Conc. (µg/mL) Conc. (µg/mL)

+/- (µg/mL)

CAS#

OSHA PEL (TWA)

LD50

TSIN SRM

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Part # 58024



## Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

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(I)= larget analyte

### Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

\* The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
\* Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in

the preparation of all standards.

\* All standard containers are meticulously cleaned prior to use.

\* Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).

\* Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated.

\* All standards should be stored with caps tight and under appropriate laboratory conditions.

\* Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

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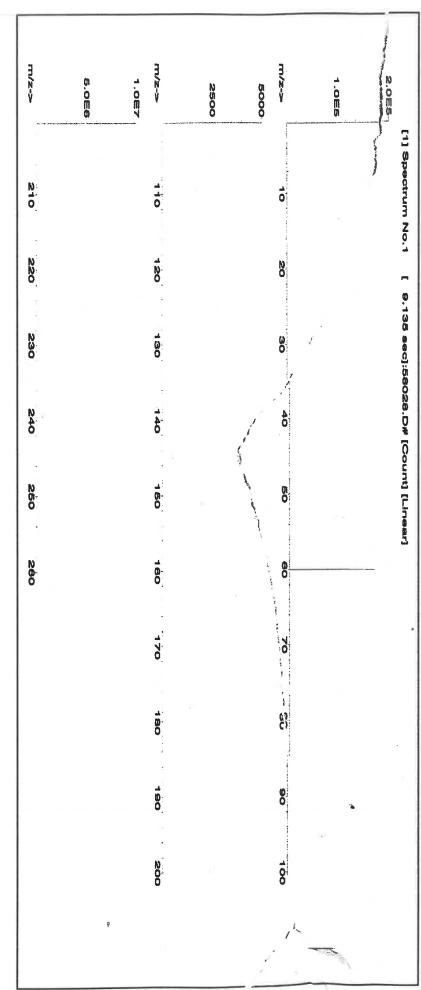


## Certified Reference Material CRM

https://Absolutestandards.com ANAB ISO 17034 Accredited AR-1539 Certificate Number

CERTIFIED WEIGHT REPORT: Nickel(II) nitrate hexahydrate (Ni) Nominal Concentration (µg/mL): m/z-> 1.005 2.OES Recommended Storage: Volume shown below was diluted to (mL): NIST Test Number: **Expiration Date:** Part Number: Lot Number: Description: [1] Spectrum No.1 ō 58128 Number Part **BTUB** 1000 57028 091223 Ambient (20 °C) 091226 Nickel (NI) 062023 ĕ 0 [ 9.135 sec]:58028.D# [Count] [Linear] 2000.02 0.1000 Dilution Factor 12/20/23 000 Vol. (mL) Pipette (mL) Conc. (ug/mL) 200.0 0.058 5E-05 Balance Uncertainty Flask Uncertainty Uncertainty 0.084 24002546 M5748 Lot # Nominal 2.0% 8 Ci O Conc. (ug/ml.) Conc. (ug/ml.) Nitric Acid Solvent: 10000.4 E 40.0 0 Nitric Acid 1000.0 Formulated By: Reviewed By: +/- (µg/ml\_ Uncertainty Expanded 12 (C) 13478-00-7 CAS# (Solvent Safety Info. On Attached pg.)

# OSHA PEL (TWA) LD50 OSHA PEL (TWA) Pedro L. Rentas Lawrence Barry 00 SDS Information mg/m3 100 orl-rat 1620 mg/kg 091223 091223 3136 NEST NEST SR



Part # 57028

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800-368-1131

Absolute Standards, Inc.

## Instrumental Analysis by Inductively Coupled Plasma Mass Spectroscopy (ICP-MS):

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### Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this Kandard.

Certified by:

\* The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
\* Printed acids, 18.2 megohm delonized water, calibrated Class A glassware and the highest purity raw materials are used in

the preparation of all standards.

\* All standard containers are meticulously cleaned prior to use.

\* Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above). \* Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated.

\* All Standards should be stored with caps tight and under appropriate laboratory conditions.

\* Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

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### Certified Reference Material CRM R:8/25)

https://Absolutestandards.com ANAB ISO 17034 Accredited AR-1539 Certificate Number

CERTIFIED WEIGHT REPORT Copper(II) nitrate trihydrate (Cu) Nominal Concentration (µg/mL): m/z-y 5.0E7 Recommended Storage: 2.5円ア 5.0E5 1.0E6 Volume shown below was diluted to (mL): **NIST Test Number: Expiration Date:** Part Number: Description: Lot Number: [1] Spectrum No.1 10 58129 Number Part 58029 071723 1000 **BTU9** Ambient (20 °C) 071726 Copper (Cu) 022723 Number Lot NO [ 33.422 sec]:58029.D# [Count] [Linear] 2000.02 0.1000 Dilution Factor 30 Val. (mL) 0.058 200.0 5E-05 Initia Flask Uncertainty Balance Uncertainty Pipette (mL) Conc. (µg/mL) Uncertainty 0.084 0 21110221 Nominal Lot # 2.0% 1000 0 Conc. (µg/mL) Conc. (µg/mL) Nitric Acid Solvent: 10000.5 (mL) Initial 40.0 60 Nitric Acid 1000.0 Final 70 Formulated By: Reviewed By: +/- (µg/mL) Uncertainty Expanded 2.2 80 10031-43-3 CAS# (Solvent Safety Info. On Attached pg.) OSHA PEL (TWA) Pedro L. Rentas Benson Chan 00 SDS Information 1 mg/m3 100 ori-rat 794 mg/kg LDSO 071723 071723 3114 TSIN SRM

m/z->

20

220

230

240

250

200

m/z->

110

120

130

40

150

160

170

180

190

200

2.0∈7

1.0≡7

Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

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(I) = larget analyte

## Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

2 of 2

<sup>\*</sup> The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated. \* Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.

<sup>\*</sup> All standard containers are meticulously cleaned prior to use.
\* Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).

Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated.

<sup>\*</sup> All Standards should be stored with caps tight and under appropriate laboratory conditions.

\* Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com

# CERTIFIED WEIGHT REPORT:

02/09/24 Lot #

24002546

Nitric Acid Solvent:

Part Number: Lot Number: Description: 57004 102523

Beryllium (Be)

Nominal Concentration (µg/mL): Recommended Storage: NIST Test Number: 1000 Ambient (20 °C)

**Expiration Date:** 

102526

BTU<sub>9</sub>

Volume shown below was diluted to (mL): 2000.02

0.058

Flask Uncertainty Balance Uncertainty

5E-05

Number

Number Lot

Vol. (mL.)

Part

Dilution Factor

hitia

Uncertainty

Nominal

(IE) 40.0

2.0%

Nitric Acid

Benson Chan

102523

Formulated By:

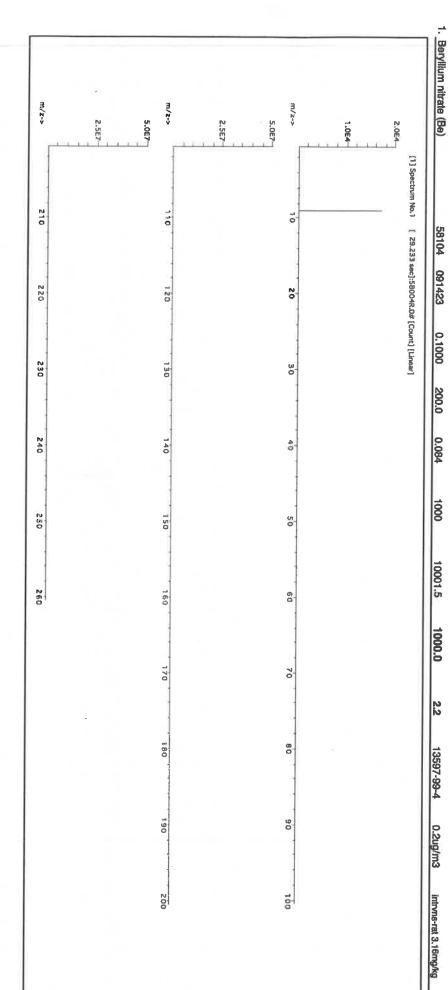
Pedro L. Rentas

102523

Reviewed By:

Pipette (mL) Conc. (µg/mL) Conc. (µg/mL) Conc. (µg/mL) Final +/- (µg/mL) Uncertainty Expanded CAS# (Solvent Safety Info. On Attached pg.) OSHA PEL (TWA) SDS Information LD50 NIST SRM

₹



Part # 57004





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800-368-1131



# Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

40.02 Cd 40.02 Dy 40.02 Cg 40.02 Br 40.02 Cg 40.02 Br 40.02 Cg 40.02 Gd T Cr 40.02 Gd 40.02 Co 40.02 Gg
40.02 Cd 40.02 40.02 Cc 40.02 40.02 Cc 40.02 7 Cr 40.02 40.02 Cc 40.02 40.02 Cc 40.02 40.02 Cc 40.02 40.02 Cc 40.02
40.02 Cd 40.02 40.02 Cc 40.02 40.02 Cc 40.02 7 Cr 40.02 40.02 Cc 40.02 40.02 Cc 40.02 40.02 Cc 40.02 40.02 Cc 40.02
40.02 40.02 40.02 40.02 40.02 40.02
a B B B B S B

(T) = Target analyte

## Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

### Certified by:



All standard containers are meticulously cleaned prior to use.

2 of 2

<sup>\*</sup> The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.

<sup>\*</sup> Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.

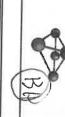
Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above). Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated.

All Standards should be stored with caps tight and under appropriate laboratory conditions. Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

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## Certified Reference Material CRM



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# CERTIFIED WEIGHT REPORT:

Part Number:

57050 071123 Tin (Sn) 202109 Salvents: 21110221 Lot # 1224 Nitric Acid

22D0562008

Hydrochloric acid

3 6% 10.0 30.0 Hydrochloric acid Nitric Acid Formulated By:

Benson Chan

071123

Nominal Concentration (µg/mL):

1000

Ambient (20 °C) 071126

Recommended Storage:

Expiration Date:

Description: Lot Number:

Reviewed By: Pedro L. Rentas

Weight shown below was diluted to (mL): **NIST Test Number: BTU9** 499.93 0.058 Flask Uncertainty 5E-05 Balance Uncertainty 071123

1. Ammonium hexafluorostannate(IV) (Sn) [1] Spectrum No.1 IN010 SND042023A1 RM# Number ρţ Conc. (µg/mL) Nominal 1000 (%) Uncertainty Assay
Purity (%) (%) 0.10 44.2 1.13107 Weight (g) Target 1.13286 Weight (g) Conc. (ug/ml.) Actual 1001.6 Actual +/- (µg/mL) Uncertainty Expanded 2.0 CAS# SDS Information
(Solvent Safety Info. On Attached pg.)
LD50 7 mg/m3 ₹ 3161a SRM

m/z-> ---x/m --Z/111 2.5E4 5.0E4 1.0ES 2.0E6 2.5E5 S.OEG 210 110 0 120 220 N [ 15.034 sec]:58150.D# [Count] [Linear] 230 130 8 240 140 40 250 150 Ö 160 260 60 170 70 180 80 190 90 200 100

1 of 2

Part # 57050

Lot # 071123

# Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

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(I) = larget analyte

## Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

\* Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in \* The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated. the preparation of all standards.

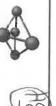
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\* Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

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CERTIFIED WEIGHT REPORT:						Fot#	Solvent:						
Part Number:		57027				24002546	Nitric Acid			2			
Lot Number: Description:		091923 Cobalt (Co)	ī						C fam	) may	D.		
1						2.0%	40.0	Nitric Acid	Formulated By:	Lawr	Lawrence Barry	091923	
Expiration Date:		091926					(Jw.)		1	\	0		
Recommended Storage:		Ambient (20 °C)	<b>်</b>						N.	X			
Nominal Concentration (ug/ml.):		1000							Leens	1	4		
NIST Test Number:		eUTB		5E-05	Balance Uncertainty	<b>\$</b>			Reviewed By:	Pedn	Pedro L. Rentas	091923	
Volume shown below was diluted to (mL):	r was dilute	d to (mL):	2000.02	0.058	0.058 Flask Uncertainty								
									Expanded	S	SDS Information		
	Part	ĕ	Dilution	Initial	Uncertainty	Nominal	Initial	Final	Uncertainty	(Solvent Sal	(Solvent Safety Info. On Attached pg.)	hed pg.)	NIST
Compound	Number	Number	Factor	Vol. (mL)	Vol. (ml.) Pipette (ml.) Conc. (µg/ml.)	nc. (ug/mL)	Conc. (µg/mL) Conc. (µg/mL) +/- (µg/mL)	Conc. (µg/ml.)		CAS# OSHA	OSHA PEL (TWA)	LDSO	SRM

[1] Speatrum No.1									Sulfill too willing	0110
	[ 34.243 8ec	34.243 sec]:58027.D# [Count] [Linear]	[Count] [Lit	Lagr						
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m/z-> 10 20		. <b>4</b>	9	<u>.</u>	20	80	0		00	
5.0E7										
TVZ-> 110 120	130	140	150	100	170	180		0	500	
5.0E7										

1 of 2

260

250

240

230

220

010

W/z->

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# Certified Reference Material CRM





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# Instrumental Analysis by Inductively Coupled Plasma Mass Spectroscopy (ICP-MS):

							Trace M	etals	Verifical	tion	by ICP-M	4S (F	g/mL)						
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(T)= Target analyte

## Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.



<sup>\*</sup> The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated. \* Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.



Lot # 091923

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# Certified Reference Material CRM

M5801



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CERTIFIED WEIGHT REPORT: 1. Arsenic (As) Compound Nominal Concentration (µg/mL): M/2-> m/z-> -z/m 5.OE4 2.5E4 Recommended Storage: 1.0E5 2.0ES 1000 Volume shown below was diluted to (mL): 500 **NIST Test Number: Expiration Date:** Part Number: Description: Lot Number: [1] Spectrum No.1 210 110 0 58133 Number Part **SUTB** 1000 111326 57033 111323 Ambient (20 °C) Arsenic (As) 020522 Number 120 D D ONN NO [ 34.433 sec]:57033.D# [Count] [Linear] 0.1000 4000.0 Dilution Factor 230 130 30 Vol. (mL) 5E-05 400.0 initial 0.06 Pipette (mL) Conc. (µg/mL) Flask Uncertainty Balance Uncertainty Uncertainty 240 140 40 0.084 24002546 Nominal 2.0% Lot # 100 250 160 50 Conc. (µg/mL) Conc. (µg/mL) Nitric Acid 10001.0 Solvent: Initial 80.0 260 160 60 Nitric Acid 1000.0 Fina 170 0 Formulated By: Reviewed By: +/- (µg/ml.) Uncertainty Expanded 2.0 180 Thomas 80 7440-38-2 (Solvent Safety Info. On Attached pg.) 190 OSHA PEL (TWA) Pedro L. Rentas Lawrence Barry 90 SDS Information 0.5 mg/m3 100 000 orl-rat 500 mg/kg LD50 111323 111323 3103a NIST SRM

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# Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

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## Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:



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Part # 57033

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## Certified Reference Material CRM

M.5814

https://Absolutestandards.com ANAB ISO 17034 Accredited AR-1539 Certificate Number

071123

NIST SRM

071123

CERTIFIED WEIGHT REPORT: 1. Boric acid (B) Nominal Concentration (µg/mL): Recommended Storage: 17/Z-V <-Z/111 m/z-> Weight shown below was diluted to (mL): 2.5EG 5.0E6 2.5E6 S.OE6 1.0E4 2.0≡4 **NIST Test Number: Expiration Date:** Part Number: Lot Number: Description: [1] Spectrum No.1 110 1210 0 IN018 BV092016A1 RM# 57005 071123 1000 Ambient (20 °C) 071126 Boron (B) Number Ĕ 120 220 Ŋ [ 12.275 sec]:58105.D# [Count] [Linear] Conc. (µg/mL) 1999.48 Nominal 9 R - 02 00 124 130 230 30 0.058 Flask Uncertainty Purity 5E-05 Balance Uncertainty 8 Uncertainty Assay Purity (%) 0.10 140 240 40 Solvent: MKBQ8597V Ammonium hydroxide 17.3 2.0% 3 11.55772 Weight (g) 150 Target 250 (I) O 40.0 Weight (g) Ammonium hydroxide 11.56201 Actual 200 160 60 Conc. (µg/mL) 1000.4 Actual 170 70 Formulated By: +/- (µg/mL) Reviewed By: Uncertainty Expanded 120 180 10043-35-3 80 CAS# (Solvent Safety Info. On Attached pg.)
# OSHA PEL (TWA) LD50 Benson Chan Pedro L. Rentas OSHA PEL (TWA) tento **SDS Information** 190 90 2 mg/m3 200 100 orl-rat 2660 mg/kg 3107

https://Absolutestandards.com ANAB ISO 17034 Accredited AR-1539 Certificate Number

Instrumental Analysis by Inductively Coupled Plasma Mass Spectroscopy (ICP-MS):

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	40.02 40.02 40.02 40.02 40.02		
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Target analyte	X Y P Z Q Z Z	ation	
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	Sen R.	-MS	
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	Z		
	4400 4400 4400 4400 4400 4400 4400 440		
		_	

## Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

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## Certified Reference Material CRM

https://Absolutestandards.com ANAB ISO 17034 Accredited AR-1539 Certificate Number

CERTIFIED WEIGHT REPORT:

Part Number: Lot Number: Description:

> 57015 091123

Solvent: 24002546 Lot # Nitric Acid

Nitric Acid

Formulated By:

Lawrence Barry

091123

(JE) 40.0

2%

Nominal Concentration (µg/mL):

**NIST Test Number:** 

BITUB 1000 Recommended Storage:

**Expiration Date:** 

091126

Phosphorous (P)

Ambient (20 °C)

Weight shown below was diluted to (mL):

2000.02

0.058 Flask Uncertainty

5E-05 Balance Uncertainty

Lot

Nominal

Purity

Uncertainty Assay

Target

Actual

Uncertainty

Expanded

**SDS** information

Reviewed By:

Pedro L. Rentas

rento

091123

 Ammonium dihydrogen phosphate (P) IN008 Pvos2018A1 [1] Spectrum No.1 RM# Number [ 12.074 sec]:58115.D# [Count] [Linear] Conc. (µg/mL) 1000 99.999 3 Purity (%) 0.10 27.5 3 Weight (g) 7.2729 Weight (g) Conc. (µg/mL) 7.2730 1000.0 +/- (µg/mL) 2.0 7722-76-1 CAS# (Solvent Safety Info. On Attached pg.)
# OSHA PEL (TWA) LD50 5 mg/m3 rl-rat >2000mg/ki 3186 SRM

000

100

1000

500

Part # 57015



https://Absolutestandards.com ANAB ISO 17034 Accredited AR-1539 Certificate Number

# Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

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	Zr	2	7	<u>~</u>	16	\$	\ -		9	*				
	40.02	20.02	3	20.02	70.0>	3	<u>6</u> 0.02		A) (2)	20.02				

## Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- \* The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated. 
  \* Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- \* All standard containers are meticulously cleaned prior to use.
- \* Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- \* Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated.
- \* All Standards should be stored with caps tight and under appropriate laboratory conditions.

  \* Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST

  \* Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

Sodium Chloride, Crystal BAKER ANALYZED® A.C.S. Reagent







Material No.: 3624-01

Batch No.: 0000281938

Manufactured Date: 2021-06-07

Retest Date: 2026-06-07

Revision No.: 1

### Certificate of Analysis

Test	Specification	Result
Assay (NaCl) (by Ag titrn)	≥ 99.0 %	100.0 %
pH of 5% Solution at 25°C	5.0 - 9.0	6.3
Insoluble Matter	≤ 0.005 %	0.003 %
lodide (I)	≤ 0.002 %	< 0.002 %
Bromide (Br)	≤ 0.01 %	< 0.01 %
Chlorate and Nitrate (as NO <sub>3</sub> )	≤ 0.003 %	< 0.001 %
ACS - Phosphate (PO <sub>4</sub> )	≤ 5 ppm	< 5 ppm
Sulfate (SO <sub>4</sub> )	≤ 0.004 %	< 0.004 %
Barium (Ba)	Passes Test	Passes Test
ACS - Heavy Metals (as Pb)	≤ 5 ppm	< 5 ppm
ron (Fe)	≤ 2 ppm	< 1 ppm
Calcium (Ca)	≤ 0.002 %	< 0.001 %
Magnesium (Mg)	≤ 0.001 %	< 0.001 %
Potassium (K)	≤ 0.005 %	0.001 %

For Laboratory, Research, or Manufacturing Use Meets Reagent Specifications for testing USP/NF monographs Country of Origin: USA

Packaging Site: Paris Mfg Ctr & DC



Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com



## Certified Reference Material CRM

M5962 R! 06/14/24



ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com

m/z->		i,	m/z->		10 c	÷ is	1. Selenium (Se)	Compound		<		Nominal Co	Re			CERTIFIED WEIGHT REPORT	מדודודה שובום
210	1.008	2.008	110	1.008	/z-> 10	[1] Spectrum No.1				Volume shown below was diluted to (mL):	NIST Test Number:	Nominal Concentration (µg/mL):	Recommended Storage:	1	Lot Number: Description:	Part Number:	1 11000H
0			0		Ū	Z	58134	Number	Part	as dilute					in in in	_	
220			120		N 0	r.	071223	Number	Lot	d to (mL):	6UTB	1000	Ambient (20 °C)		060624 Selenium (Se)	57034	
Ŋ			<u></u>		ω	3.702	0.1000	Factor	Dilution	2000.07			<u>೦</u>		Se)		
230			130		90	sec]:58	200.0	Val. (mL	Initial	0.100	5E-05						
240			140		40	33.702 sec]:58034.D# [Count] [Linear]	0.084	Vol. (mL) Pipette (mL) Conc. (µg/mL)	Uncertainty	Flask Uncertainty	Balance Uncertainty						
250			150		50	Count) [L	1000	Conc. (µg/mL)	Nominal	ťγ	ainty			2.0%	24007540	24002546	
260			160		. 60	inear 2	10002.5	Conc. (µg/mL	Initial				(mL)	40.0	Zin Zin	Solvent:	
0							1000.0	Conc. (µg/mL) Conc. (µg/mL)	Final					Nitric Acid			(1)
			170		70		2.2	.) +/- (µg/mL)	Uncertainty	Expanded	Reviewed By:	K	N	Formulated By:	M		10
			180		80		7782-49-2	C	(So		y:	200	11	Ву:			
			190		90		2 0.2 mg/m3	OSHA PEL (TWA)	(Solvent Safety Info. On Attached pg.)	SDS Information	Pedro L. Rentas	lenco		Benson Chan	M		
			200		100			NA)	). On Atta	rmation	ntas	,	/	5			
			-		J		orl-rat 6700 mg/kg	LDS0	ched pg.)		060624			060624			
							3149	SRM	NIST		4			4-1		_	

# Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

							I race M	1etals	Verifica	lion	oy ICP-M	S (H	g/mL)						
A	40.02	CQ.	<0.02	Dy	<0.02	HH	<0.02	11	<0.02	Z.	<0.02	Pr	<0.02	Se	H	-T	40.02	W	40,02
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As	<0.2	ზ	<0.02	臣	<0.02	Ħ	<0.02	Mg	<0.01	°	<0.02	Rh	40.02	Ag	<0.02	∄	40.02	۷	<0.02
Ва	<0.02	Ç	<0.02	æ	<0.02	ŀ	<0.02	Mn	<0.02	Pd	40.02	₽.	<0.02	Na	<0.2	Ħ	<0.02	4	<0.02
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В	<0.02	Ω	<0.02	Au	<0.02	Рь	<0.02	M	<0.02	×	40.2	Sc	<0.02	Ta	<0.02	Ħ	<0.02	Zr	<0.02

(T) = Target analyte

## Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- \* The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
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  \* Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

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## Certified Reference Material CRM

M5969 11/24

https://Absolutestandards.com ANAB ISO 17034 Accredited AR-1539 Certificate Number

CERTIFIED WEIGHT REPORT: Part Number:

57016 122923

Lot Number: Description:

Nominal Concentration (µg/mL):

**NIST Test Number:** 

**6UTB** 1000

5E-05 Balance Uncertainty 0.06 Flask Uncertainty

Recommended Storage:

**Expiration Date:** 

122926 Ambient (20 °C)

Sulfur (S)

Weight shown below was diluted to (mL):

4000.0

ğ

Nominal

Purity

Uncertainty Assay

Target

Actual

Actual

Uncertainty Expanded Solvent:

122923

Lot #

ASTM Type 1 Water

Formulated By:

Benson Chan

122923

rento

Pedro L. Rentas

Reviewed By: 122923

SDS Information

1. Ammonium sulfate (S) IN117 SLBR7225V Number Conc. (µg/ml.) 1000 99.9 8 Purity (%) 0.10 24.3 8 Weight (g) 16.4979 Weight (g) Conc. (µg/mL) 16.4980 1000.0 +/- (µg/mL) 20 7783-20-2 CAS# (Solvent Safety Info. On Attached pg.)
# OSHA PEL (TWA) LD50 OSHA PEL (TWA) N orl-rat 4250mg/kg 3181 SRM

-Z/F 17/Z-> H/X-Y 1.0E8 2.5E5 2.5E8 5.0EB 5.0E7 5.0E5 [1] Spectrum No.1 110 210 0 120 220 N O [ 33.603 sec]:57016.D# [Count] [Linear] 130 00 230 140 240 40 150 1000 00 160 260 60 170 0 180 0 190 90 100 000

Part # 57016

CERTIFIED WEIGHT REPORT:
Part Number:
Lot Number: Lithium nitrate (Li) Nominal Concentration (µg/mL): m/z-> Recommended Storage: Volume shown below was diluted to (mL): NIST Test Number: **Expiration Date** [1] Spectrum No.1 [ 32.093 sec]:58003.D# [Count] [Linear] Description: 210 10 Part Lot Number Number 58103 070622 0.1000 57003 062124 Lithium (Li) 6UTB 062127 Ambient (20 °C) 1000 220 120 20 250.11 230 25.0 0.004 Initial Uncertainty Nominal Initial Final

Vol. (mL) Pipette (ml.) Conc. (µg/mL) Conc. (µg/mL) Conc. (µg/mL) 0.016 Flask Uncertainty 5E-05 Balance Uncertainty HEBSON OF PSON 240 40 1000 24002546 Lot# 2.0% 250 150 50 Nitric Acid Solvent: 10000.4 (mL) 260 1000.0 Nitric Acid 7/01/24 Formulated By: Reviewed By: +/- (µg/mL) Uncertainty Giovannie Capacito 2.0 7790-69-4 5 mg/m3 orl-rat 1426 mg/kg NA SDS Information
(Solvent Safety Info. On Attached pg.)
CAS# OSHA PEL (TWA) LD50 Pedro L. Rentas Giovanni Esposito 9 0 062124 062124 SRM

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**\$** 

Certified Reference Material CRM

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ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com

Part # 57003 Lot # 062124

1 of 2

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### Certified Reference Material CRM



ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com

# Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

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ද වූ	3	- 00	3	Eu	먁	Dy			
40.02	3	40.02	40.02	<0.02	<0.02	<0.02			
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Z.	Mo	Hg	Mn	Mg	Li			letals	
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×	7	Þ	Ы	os Os	ß	N		tion	١
<0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	3	y ICP-M	١
Sc	Sm	Ru	Rb	Rh	Re	7	T.	Brl) S	۱
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	20.02	4	/mL)	
Ta	s	Sr	Na	Ag	2	9 5	e	ı	١
<0.02	<0.02	<0.02	40.2	<0.02	20.02	6 8 E	A) 3		I
11	Sn	Tm	H	II	1 10	1	7		I
<0.02	<0.02	<0.02	<0.02	20.02	20.02	3	<0.02		
12	Zn	×	Ϋ́	<	: 0	1	W		
20.02	40.02	<0.02	<0.02	20.02	200	2000	<0.02		

(T) = Target analyte

### Physical Characterization:

Al Sh As Ba Ba Bi

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

	Puri	굺
	Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in	certif
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the preparation of all standards.

\* All standard containers are meticulously cleaned prior to use.

\* All standards on prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).

\* Standards are prepared gravimetrically using balances that are calibrated.

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Part # 57003 Lot # 062124

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2 of 2

### Certificate of Analysis 6652M , 8782M

MORGANIC NE NE SE SEGENE YOU TREST

info@inorganicventures.com P: 800-669-6799/540-585-3030 P: 540-585-3030 R:2/22/24

300 Technology Drive Christiansburg, VA 24073 USA inorganicventures.com



### ACCREDITATION / REGISTRATION

Number QSR-1034). the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Ventures is also an ISO 9001 registered manufacturer (GSR Certificate INORGANIC VENTURES is accredited to ISO 17034, "General Requirements for

### PRODUCT DESCRIPTION

Catalog Number:

Single Analyte Custom Grade Solution Product Code:

CGTN

2% (v/v) HNO3 :xintsM T2-TI719972 Lot Number:

muineill 1 000 hg/mL ea: Value / Analyte(s): tr. HF

Starting Material Lot#: 2094 Starting Material: Ti Metal

Starting Material Purity: 99.9975%

1002 ± 5 µg/mL Certified Value: **CERTIFIED VALUES AND UNCERTAINTIES** 

1.012 g/mL (measured at 20  $\pm$  4 °C) Density:

Assay Information:

ICP Assay NIST SRM 3162a Lot Number: 130925 1002 ± 4 µg/mL Assay Method #1

The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a National Institute of Standards and Technology (NIST) SRM/RM. See Sec 4.2 for balance  $\frac{1}{1000}$ 

Certified Value, X<sub>CRM/RM</sub>, where one method of characterization is used is the mosn of individual results:

XCRANGAM =  $(x_a)$  (ucher a) X =  $x_a$  mass of Keesy Method A with  $x_a$  =  $x_a$  the standard uncertainty of

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expressed at approximately the 95% confidence level using a coverage factor of  $K=\Sigma$ .

Characterization of CRM/RM by One Method Characterization of CRM/RM by Two or More Methods

4.0 TRACEABILITY TO NIST

- All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration

### 4.2 Balance Calibration

used for testing are annually compared to master weights and are traceable to NIST. - All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRWIRMs.

CRM/RMs are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below, solutions tested by ICP-MS were analyzed in an III bA-Bitter of ore each element, is reported below, solutions tested by ICP-MS were analyzed in an III bA-Bitter of the properties of the properties

e2 M 078220.0 > gN O 882000.0 > u3 M 8g < 0.000536 M Eu <

### ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to

Page 2 of 4

INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

> uA M 882000.0

> 9A M 886 0.000.0

> bq M 882000.0 > rq M 888200.0 > rq M 682000.0 > dg M 271100.0

> q O f81200.0 > dq M f82800.0

> iN O 882000.0 > sO M 841200.0

> dN O 322500.0 > N M 862000.0

M - Checked by ICP-MS

Mn < Mg < Li <

> 0H

> 6H

ΉŁ

- For the calibration of analytical instruments and validation of analytical methods as appropriate.

M 976800.0 > 8 i 84500.0 M 576800.0 > 8 M 782600.0

by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

> mT M 882000.0 > U M 882000.0 > V M 682000.0 W M

> 6T M 882000.0 > AT M 882000.0

sT M 034450.0 > dT M E70100.0

s 853000.0 M 882000.0

O.000269 O

O.043560 O

n2 M 068010.0 89Z000.0 > mS M 89Z000.0

> II

JS

674000.0 228610.0

892000.0 892000.0

0.000268

699630.0

0.001341

892000.0

0.010560

960000'0

960000.0

73260.0 > nZ O 402100.0 038540.0 > nZ O 267400.0

### 5.0 TRACE METALLIC IMPURITIES (TMI ) DETERMINED BY ICP-MS AND ICP-OES (µg/ml)

7.7 Storage and Handling Recommendations

oM M 882000.0

0.000268 M K 0.000268 M K 0.000268 M K

0.000872 O Fe > 0.008586 M Ga <

O 892000.0

O S37000.0 M 882000.0

M 882000.0

M 603100.0

M 885800.0

M £83200.0 > 00 M GG8020 O.004577 M Gd <

INTENDED USE

W Et < O Cn <

O B <

IA O

### 4.1 Thermometer Calibration

volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is - This product is traceable to MIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRMINM uncertainty error and the measurement, weighing and

### Page 3 of 4

- Chemical Testing - Accredited / AZLA Certificate Number 863.01

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

- QSR Certificate Number QSR-1034

1.01 ISO 9001 Qualify Management System Registration

### MOITATY STANDARD DOCUMENTATION 0.01

Homogeneity data indicate that the end user should take a minimum ample size of 0.0.2 m L to assume

This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous. The Coth series alongs mirranament to be the Coth of the Coth series alongs mirranament to be the Coth series alongs mirranament.

### HOMOGENEITY

Please refer to the Safety Data Sheet for information regarding this CRWRM.

### NOITAMROANI SUOGRASAH HF Note: This standard should not be prepared or stored in glass.

Ollinger		C INTOTINATION (ICP_OEC n.	Idoseomeni	
ss radial/axial view):	are given	Estimation (ICP-OES D.L.s	Technique/Line	
Interferences (Underline 11 )	Order	idq 41	ICP-MS 48 amu	
Interferences (underlined indicates severe) 32S16O, 32S14N,	A/N	add		
14N160180,				
14N17N2, 36Ar12C,				
48Ca, [96X=2				
7-V001 (no a				
(where X = Zr, Mo, Ru)]		10000 () 1900 ()	ICP-OES 323.452 nm	
Ce, Ar, Ni		Jm/gu Se000.0 \ +200.0	ICP-0ES 334.941 nm	
		m/pu 820000.0 \ 8500.0	ICP-OES 336.121 nm	
ла, Та, Сг, U М М9 Ω-	1 1		F Note: This standar	ŀ
W, Mo, Co		In/gy 4500000 \ cocos-	nous prepries sur secon	٠

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/a

1:1:1 H2O / HF./ H2SO4 or fuse ash with pyrosulfate if oxide is as plastic pigment and likely in brookite Volentily), Oxide - Northere are repetation; and sociation; restore (Dissolved by heating in 1737 HZO / HF / HZSO4); Oxide - Northere history (~800EC) brooklie (fuse in Pt0 with KZSZO7); Ores (fuse in Pt0 with KZZZO7); Ores (fuse in Pt0 with provide it as plastic pigment and likely in brooktie (fuse in Pt0 with provide it as plastic pigment and likely in brooktie TI Containing Samples (Preparation and Solution) - Metal (Soluble in HZO / HF caution -powder reacts

HNO3 / LDPE container. 1-10,000 ppm single element solutions as the Ti(F)6-2 chemically stable for years in 2-5% HNO3 / trace HF in an LDPE container. with a fendency to hydrolyze forming the hydrated oxide in all dilute acids except HE.

Stability - 2-100 ppb levels stable (Alone or mixed with all other metals) as the Ti(F)6-2 for months in 1%

HNO3 / LDPE container. 1-10.000 ppm sincle element solutions as the Ti(F)8-2 chemically stable for year media. Unstable at ppm levels with metals that would pull F-away (i.e. Do not mix with Alkaline or Rare Earths or high levels of transition elements unless they are fluorinated). Stable with most inorganic anions with a tendency to hydrolyze forming the hydrafed oxide in all dilute adds except HF. Chemical Compatibility - Soluble in concentrated HCI, HF, H3PO4 H2SO4 and HNO3. Avoid neutral to basic Atomic Weight, Valence; Coordination Number; Chemical Form in Solution - 47.87 +4 6 Ti(F)6-2

- For more information, visit www.inorganicventures.com/TCT

reported density. Do not pipette from the container. Do not refurn removed aliquots to container. - After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between  $4^{\circ}$  -  $24^{\circ}$  C to minimize the effects of transpiration. Use at  $20^{\circ} \pm 4^{\circ}$  C to minimize volumetric dilution error when using the renorded density. Do not biselfe from the container. Do not return removed alticular to container.

Twitte sociate in the secied 101 beg, trainspleaded for the orderiver in the shalfy concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss. - While stored in the sealed TCT bag, transpiration of this CRWRM is negligible. After opening the sealed TCT bag, transpiration in a negligible in the capture managed in the capture

- Store between approximately  $4^{\circ}$  - 30° C while in sealed TCT bag.

Page 4 of 4

Chairman / Senior Technical Director

- Sealed TCT Bag Open Date:

NAMES AND SIGNATURES OF CERTIFYING OFFICERS

- The date after which this CRM/RM should not be used.

CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

norganic Ventures, 300 Technology Drive, Christiansburg, Va. 24073, USA; Telephone: 800.859.5790; 540.855.3030, Fax: 540.555.3012; Inorga - Reference Material Producer - Accredited / A2LA Certificate Number 883.02 10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- This CRMRM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRMRM being stored and handled in accordance with the instructions given in Sec. 7.1.

stability studies conducted on properly stored and handled CRWRMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability. - The lot expiration date reflects the period of time that the stability of a CRMRM can be supported by long term

- The certification is valid within the measurement uncertainty specified provided the CRWRM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified it instructions in Sec 7.1 are not followed or if the CRWRM is damaged, confaminated, or otherwise modified.

Thomas Kozikowski Manager, Quality Control Certificate Approved By:

thibils Validity

- June 17, 2027 11.2 Lot Expiration Date

June 17, 2022 11.1 Certification Issue Date

Paul Gaines Certifying Officer:

0.Sr

0.11



### Certificate of Analysis

300 Technology Drive Christiansburg, VA 24073 USA inorganicventures.com

### M5985 R:6/14/24

P: 800-669-6799/540-585-3030 F: 540-585-3012 info@inorganicventures.com

### 1.0 ACCREDITATION / REGISTRATION

**INORGANIC VENTURES** is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Ventures is also an ISO 9001 registered manufacturer (QSR Certificate Number QSR-1034).



### 2.0 PRODUCT DESCRIPTION

Product Code:

Single Analyte Custom Grade Solution

Catalog Number:

CGIN10

Lot Number:

U2-IN729349

Matrix:

5% (v/v) HNO3

Value / Analyte(s):

10 000 μg/mL ea:

Indium

Starting Material:

Indium Metal

Starting Material Lot#:

2511

Starting Material Purity:

99.9995%

### 3.0 CERTIFIED VALUES AND UNCERTAINTIES

**Certified Value:** 

 $10022 \pm 30 \mu g/mL$ 

Density:

1.044 g/mL (measured at 20 ± 4 °C)

### **Assay Information:**

Assay Method #1

10021 ± 56 µg/mL

ICP Assay NIST SRM 3124a Lot Number: 110516

Assay Method #2

10035 ± 25 µg/mL

EDTA NIST SRM 928 Lot Number: 928

Assay Method #3

10001 ± 33 µg/mL

Calculated NIST SRM Lot Number: See Sec. 4.2

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a National Institute of Standards and Technology (NIST) SRM/RM. See Sec 4.2 for balance traceability.

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

### Characterization of CRM/RM by Two or More Methods

Certified Value, X<sub>CRM/RM</sub>, where two or more methods of characterization are used is the weighted mean of the results:

### $X_{CRM/RM} = \Sigma(w_i) (X_i)$

X<sub>i</sub> = mean of Assay Method i with standard uncertainty uchar i

w<sub>i</sub> = the weighting factors for each method calculated using the inverse square of

 $w_i = (1/u_{char\ i})^2 / (\Sigma (1/(u_{char\ i})^2)$ 

CRM/RM Expanded Uncertainty (±) =  $U_{CRM/RM} = k \left(u^2_{char} + u^2_{bb} + u^2_{lts} + u^2_{ts}\right)^{1/2}$ 

k = coverage factor = 2

 $u_{char} = [\Sigma((w_i)^2 (u_{char})^2)]^{\frac{1}{2}}$  where  $u_{char}$  i are the errors from each characterization method

ubb = bottle to bottle homogeneity standard uncertainty

u<sub>lts</sub> = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

Certified Value,  $X_{\text{CRM/RM}}$ , where one method of characterization is used is the mean of individual results:

Characterization of CRM/RM by One Method

X<sub>CRM/RM</sub> = (X<sub>a</sub>) (u<sub>char a</sub>)

X<sub>a</sub> = mean of Assay Method A with

uchar a = the standard uncertainty of characterization Method A

CRM/RM Expanded Uncertainty (±) =  $U_{CRM/RM} = k \left(u^2_{chara} + u^2_{bb} + u^2_{lts} + u^2_{ls}\right)^{1/2}$ 

k = coverage factor = 2

u<sub>char a</sub> = the errors from characterization

ubb = bottle to bottle homogeneity standard uncertainty

ults = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

### 4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

### 4.1 Thermometer Calibration

- All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

### 4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

### 4.3 Glassware Calibration

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM/RMs.

### 5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES (µg/mL)

CRM/RMs are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

М	Ag	<	0.000760	М	Eu	<	0.000760	0	Na		0.012771	M	Se	<	0.023000	М	Zn	<	0.006100
М	Al		0.003385	0	Fe		0.004462	М	Nb	<	0.000760	0	Si		0.024619	М	Zr	<	0.000760
М	As	<	0.004600	М	Ga	<	0.000760	М	Nd	<	0.000760	М	Sm	<	0.000760				
М	Au	<	0.002300	М	Gd	<	0.000760	0	Ni	<	0.005100	М	Sn	<	0.000760				
0	В		0.003692	М	Ge	<	0.001600	М	Os	<	0.000760	0	Sr	<	0.000610				
М	Ba	<	0.001600	M	Hf	<	0.000760	n	Р	<		М	Ta	<	0.000760				
0	Be	<	0.000130	M	Hg	<	0.003100	M	Pb		0.001400	М	Tb	<	0.000760				
M	Bi	<	0.000760	М	Но	<	0.000760	М	Pd	<	0.001600	М	Te	<	0.000760				
0	Ca		0.004616	8	In	<		М	Pr	<	0.000760	М	Th	<	0.000760				
M	Cd	<	0.000760	М	lr	<	0.000760	M	Pt	<	0.000760	0	π	<	0.001100				
М	Ce	<	0.000760	0	K		0.007078	М	Rb	<	0.000760	М	TI	<	0.000760				
М	Co	<	0.000760	М	La	<	0.000760	М	Re	<	0.000760	М	Tm	<	0.000760				
0	Сг	<	0.001300	0	Li	<	0.000130	М	Rh	<	0.000760	М	U	<	0.000760				
М	Cs	<	0.000760	М	Lu	<	0.000760	М	Ru	<	0.000760	М	٧	<	0.001600				
М	Cu	<	0.003800	0	Mg		0.000707	n	S	<		М	W	<	0.001600				
М	Dy	<	0.000760	0	Mn		0.000149	M	Sb	<	0.000760	М	Υ	<	0.000760				
М	Er	<	0.000760	М	Мо	<	0.002300	М	Sc	<	0.000760	M	Yb	<	0.000760				

n - Not Checked For s - Solution Standard Element

M - Checked by ICP-MS O - Checked by ICP-OES

i - Spectral Interference

### **INTENDED USE** 6.0

6.1 This standard is intended for the calibration of analytical instruments and validation of analytical methods as appropriate. This CRM may be used in connection with EPA Methods 6010, 6020 (all versions), Standard Methods 3120 B and USP <232> / ICH Q3D.

**6.2** For products attaining traceability through Inorganic Ventures' Primary Certified Reference Materials (PCRM™) see the Limited License to Use PCRM™ in the Inorganic Ventures <u>Terms and Conditions of Sale.</u> <a href="https://www.inorganicventures.com/terms-and-conditions-sale">https://www.inorganicventures.com/terms-and-conditions-sale</a>. The Terms and Conditions contain information on the use of materials traceable to PCRM™ certified reference materials. This Limited License agreement is especially pertinent for laboratories accredited under ISO:17034.

### 7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

### 7.1 Storage and Handling Recommendations

- Store between approximately 4° 30° C while in sealed TCT bag.
- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.
- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between 4° 24° C to minimize the effects of transpiration. Use at 20° ± 4° C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.
- For more information, visit www.inorganicventures.com/TCT

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 114.82 +3 6 In(H2O)6+3 Chemical Compatibility -Soluble in HCl, HNO3, and H2SO4. Avoid neutral and basic media. Stable with most metals and inorganic anions. The oxalate, sulfide, carbonate, hydroxide and phosphate are insoluble in water.

Stability - 2-100 ppb levels stable for months in 1% HNO3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 2-5% HNO3 / LDPE container.

In Containing Samples (Preparation and Solution) -Metal (Best dissolved in HCl / HNO3); Oxide (Soluble in mineral acids); Ores (Carbonate fusion in Pt0 followed by HCl dissolution); Organic Matrices (Sulfuric/peroxide digestion or dry ash and dissolution in dilute HCl).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Interferences (underlined indicates severe)
ICP-MS 115 amu	1 ppt	n/a	115Sn, 99Ru16O
ICP-OES 158.583 nm	0.05 / 0.002 μg/mL	1	
ICP-OES 230.606 nm	0.1 / 0.03 μg/mL	1	Ni, Os
ICP-OES 325.609 nm	0.2 / 0.05 μg/mL	1	Mn, Mo, Th

### 8.0 HAZARDOUS INFORMATION

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.

### 9.0 HOMOGENEITY

- This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous. Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

### 10.0 QUALITY STANDARD DOCUMENTATION

### 10.1 ISO 9001 Quality Management System Registration

QSR Certificate Number QSR-1034

### 10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

### 10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

Inorganic Ventures, 300 Technology Drive, Christiansburg, Va. 24073, USA; Telephone: 800.669.6799; 540.585.3030, Fax: 540.585.3012; Inorganicventures.com; Info@inorganicventures.com

### 11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

### 11.1 Certification Issue Date

February 21, 2023

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

### 11.2 Lot Expiration Date

- February 21, 2028
- The date after which this CRM/RM should not be used.
- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

### 11.3 Period of Validity

0 TOT D 0	na Datas	
- Sealed TCT Bag Ope	en Date:	

- This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.

### 12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Thomas Kozikowski Manager, Quality Control

Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director

20178hi



### Certificate of Analysis

300 Technology Drive Christiansburg, VA 24073 USA inorganicventures.com R:2/22/24 M5-997

P: 800-669-6799/540-585-3030 F: 540-585-3012 info@inorganicventures.com

### 1.0 ACCREDITATION / REGISTRATION

**INORGANIC VENTURES** is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Ventures is also an ISO 9001 registered manufacturer (QSR Certificate Number QSR-1034).



### 2.0 PRODUCT DESCRIPTION

Product Code: Multi Analyte Custom Grade Solution

Catalog Number: CLPP-CAL-3

Lot Number: T2-MEB727800

Matrix: 7% (v/v) HNO3

Value / Analyte(s): 1 000 μg/mL ea:

Arsenic, Lead,

Selenium, Thallium,

500 µg/mL ea: Cadmium

### 3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE	CERTIFIED VALUE	ANALYTE	CERTIFIED VALUE
Arsenic, As	1 000 ± 7 µg/mL	Cadmium, Cd	500.0 ± 2.2 μg/mL
Lead, Pb	1 000 ± 4 µg/mL	Selenium, Se	1 000 ± 6 μg/mL

Thallium, ΤΙ 1 000 ± 7 μg/mL

**Density:** 1.042 g/mL (measured at  $20 \pm 4$  °C)

### **Assay Information:**

ANALYTE As	METHOD ICP Assay	<b>NIST SRM#</b> 3103a	SRM LOT# 100818
As	Calculated		See Sec. 4.2
Cd	ICP Assay	3108	130116
Cd	EDTA	928	928
Pb	ICP Assay	3128	101026
Pb	EDTA	928	928
Se	ICP Assay	3149	100901
TI	ICP Assay	3158	151215

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

### Characterization of CRM/RM by Two or More Methods

Certified Value, X<sub>CRM/RM</sub>, where two or more methods of characterization are used is the weighted mean of the results:

### $X_{CRM/RM} = \Sigma(w_i) (X_i)$

X<sub>i</sub> = mean of Assay Method i with standard uncertainty u<sub>char i</sub>

w<sub>i</sub> = the weighting factors for each method calculated using the inverse square of the variance;

 $w_i = (1/u_{char})^2 / (\Sigma(1/(u_{char})^2))$ 

CRM/RM Expanded Uncertainty (±) =  $U_{CRM/RM} = k (u^2_{char} + u^2_{bb} + u^2_{lts} + u^2_{ts})^{1/2}$ 

k = coverage factor = 2

 $u_{char} = [\Sigma((w_i)^2 (u_{char})^2)]^{1/2}$  where  $u_{char}$  are the errors from each characterization method

ubb = bottle to bottle homogeneity standard uncertainty

ults = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

### Characterization of CRM/RM by One Method

Certified Value, X<sub>CRIMRM</sub>, where one method of characterization is used is the mean of individual results:

XCRM/RM = (Xa) (uchar a)

X<sub>a</sub> = mean of Assay Method A with

uchar a = the standard uncertainty of characterization Method A

CRM/RM Expanded Uncertainty (1) =  $U_{CRM/RM} \approx k \left(u^2_{chara} + u^2_{bb} + u^2_{ts} + u^2_{ts}\right)^{1/2}$ 

k = coverage factor = 2

uchar a = the errors from characterization

u<sub>bb</sub> = bottle to bottle homogeneity standard uncertainty

uits = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

### 4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

### 4.1 Thermometer Calibration

- All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

### 4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

### 4.3 Glassware Calibration

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM/RMs.

### 5.0 TRACE METALLIC IMPURITIES (TMI ) DETERMINED BY ICP-MS AND ICP-OES (μg/mL)

N/A

### 6.0 INTENDED USE

- 6.1 This standard is intended for the calibration of analytical instruments and validation of analytical methods as appropriate. This CRM may be used in connection with EPA Methods 6010, 6020 (all versions), Standard Methods 3120 B and USP <232> / ICH Q3D.
- **6.2** For products attaining traceability through Inorganic Ventures' Primary Certified Reference Materials (PCRM™) see the Limited License to Use PCRM™ in the Inorganic Ventures <u>Terms and Conditions of Sale.</u>

  <a href="https://www.inorganicventures.com/terms-and-conditions-sale">https://www.inorganicventures.com/terms-and-conditions-sale</a>. The Terms and Conditions contain information on the use of materials traceable to PCRM™ certified reference materials. This Limited License agreement is especially pertinent for laboratories accredited under ISO:17034.

### 7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

### 7.1 Storage and Handling Recommendations

- Store between approximately 4° 30° C while in sealed TCT bag.
- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.
- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between 4° 24° C to minimize the effects of transpiration. Use at  $20^{\circ} \pm 4^{\circ}$  C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.
- For more information, visit www.inorganicventures.com/TCT

### 8.0 HAZARDOUS INFORMATION

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.

### 9.0 HOMOGENEITY

- This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous. Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

### 10.0 QUALITY STANDARD DOCUMENTATION

### 10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

### 10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

### 10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

Inorganic Ventures, 300 Technology Drive, Christiansburg, Va. 24073, USA; Telephone: 800.669.6799; 540.585.3030, Fax: 540.585.3012; inorganic

### 11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

### 11.1 Certification Issue Date

December 21, 2022

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

### 11.2 Lot Expiration Date

- December 21, 2027
- The date after which this CRM/RM should not be used.
- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

### 11.3 Period of Validity

<ul> <li>Sealed TCT Bag Open Date:</li> </ul>	
-----------------------------------------------	--

### 12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

**Certificate Approved By:** 

Thomas Kozikowski Manager, Quality Control DD9784.

**Certifying Officer:** 

Paul Gaines Chairman / Senior Technical Director

<sup>-</sup> This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.

Sulfuric Acid
BAKER INSTRA-ANALYZED® Reagent
For Trace Metal Analysis
Low Selenium





Material No.: 9673-33

Batch No.: 23D2462010 Manufactured Date: 2023-03-22

Retest Date: 2028-03-20

Revision No.: 0

### Certificate of Analysis

Test	Specification	Result
ACS - Assay (H2SO4)	95.0 - 98.0 %	96,1 %
Appearance	Passes Test	Passes Test
ACS - Color (APHA)	≤ 10	5
ACS – Residue after Ignition	≤ 3 ppm	< 1 ppm
ACS - Substances Reducing Permanganate (as SO2)	≤ 2 ppm	< 2 ppm
Ammonium (NH <sub>4</sub> )	≤ 1 ppm	1 ppm
Chloride (CI)	≤ 0.1 ppm	< 0.1 ppm
Nitrate (NO₃)	≤ 0.2 ppm	< 0.1 ppm
Phosphate (PO4)	≤ 0.5 ppm	< 0.1 ppm
Trace Impurities – Aluminum (Al)	≤ 30.0 ppb	< 5.0 ppb
Arsenic and Antimony (as As)	≤ 4.0 ppb	< 2.0 ppb
Trace Impurities – Boron (B)	≤ 10.0 ppb	8.5 ppb
Trace Impurities – Cadmium (Cd)	≤ 2.0 ppb	< 0.3 ppb
Trace Impurities - Chromium (Cr)	≤ 6.0 ppb	< 0.4 ppb
Trace Impurities - Cobalt (Co)	≤ 0.5 ppb	< 0.3 ppb
Trace Impurities - Copper (Cu)	≤ 1.0 ppb	< 0.1 ppb
Trace Impurities - Gold (Au)	≤ 10.0 ppb	0.5 ppb
Heavy Metals (as Pb)	≤ 500.0 ppb	< 100.0 ppb
Trace Impurities - Iron (Fe)	≤ 50.0 ppb	1.3 ppb
Trace Impurities - Lead (Pb)	≤ 0.5 ppb	< 0.5 ppb
Trace Impurities - Magnesium (Mg)	≤ 7.0 ppb	0.8 ppb
Trace Impurities – Manganese (Mn)	≤ 1.0 ppb	< 0.4 ppb
Trace Impurities – Mercury (Hg)	≤ 0.5 ppb	< 0.1 ppb
Trace Impurities - Nickel (Ni)	≤ 2.0 ppb	0.3 ppb
Trace Impurities – Potassium (K)	≤ 500.0 ppb	< 2.0 ppb
Trace Impurities - Selenium (Se)	≤ 50.0 ppb	< 0.1 ppb
Trace Impurities – Silicon (Si)	≤ 100.0 ppb	31.5 ppb
Trace Impurities – Silver (Ag)	≤ 1.0 ppb	< 0.3 ppb

>>> Continued on page 2 >>>

Sulfuric Acid
BAKER INSTRA-ANALYZED® Reagent
For Trace Metal Analysis
Low Selenium





Material No.: 9673-33 Batch No.: 23D2462010

Test	Specification	Result
Trace Impurities - Sodium (Na)	≤ 500.0 ppb	5.4 ppb
Trace Impurities – Strontium (Sr)	≤ 5.0 ppb	< 0.2 ppb
Trace Impurities – Tin (Sn)	≤ 5.0 ppb	< 0.8 ppb
Trace Impurities – Zinc (Zn)	≤ 5.0 ppb	0.4 ppb

For Laboratory, Research, or Manufacturing Use

Country of Origin: USA

Packaging Site: Phillipsburg Mfg Ctr & DC





300 Technology Drive Christiansburg, VA 24073 USA

inorganicventures.com

Certificate of Analysis

M6074

M6075 M6076 M6077

P: 800-669-6799/540-585-3030 F: 540-585-3012 info@inorganicventures.com

EXP. 9/6/2029

### 1.0 ACCREDITATION / REGISTRATION

**INORGANIC VENTURES** is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Ventures is also an ISO 9001 registered manufacturer (QSR Certificate Number QSR-1034).



### 2.0 PRODUCT DESCRIPTION

Product Code:

Multi Analyte Custom Grade Solution

Catalog Number:

CHEM-CLP-4

Lot Number:

V2-MEB746762

Matrix:

3% (v/v) HNO3

3% (v/v) HF

Value / Analyte(s):

1 000 µg/mL ea:

Boron,

Molybdenum,

Silicon,

Tin,

Titanium

### 3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE Boron, B **CERTIFIED VALUE** 

ANALYTE Molybdenum, Mo **CERTIFIED VALUE** 

1 000 ± 5 μg/mL

Silicon, Si

1 000 ± 5 μg/mL 1 000 ± 7 μg/mL

Tin, Sn

1 000 ± 5 µg/mL

Titanium, Ti

1 000 ± 6 µg/mL

Density:

1.033 g/mL (measured at 20  $\pm$  4 °C)

### **Assay Information:**

ay imormation.			
ANALYTE	METHOD	NIST SRM#	SRM LOT#
В	ICP Assay	3107	190605
В	Calculated		See Sec. 4.2
Мо	ICP Assay	traceable to 3134	U2-MO739068
Si	ICP Assay	Traceable to 3150	S2-S1702546
Sn	ICP Assay	3161a	140917
Ti	ICP Assay	traceable to 3162a	T2-TI725816

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

### Characterization of CRM/RM by Two or More Methods

Certified Value, X<sub>CRM/RM</sub>, where two or more methods of characterization are used is the weighted mean of the results:

### $X_{CRM/RM} = \Sigma(w_i) (X_i)$

X<sub>i</sub> = mean of Assay Method i with standard uncertainty u<sub>char i</sub>

w<sub>i</sub> = the weighting factors for each method calculated using the inverse square of the variance:

 $w_i = (1/u_{char i})^2 / (\Sigma(1/(u_{char i})^2))$ 

CRM/RM Expanded Uncertainty (±) =  $U_{CRM/RM} = k (u^2_{char} + u^2_{bb} + u^2_{lts} + u^2_{ts})^{1/2}$ 

k = coverage factor = 2

 $u_{char} = [\Sigma((w_i)^2 (u_{char})^2)]^{\frac{1}{2}}$  where  $u_{char}$  i are the errors from each characterization method

ubb = bottle to bottle homogeneity standard uncertainty

ults = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

### Characterization of CRM/RM by One Method

Certified Value, X<sub>CRW/RM</sub>, where one method of characterization is used is the mean of individual results:

X<sub>CRM/RM</sub> = (X<sub>a</sub>) (u<sub>char a</sub>)

X<sub>a</sub> = mean of Assay Method A with

uchar a = the standard uncertainty of characterization Method A

CRM/RM Expanded Uncertainty (2) =  $U_{CRM/RM} = k (u_{chara}^2 + u_{bb}^2 + u_{its}^2 + u_{ts}^2)^{1/2}$ 

k = coverage factor = 2

uchar a = the errors from characterization

ubb = bottle to bottle homogeneity standard uncertainty

uits = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

### 4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

### 4.1 Thermometer Calibration

- All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

### 4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

### 4.3 Glassware Calibration

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM/RMs.

### TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES (µg/mL) 5.0

### **INTENDED USE** 6.0

- 6.1 This standard is intended for the calibration of analytical instruments and validation of analytical methods as appropriate. This CRM may be used in connection with EPA Methods 6010, 6020 (all versions), Standard Methods 3120 B and USP <232> / ICH Q3D.
- 6.2 For products attaining traceability through Inorganic Ventures' Primary Certified Reference Materials (PCRM™) see the Limited License to Use PCRM™ in the Inorganic Ventures Terms and Conditions of Sale. https://www.inorganicventures.com/terms-and-conditions-sale. The Terms and Conditions contain information on the use of materials traceable to PCRM™ certified reference materials. This Limited License agreement is especially pertinent for laboratories accredited under ISO:17034.

### 7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

### 7.1 Storage and Handling Recommendations

- Store between approximately 4° 30° C while in sealed TCT bag.
- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.
- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between  $4^{\circ}$   $24^{\circ}$  C to minimize the effects of transpiration. Use at  $20^{\circ} \pm 4^{\circ}$  C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.
- For more information, visit www.inorganicventures.com/TCT HF Note: This standard should not be prepared or stored in glass.

### 8.0 HAZARDOUS INFORMATION

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.

### 9.0 HOMOGENEITY

- This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous. Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

### 10.0 QUALITY STANDARD DOCUMENTATION

### 10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

### 10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

### 10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

Inorganic Ventures, 300 Technology Drive, Christiansburg, Va. 24073, USA; Telephone: 800.669,6799; 540.585.3030, Fax: 540.585.3012; inorganicventures.com; info@inorganicventures.com

### 11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

### 11.1 Certification Issue Date

September 06, 2024

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

### 11.2 Lot Expiration Date

- September 06, 2029
- The date after which this CRM/RM should not be used.
- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

### 11.3 Period of Validity

<ul> <li>Sealed TCT</li> </ul>	Bag Open Date:	

- This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.

Paul R Sains

### 12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Joseph Burns Custom VS Manager

**Certifying Officer:** 

Paul Gaines Chairman / Senior Technical Director

www.absolutestandards.com

Part Number:

Lot Number:



ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com

CERTIFIED WEIGHT REPORT:

Formulated By: Diovannie Giovanni Esposito 2 Septe 101124

Pedro L. Rentas

101124

Recommended Storage: **Expiration Date:** Description: 101124

Manganese (Mn)

Ambient (20 °°)

Manganese (20 °°) 1000

Nominal Concentration (µg/mL): Weight shown below was diluted to (mL): **NIST Test Number:** ETUB ត្ត 4000.2 Nominal 0.10 Flask Uncertainty 5E-05 Balance Uncertainty Purity Uncertainty Assay Target Actual Actual Reviewed By: Uncertainty Expanded (Solvent Safety Info. On Attached pg.)

RM#

Number

Conc. (µg/mL)

8

Purity (%)

8

Weight (g)

Weight (g) Conc. (µg/ml.)

+/- (µg/mL)

CAS#

OSHA PEL (TWA)

LD50

SRM NIST T SDS Information

 Manganese(II) nitrate hydrate (Mn) IN031 MNM082020A1 1000 99.999 0.10 20.8 19.2322 19.2344 1000.1 2. 0 15710-66-4 5 mg/m3 orl-rat >300mg/kg 3132

m/z->	5.0E7	1.0E8	5.0E7	1.0E8	7-2/2	N UI	5. OE6
							[1] 88
0		110			0		[1] Spectrum No.1
			•				NO.1
N N O		120			0		و
230		100			30		1.243
ō		Ō					ec]:57(
N 40		140			40		[ 34.243 sec]:57025.D# [Count] [Linear]
							Coun
N D		150			6		tj (Line
N O		300			<b>0</b>		2
J		J					
		170			70		
		-			Ó		
		0			80		
		90			0		
		N 0	on.		100		



ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com

## Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

Г							Trace Me	etals	Verifica	tion	by ICP-	SM	(µg/mL)						
A	40.02	2	40.02	Dγ	40.02	H	<0.02	<u>E</u>	<0.02	Z	<0.02	꾸	<0.02	Se	40.2	<u>4</u>	<0.02	*	<0.02
dS	<0.02	ರಿ	<0.2	뎍	<0.02	Н	<0.02	Ę	40.02	ş	<0.02	Re	<0.02	ž.	40.02	Te	<0.02	c	<0.02
As	40.2	င္ပ	40.02	띹	<0.02	In	<0.02	Mg	40.01	0°	<0.02	쫑	<0.02	A	8,02	1	<0.02	<	40.02
Ba	40.02	ς,	<0.02	ନୁ	40.02	F.	40.02	Mn	H	Pd	<0.02	<b>&amp;</b>	40.02	Z	40,2	1	<0.02	충	<b>&lt;</b> 0.02
Ве	40.01	ប៉	40.02	ଦ୍ମ	40.02	7,	40.2	Hg	<0.2	Þ	<0.02	Ru	40.02	Sr	0.02	Tm	<0.02	×	<0.02
Bi	0.02	ဝ	<0.02	ନ୍ମ	40.02	La	<0.02	Mo	40.02	7	40.02	Sm	<0.02	S	A.02	Sn	<0.02	Zn	<b>60.02</b>
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	×	40.2	S	<0.02	Ta	40.02	크	<0.02	Zr	<0.02
									}										

(T) = Target analyte

### Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

### Certified by:

Jon T. Mills

- \* The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- \* Purified acids, 18.2 megohm delonized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- \* All standard containers are meticulously cleaned prior to use.
- \* Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- \* Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated.
- \* All standards should be stored with caps tight and under appropriate laboratory conditions.
- \* Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



### Certificate of Analysis

300 Technology Drive Christiansburg, VA 24073 USA inorganicventures.com

M6137

P: 800-669-6799/540-585-3030 F: 540-585-3012 info@inorganicventures.com

### 1.0 ACCREDITATION / REGISTRATION

INORGANIC VENTURES is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Ventures is also an ISO 9001 registered manufacturer (QSR Certificate Number QSR-1034).



### 2.0 PRODUCT DESCRIPTION

Product Code:

Single Analyte Custom Grade Solution

Catalog Number:

CGSI1

Lot Number:

V2-SI744713

Matrix:

tr. HNO3

tr. HF

Value / Analyte(s):

1 000 µg/mL ea:

Silicon

Starting Material:

Silica

Starting Material Lot#:

1771

Starting Material Purity:

99.9981%

### 3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Value:

999 ± 6 µg/mL

Density:

1.003 g/mL (measured at 20 ± 4 °C)

### **Assay Information:**

Assay Method #1

999 ± 5 µg/mL

ICP Assay NIST SRM Traceable to 3150 Lot Number: S2-Si702546

Assay Method #2

1000 ± 7 µg/mL

Calculated NIST SRM Lot Number: See Sec. 4.2

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a National Institute of Standards and Technology (NIST) SRM/RM. See Sec 4.2 for balance traceability.

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

### Characterization of CRM/RM by Two or More Methods

Certified Value, X<sub>CRM/RM</sub>, where two or more methods of characterization are used is the weighted mean of the results:

### $X_{CRM/RM} = \Sigma(w_i) (X_i)$

 $\mathbf{X_i}$  = mean of Assay Method  $\mathbf{i}$  with standard uncertainty  $\mathbf{u}_{char}$   $\mathbf{i}$  $\mathbf{w}_{i}$  = the weighting factors for each method calculated using the inverse square of the variance:

 $w_i = (1/u_{char i})^2 / (\Sigma (1/(u_{char i})^2)$ 

CRM/RM Expanded Uncertainty (±) =  $U_{CRM/RM} = k (u^2_{char} + u^2_{bb} + u^2_{its} + u^2_{bs})^{1/2}$ 

k = coverage factor = 2

 $u_{char} = [\Sigma((w_i)^2 (u_{char})^2)]^{\frac{1}{2}}$  where  $u_{char}$  are the errors from each characterization method ubb = bottle to bottle homogeneity standard uncertainty

ults = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

### Characterization of CRM/RM by One Method

Certified Value, X<sub>CRM/RM</sub>, where one method of characterization is used is the mean of individual results:

 $X_{CRM/RM} = (X_a) (u_{char a})$ 

X, = mean of Assay Method A with

uchar a = the standard uncertainty of characterization Method A

CRM/RM Expanded Uncertainty (±) =  $U_{CRM/RM} = k (u_{chara}^2 + u_{bb}^2 + u_{its}^2 + u_{ts}^2)^{1/2}$ 

k = coverage factor = 2

uchar a = the errors from characterization

u<sub>bb</sub> = bottle to bottle homogeneity standard uncertainty ults = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

### 4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

### 4.1 Thermometer Calibration

 All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

### 4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

### 4.3 Glassware Calibration

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM/RMs.

### TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES (µg/mL) 5.0

CRM/RMs are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

M	Ag	<	0.000310	M	Eu	<	0.000310	0	Na		0.001656	M	Se	<	0.022000	М	Zn	<	0.002500
M	Al		0.010787	M	Fe	<	0.027000	M	Nb	<	0.001300	s	Si	<		0	Zr	<	0.001900
М	As	<	0.001900	М	Ga	<	0.001300	M	Nd	<	0.000310	М	Sm	<	0.000310				
М	Au	<	0.000910	М	Gd	<	0.000310	M	Ni	<	0.005500	М	Sn		0.000096				
M	В		0.016180	M	Ge	<	0.001900	M	Os	<	0.000610	0	Sr		0.000092				
M	Ba		0.000096	M	Hf		0.000423	i	Р	<		M	Ta		0.002542				
0	Be	<	0.000570	M	Hg	<	0.000610	M	Pb	<	0.000310	М	Tb	<	0.000310				
M	Bi	<	0.000310	М	Но	<	0.000610	М	Pd	<	0.000610	M	Te	<	0.000910				
0	Ca		0.011557	M	ln	<	0.000310	M	Pr	<	0.000310	M	Th	<	0.001900				
M	Cd	<	0.000310	M	lr	<	0.000310	M	Pt	<	0.000310	М	Ti		0.001078				
M	Ce	<	0.000610	0	K		0.000577	M	Rb	<	0.009100	М	TI	<	0.000310				
M	Co	<	0.001600	M	La	<	0.000310	M	Re	<	0.000310	М	Tm	<	0.000310				
М	Cr	<	0.010000	0	Li	<	0.000460	М	Rh	<	0.000310	М	U	<	0.000310				
М	Cs	<	0.000310	M	Lu	<	0.000310	M	Ru	<	0.000310	0	V	<	0.001300				
М	Cu	<	0.002500	0	Mg		0.001348	0	S	<	0.570000	М	W	<	0.001900				
М	Dу	<	0.000310	М	Mn	<	0.002500	M	Sb	<	0.000310	M	Υ	<	0.000310				
M	Er	<	0.000310	M	Мо	<	0.000310	0	Sc	<	0.000590	M	Yb	<	0.000310				

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

### 6.0 **INTENDED USE**

6.1 This standard is intended for the calibration of analytical instruments and validation of analytical methods as appropriate. This CRM may be used in connection with EPA Methods 6010, 6020 (all versions), Standard Methods 3120 B and USP <232> / ICH Q3D.

6.2 For products attaining traceability through Inorganic Ventures' Primary Certified Reference Materials (PCRM™) see the Limited License to Use PCRM™ in the Inorganic Ventures <u>Terms and Conditions of Sale</u>, <a href="https://www.inorganicventures.com/terms-and-conditions-sale">https://www.inorganicventures.com/terms-and-conditions-sale</a>. The Terms and Conditions contain information on the use of materials traceable to PCRM™ certified reference materials. This Limited License agreement is especially pertinent for laboratories accredited under ISO:17034.

### 7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

### 7.1 Storage and Handling Recommendations

- Store between approximately 4° 30° C while in sealed TCT bag.
- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.
- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between  $4^{\circ}$   $24^{\circ}$  C to minimize the effects of transpiration. Use at  $20^{\circ} \pm 4^{\circ}$  C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.

### - For more information, visit www.inorganicventures.com/TCT

Atomic Welght; Valence; Coordination Number; Chemical Form in Solution - 28.09 +4 6 Si(OH)x(F)y2-Chemical Compatibility -Soluble in HCl, HF, H3PO4 H2SO4 and HNO3 as the Si(OH)x(F)y2-. Avoid neutral to basic media. Unstable at ppm levels with metals that would pull F- away (i.e. Do not mix with Alkaline or Rare Earths, or high levels of transition elements unless they are fluorinated. Stable with most inorganic anions with a tendency to hydrolyze forming silicic acid (silicic acid is soluble up to ∼100 ppm in water) in all dilute acids

Stability - 2-100 ppb levels - stability unknown - (alone or mixed with all other metals) as the Si(OH)x(F)y2-. 1-10,000 ppm single element solutions as the Si(OH)x(F)y2- chemically stable for years in 2-5 % HNO3 / trace HF in a LDPE container.

Si Containing Samples (Preparation and Solution) -Metal (Soluble in 1:1:1 H2O / HF / HNO3); Oxide - SiO2, amorphic (dissolve by heating in 1:1:1 H2O / HF / HNO3); Oxide - quartz (fuse in Pt0 with Na2CO3); Geological Samples(fuse in Pt0with Na2CO3 followed by HCI solution of the fuseate); Organic Matrices containing silicates and non volatile silicon compounds (dry ash at 4500C in Pt0 and dissolve by gently warming with 1:1:1 H2O / HF / H2SO4 or fuse / ash with Na2CO3 and dissolve fuseate with HCI / H2O); Silicone Oils - dimethyl silicones depolymerize to form volatile monomer units when heated (Measure directly in alcoholic KOH / xylene mixture where sample is treated first with the KOH at 60-1000C to "unzip" the Si- O-Si polymeric structure or digest with conc. H2SO4 / H2O2 followed by cooling and dissolution of the dehydrated silica with HF.) Note that the direct analysis of silicone oils in an organic solvent will result in false high results due to high vapor pressure of volatile monomer units like hexamethylcyclotrisiloxane. The KOH forms the K2+Si(CH3)2O= salt which is not volatile at room temperature.

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

	•		
Technique/Line	Estimated D.L.	Order	Interferences (underlined indicates severe)
ICP-MS 28 amu	4000 - 8000 ppt	N/A	N2, 12C16O
ICP-OES 212.412 nm	0.02/0.01 µg/mL	1	Hf, Os, Mo, Ta
ICP-OES 251.611 nm	0.012/0.003 µg/mL	1	Ta, U, Zn, Th
ICP-OES 288.158 nm	0.03/0.004 µg/mL	1	Ta, Ce, Cr, Cd, Th

HF Note: This standard should not be prepared or stored in glass.

### 8.0 HAZARDOUS INFORMATION

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.

### 9.0 HOMOGENEITY

- This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous. Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

### **QUALITY STANDARD DOCUMENTATION** 10.0

### 10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

### 10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

### 10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

Reference Material Producer - Accredited / A2LA Certificate Number 883.02

Inorganic Ventures, 300 Technology Drive, Christiansburg, Va. 24073, USA; Telephone: 800.669.6799; 540.585.3030, Fax: 540.585.3012; inorganicventures.com; info@inorganicventures.com

### 11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

### 11.1 Certification Issue Date

July 10, 2024

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

### 11.2 Lot Expiration Date

- July 10, 2029
- The date after which this CRM/RM should not be used.
- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

### 11.3 Period of Validity

- This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.

### NAMES AND SIGNATURES OF CERTIFYING OFFICERS 12.0 Certificate Prepared By:

**Uyen Truong** Custom Processing Supervisor

Mayyand Man
Paul R. Laine

### Certificate Approved By:

Muzzammil Khan Stock Laboratory Supervisor

**Certifying Officer:** 

**Paul Gaines** Chairman / Senior Technical Director



ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com

CERTIFIED WEIGHT REPORT: Part Number:	58120	<b>₹</b>	R-1/13/25		Solvent: 2	Lot # 24012496	Nitric Acid						
Lot Number: Description:	121824 Calcium (Ca)	(Ca)							Ž.	iovannie	Especto		
Expiration Date: Recommended Storage: Nominal Concentration (uc/mL):	121827 Ambient (20 °C) 10000	(0, 0			5%	80.0 (mL)	Nitric Acid		Formulated By:	# N %	Giovanni Esposito	121824	
NIST Test Number:	6UTB		5E-05 B	5E-05 Balance Uncertainty	ainty				Reviewed By:		Pedro L. Rentas	121824	
Weight shown below was diluted to (mL):	diluted to (mL):	4000.1	0.15 Ft	0.15 Flask Uncertainty	Į.			9					
	Lot	Nominal	Purity	Purity Uncertainty Assay	Assay	Target	Actual	Actual	Expanded Uncertainty	vios)	Solvent Safety Info. On Attached pg.)	on ttached pg.)	NIST
	RM# Number	Conc. (µg/mL)	(%)	Purity (%)	(%)	Weight (g)	Weight (g)	Conc. (µg/mL)	(Jm/grl) -/+	CAS#	OSHA PEL (TWA)	LD50	SRM
1. Calcium carbonate (Ca)	INO14 CADO32023B3	10000	88.888	0.10	39.9	100.2537	100.2677	10001.4	20.0	471-34-1	5 mg/m3	orl-rat >2000mg/kg	3109a
[1] Spectrum No.1		[ 12.514 sec]:58120.D# [Count] [Linear]	sec]:56	1120.D#	Cou	int] [Line	ar]						
2.0E4													
1.0后4													
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Lot # 121824

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Absolute Standards, Inc.

www.absolutestandards.com

800-368-1131



# Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

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Q.02         Ca         T         Er         Q.02         Ho         Q.02         Lu         Q.02         Nb         Q.02         Re         Q.02         Re         Q.02         Re         Q.02         Te           Q.02         Ca         Q.02         Eu         Q.02         Ir         Q.02         Ma         Q.02         Re         Q.02         Re         Q.02         Tr         Q.02         Tr         Q.02         Tr         Q.02         Re         Q.02         Re         Q.02         Tr         Q.02         Tr         Q.02         Re         Q.02         Re         Q.02         Tr         Q.02         Tr         Q.02         Re         Q.02         Tr          Q.02         Ca         Q.02         Ca         Ca         Q.02         Re	P	<0.02	25	<0.02	Dy	<0.02	H	<0.02	Fi	<0.02	ź	<0.02	দ	<0.02	Se	<0.2	TP	<0.02	<b>M</b>	<0.02
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(T) = Target analyte

### Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.





<sup>\*</sup> The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.

Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.

<sup>\*</sup> Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above). All standard containers are meticulously cleaned prior to use.

<sup>\*</sup> Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated.

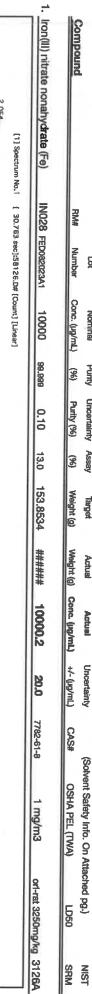
<sup>&#</sup>x27;All standards should be stored with caps tight and under appropriate laboratory conditions.

<sup>\*</sup> Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

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CERTIFIED WEIGHT REPORT: Lot#

Nominal Concentration (µg/mL): Recommended Storage: Weight shown below was diluted to (mL): NIST Test Number: **Expiration Date:** Part Number: Description: Lot Number: 58126 011025 Iron (Fe) **8TB** 10000 011028 Ambient (20 °C) 2000.07 R->1/18/25 M6140 0.100 Flask Uncertainty 5E-05 Balance Uncertainty Solvent: 22% 24012496 40.0 Nitric Acid Nitric Acid Reviewed By: Formulated By: Expanded Pedro L. Rentas Benson Chan SDS Information 011025 011025



Q

Nominal

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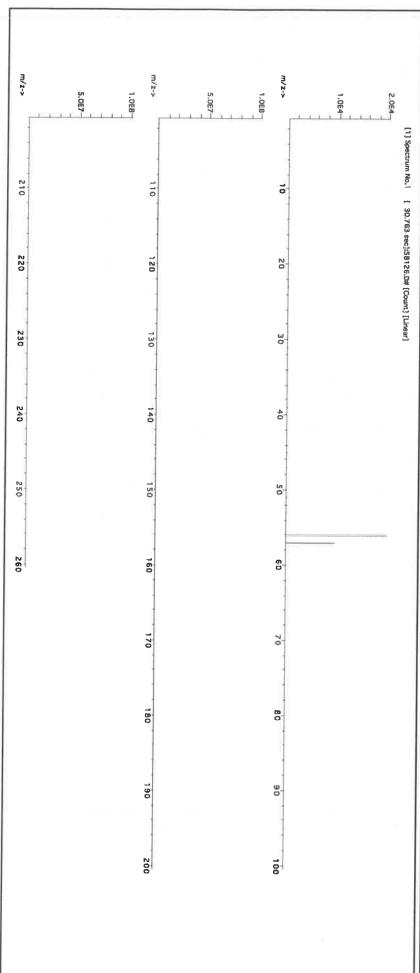
Uncertainty

Target

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https://Absolutestandards.com ANAB ISO 17034 Accredited AR-1539 Certificate Number

## Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

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(T)= Target analyte

### Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard

Certified by:

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  \* Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

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## Certified Reference Material CRM

ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com

CERTIFIED WEIGHT REPORT: 1. Potassium nitrate (K) Compound Nominal Concentration (µg/mL): Weight shown below was diluted to (mL): Recommended Storage: **NIST Test Number: Expiration Date:** Part Number: Lot Number: Description: IN034 KD062022A1 BTU9 57119 103024 Potassium (K) M6141 10000 103027 Ambient (20 °C) Number 5 Conc. (µg/mL) 4000.1 10000 716142 Nominal R->1/13/25 0.15 Flask Uncertainty 99.999 5E-05 Balance Uncertainty Purity 8 Uncertainty Purity (%) 0.10 Solvent: 24002546 Assay 37.7 E 2% Weight (g) 106.1040 Target 80.0 Lot # Nitric Acid Nitric Acid ###### Weight (g) Conc. (µg/mL) Actual 10001.1 Actual Reviewed By: Formulated By: +/- (µg/mL) Uncertainty Expanded 20.0 Tieranie. 7757-79-1 CAS# (Solvent Safety Info. On Attached pg.) Pedro L. Rentas Giovanni Esposito からからかん OSHA PEL (TWA) **SDS Information** 5 mg/m3 orl-rat 3750 mg/kg 3141a LD50 103024 103024 SRM NIST

m/z->	Ø000	m/z->	1.0E5	m/z->	1.0E6	2.0E6
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https://Absolutestandards.com ANAB ISO 17034 Accredited AR-1539 Certificate Number

## Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

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	×	7	P	Pd	õ	B	Z	I	ation	I
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	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		( <i>µ</i> g/mL)	
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	Ti	Sn	Im	H	1	Te	Тb			I
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(i) = larget analyte

### Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard

Certified by:

- \* The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
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  \* Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994)

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## Certified Reference Material CRM



ANAB ISO 17034 Accredited AR-1539 Certificate Number https:///Absolutestandards.com

CERTIFIED WEIGHT REPORT: 1. Sodium nitrate (Na) Neminal Concentration (µg/mL): Recommended Storage: Weight shown below was diluted to (mL): m/z-> m/z-> M/X-Y NIST Test Number: 2.5E6 5.0E6 2.500 5.0E6 2.5E5 5.0E5 **Expiration Date:** Part Number: Lot Number: Description: [1] Spectrum No.1 210 110 IN036 NAV01201511 0 RM# **6UTB** 072427 58111 072424 10000 Ambient (20 °C) Sodium (Na) Number Lot 120 220 NO [ 8.935 sec]:58111.D# [Count] [Linear] Conc. (µg/mL) 10000 4000.2 Nominal M6144 R->1/13/2 Solvent: 130 30 99.999 5E-05 Balance Uncertainty Purity 0.10 Flask Uncertainty (96) Uncertainty Assay Purity (%) 0.10 240 140 4 26.9 8 2% 24002546 Nitric Acid 148.7096 Weight (g) Target (mL) 250 150 50 ###### Weight (g) Conc. (µg/mL) Nitric Acid Actual 160 260 0 10000.0 Actual 170 70 +/- (µg/mL) Uncertainty Reviewed By: Formulated By: Expanded 20.0 7631-99-4 180 80 CAS# (Solvent Safety Info. On Attached pg.) Pedro L. Rentas Benson Chan OSHA PEL (TWA) **SDS** Information 180 90 5 mg/m3 200 100 orl-rat 3430 mg/kg 3152a 072424 072424 TSIN MES.

Printed: 1/10/2025, 4:48:22 PM

1 of 2

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## Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

ĺ	B	<u>B</u>	Be	Ba	As	Sb	≥	9		
	<0.02	<0.02	10.0>	<0.02	40.2	<0.02	<0.02			
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	<0.02	<0.02	<0.02	<0.02	<0.02	40.2	<0.02			
l	Au	ဂ္ဂ	ନ୍ଥ	<u>ਨ</u>	Eu	E)	Дy			
	△0.02	<0.02	<0.02	△0.02	<0.02	40.02	<0.02	STATE OF STREET		
	Pb	La	Fe	F	In	Но	Hf			
	<0.02	<0.02	<0.2	<0.02	<0.02	<0.02	<0.02		Trace M	
	N.	Mo	Hg	Mn	Mg	L	Ш		etals	
	<0.02	40.02	40.2	<0.02	<0.01	<0.02	<0.02		Verifica	
	×	7	Þ	Pd	0°	ğ	Z.		tion	
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	Sc	Sm	Ru	Rb	Rh	Re	Pr		ES (III	
	<0.02	<0.02	<0.02	<0.02	<0.02	40.02	<0.02		g/mL)	
	Ta	S	Sr	Z	Ag	S:	%			
	<0.02	<0.02	△0.02	Т	<0.02	<0.02	40.2			
	11	Sn	Tm	Ħ	1	Te	41	i		
	<0.02	△0.02	<0.02	<0.02	40.02	<0.02	<0.02			
	Zr	Zn	۲	\$	<	C	W			
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(T) = Target analyte

### Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

\* The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.

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Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).

Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated.

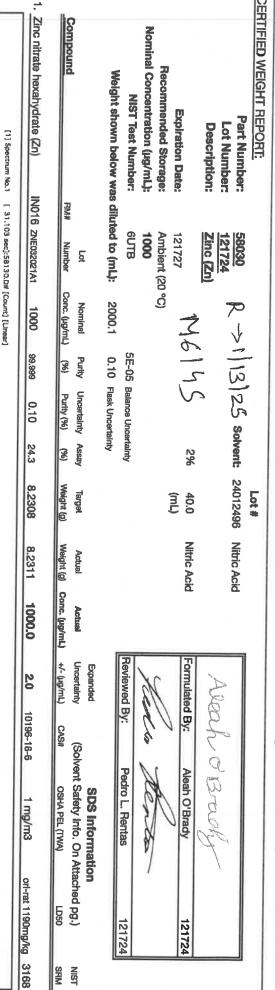
All Standards should be stored with caps tight and under appropriate laboratory conditions.

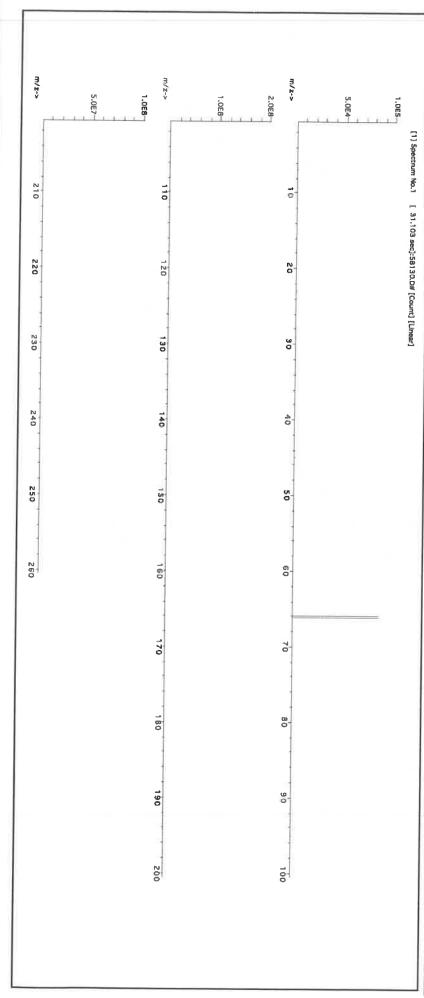
Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

Part # 58111

ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com

## Www.absolutestandards.com CERTIFIED WEIGHT REPORT:





Part # 58030



## Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

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7,		2		>		1	40.00	-	10.6	27.7	10.4	70	20.02	Ca	20.02	Z.	10.0	Be
ped		B	20.02	S	A) (72	Z ::	3	0	3	5	5	5	3	>		2		
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(T) = Target analyte

### Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard

Certified by:

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Part # 58030

Hydrochloric Acid, 36.5-38.0% BAKER INSTRA-ANALYZED® Reagent For Trace Metal Analysis





M6151

R-> 1/15/25

Material No.: 9530-33

Batch No.: 22G2862015 Manufactured Date: 2022-06-15

Retest Date: 2027-06-14

Revision No.: 0

### Certificate of Analysis

Test	Specification	Result
ACS - Assay (as HCI) (by acid-base titrn)	36.5 - 38.0 %	
ACS - Color (APHA)	50.5 - 36.0 % ≤ 10	37.9 %
ACS - Residue after Ignition	≤ 3 ppm	5
ACS - Specific Gravity at 60°/60°F		< 1 ppm
ACS – Bromide (Br)	1.185 - 1.192	1.191
ACS - Extractable Organic Substances	≤ 0.005 %	< 0.005 %
ACS - Free Chlorine (as Cl2)	≤ 5 ppm	< 1 ppm
Phosphate (PO <sub>4</sub> )	≤ 0.5 ppm	< 0.5 ppm
Sulfate (SO <sub>4</sub> )	≤ 0.05 ppm	< 0.03 ppm
Sulfite (SO₃)	≤ 0.5 ppm	< 0.3 ppm
Ammonium (NH <sub>4</sub> )	≤ 0.8 ppm	0.3 ppm
Trace Impurities - Arsenic (As)	≤ 3 ppm	< 1 ppm
Trace Impurities - Aluminum (AI)	≤ 0.010 ppm	< 0.003 ppm
Arsenic and Antimony (as As)	≤ 10.0 ppb	1.3 ppb
Trace Impurities - Barium (Ba)	≤ 5.0 ppb	< 3.0 ppb
Trace Impurities - Beryllium (Be)	≤ 1.0 ppb	0.2 ppb
Trace Impurities - Bismuth (Bi)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Boron (B)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities - Cadmium (Cd)	≤ 20.0 ppb	< 5.0 ppb
Trace Impurities - Calcium (Ca)	≤ 1.0 ppb	< 0.3 ppb
	≤ 50.0 ppb	163.0 ppb
Trace Impurities - Chromium (Cr)	≤ 1.0 ppb	0.7 ppb
Trace Impurities - Cobalt (Co)	≤ 1.0 ppb	< 0.3 ppb
Trace Impurities - Copper (Cu)	≤ 1.0 ppb	< 0.1 ppb
Trace Impurities – Gallium (Ga)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Germanium (Ge)	≤ 3.0 ppb	< 2.0 ppb
Frace Impurities – Gold (Au)	≤ 4.0 ppb	0.6 ppb
Heavy Metals (as Pb)	≤ 100 ppb	< 50 ppb
Frace Impurities – Iron (Fe)	≤ 15 ppb	6 ppb

>>> Continued on page 2 >>>

Hydrochloric Acid, 36.5-38.0% BAKER INSTRA-ANALYZED® Reagent For Trace Metal Analysis





Material No.: 9530-33 Batch No.: 22G2862015

Test	Specification	Result
Trace Impurities – Lead (Pb)	≤ 1.0 ppb	< 0.5 ppb
Trace Impurities - Lithium (Li)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Magnesium (Mg)	≤ 10.0 ppb	2.9 ppb
Trace Impurities - Manganese (Mn)	≤ 1.0 ppb	< 0.4 ppb
Trace Impurities – Mercury (Hg)	≤ 0.5 ppb	0.1 ppb
Trace Impurities – Molybdenum (Mo)	≤ 10.0 ppb	< 3.0 ppb
Trace Impurities - Nickel (Ni)	≤ 4.0 ppb	< 0.3 ppb
Trace Impurities - Niobium (Nb)	≤ 1.0 ppb	0.8 ppb
Trace Impurities - Potassium (K)	≤ 9.0 ppb	< 2.0 ppb
Trace Impurities - Selenium (Se), For Information Only		< 1.0 ppb
Trace Impurities - Silicon (Si)	≤ 100.0 ppb	< 10.0 ppb
Trace Impurities - Silver (Ag)	≤ 1.0 ppb	0.5 ppb
Trace Impurities – Sodium (Na)	≤ 100.0 ppb	2.3 ppb
Trace Impurities – Strontium (Sr)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Tantalum (Ta)	≤ 1.0 ppb	1.6 ppb
Trace Impurities – Thallium (TI)	≤ 5.0 ppb	< 2.0 ppb
Trace Impurities – Tin (Sn)	≤ 5.0 ppb	4.0 ppb
Trace Impurities – Titanium (Ti)	≤ 1.0 ppb	1.5 ppb
Trace Impurities – Vanadium (V)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Zinc (Zn)	≤ 5.0 ppb	0.8 ppb
Frace Impurities – Zirconium (Zr)	≤ 1.0 ppb	0.3 ppb

Hydrochloric Acid, 36.5-38.0% BAKER INSTRA-ANALYZED® Reagent For Trace Metal Analysis





Material No.: 9530-33 Batch No.: 22G2862015

Test

Specification

Result

For Laboratory, Research, or Manufacturing Use Product Information (not specifications): Appearance (clear, fuming liquid) Meets ACS Specifications Storage Condition: Store below 25 °C.

Country of Origin: USA Packaging Site: Phillipsburg Mfg Ctr & DC







R-02/02/2025

M-6158

Material No.: 9606-03 Batch No.: 24D1062002

Manufactured Date: 2024-03-26

Retest Date: 2029-03-25 Revision No.: 0

### Certificate of Analysis

Assay (HNOs) Appearance Appearance Appearance Passes Test Passes Test Passes Test Color (APHA) Residue after Ignition Chloride (Cl) Phosphate (PO4) Sulfate (SO4) Sulfate (SO4) Arsenic and Antimony (as As) Arsenic iand Antimony (as As) Arsenic iand Antimony (as As) Arsenic iand Antimony (as As) Arsenic and Antimony (as As) Arsenic and Interest is Barium (Ba) Arsenic iand Interest	Test	Specification	Result
Appearance Color (APHA)  Residue after Ignition  Chloride (Cl)  Phosphate (POa)  Sulfate (SOa)  Trace Impurities - Barium (Ba)  Trace Impurities - Cobalt (Co)  Trace Impurities - Lead (Pb)  Trace Impur	Assay (HNO3)		
Second Capera	Appearance		
Residue after Ignition	Color (APHA)		
Chloride (Cf)  Phosphate (PO <sub>4</sub> )  Sulfate (SO <sub>4</sub> )  Sulfate (SO <sub>4</sub> )  Trace Impurities – Aluminum (AI)  Arsenic and Antimony (as As)  Trace Impurities – Beryllium (Ba)  Trace Impurities – Beryllium (Be)  Trace Impurities – Beryllium (Be)  Trace Impurities – Boron (B)  Trace Impurities – Cadrium (Cd)  Trace Impurities – Cadrium (Cd)  Trace Impurities – Cadrium (Ca)  Trace Impurities – Cobalt (Co)  Trace Impurities – Cobalt (Co)  Trace Impurities – Cobalt (Co)  Trace Impurities – Copper (Cu)  Trace Impurities – Gallium (Ga)  Trace Impurities – Gold (Au)  Expressible 10.0 ppb  Trace Impurities – Gold (Au)  Expressible 10.0 ppb  Trace Impurities – Color (Fe)  Trace Impurities – Color (Fe)  Trace Impurities – Color (Fe)  Trace Impurities – Color (Au)  Expressible 10.0 ppb  Trace Impurities – Color (Au)  Expressible 10.0 ppb  Trace Impurities – Color (Fe)  Trace Impurities – Color (Fe)  Trace Impurities – Lithium (Li)  Expressible 10.0 ppb  Trace Impurities – Manganese (Mn)  Expressible 10.0 ppb  Trace Impurities – Manganese (Mn)  Frace Impurities – Nickel (Ni)	Residue after Ignition		5
Phosphate (PO <sub>4</sub> )         ≤ 0.10 ppm         < 0.03 ppm	Chloride (CI)		1 ppm
Sulfate (SO <sub>4</sub> ) ≤ 0.2 ppm < 0.2 ppm  Trace Impurities - Aluminum (AI) ≤ 40.0 ppb < 1.0 ppb  Arsenic and Antimony (as As) ≤ 5.0 ppb < 2.0 ppb  Trace Impurities - Barium (Ba) < 10.0 ppb < 1.0 ppb  Trace Impurities - Beryllium (Be) < 10.0 ppb < 1.0 ppb  Trace Impurities - Bismuth (Bi) < 20.0 ppb < 10.0 ppb  Trace Impurities - Boron (B) < 10.0 ppb < 5.0 ppb  Trace Impurities - Cadmium (Cd) < 50 ppb < 1 ppb  Trace Impurities - Calcium (Ca) < 50.0 ppb < 1.0 ppb  Trace Impurities - Chromium (Cr) < 30.0 ppb < 1.0 ppb  Trace Impurities - Chromium (Cr) < 30.0 ppb < 1.0 ppb  Trace Impurities - Cobalt (Co) < 10.0 ppb < 1.0 ppb  Trace Impurities - Copper (Cu) < 10.0 ppb < 1.0 ppb  Trace Impurities - Gallium (Ga) < 10.0 ppb < 1.0 ppb  Trace Impurities - Gold (Au) < 20 ppb < 10 ppb  Trace Impurities - Gold (Au) < 20 ppb < 100 ppb  Trace Impurities - Lithium (E) < 10.0 ppb < 1.0 ppb  Trace Impurities - Lithium (Li) < 10.0 ppb < 1.0 ppb  Trace Impurities - Lithium (Li) < 10.0 ppb < 1.0 ppb  Trace Impurities - Lithium (Li) < 10.0 ppb < 1.0 ppb  Trace Impurities - Mangaese (Mn) < 10.0 ppb < 1.0 ppb	Phosphate (PO <sub>4</sub> )		< 0.03 ppm
Trace Impurities - Aluminum (AI)       ≤ 40.0 ppb       < 1.0 ppb	Sulfate (SO <sub>4</sub> )	• •	< 0.03 ppm
Arsenic and Antimony (as As)	Trace Impurities - Aluminum (AI)		
Trace Impurities - Barium (Ba)       ≤ 10.0 ppb       < 1.0 ppb		• •	• •
Trace Impurities – Beryllium (Be)  Trace Impurities – Bismuth (Bi)  Trace Impurities – Boron (B)  Trace Impurities – Cadmium (Cd)  Trace Impurities – Cadmium (Cd)  Trace Impurities – Calcium (Ca)  Trace Impurities – Chromium (Cr)  Trace Impurities – Chromium (Cr)  Trace Impurities – Cobalt (Co)  Trace Impurities – Cobalt (Co)  Trace Impurities – Copper (Cu)  Trace Impurities – Copper (Cu)  Trace Impurities – Gallium (Ga)  Trace Impurities – Gallium (Ga)  Trace Impurities – Gold (Au)  Trace Impurities – Gold (Au)  Express of the substitute of the			
Trace Impurities – Bismuth (Bi)		• •	< 1.0 ppb
Trace Impurities – Boron (B)			< 1.0 ppb
Trace Impurities - Cadmium (Cd)  Frace Impurities - Calcium (Ca)  Frace Impurities - Chromium (Cr)  Frace Impurities - Chromium (Cr)  Frace Impurities - Cobalt (Co)  Frace Impurities - Copper (Cu)  Frace Impurities - Callium (Ga)  Frace Impurities - Gallium (Ga)  Frace Impurities - Germanium (Ge)  Frace Impurities - Gold (Au)  Frace Impurities - Gold (Au)  Frace Impurities - Fron (Fe)  Frace Impurities - Lead (Pb)  Frace Impurities - Lithium (Li)  Frace Impurities - Magnesium (Mg)  Frace Impurities - Manganese (Mn)  Frace Impurities - Nickel (Ni)			• •
Trace Impurities – Calcium (Ca)		• •	< 5.0 ppb
Trace Impurities - Chromium (Cr)  Trace Impurities - Cobalt (Co)  Trace Impurities - Copper (Cu)  Trace Impurities - Copper (Cu)  Trace Impurities - Gallium (Ga)  Trace Impurities - Garmanium (Ge)  Trace Impurities - Gold (Au)  Heavy Metals (as Pb)  Trace Impurities - Iron (Fe)  Trace Impurities - Lead (Pb)  Trace Impurities - Lead (Pb)  Trace Impurities - Lithium (Li)  Trace Impurities - Magnesium (Mg)  Trace Impurities - Magnesium (Mg)  Trace Impurities - Manganese (Mn)  Trace Impurities - Magnesium (Mg)  Trace Impurities - Manganese (Mn)  Trace Impurities - Nickel (Ni)		• ,	< 1 ppb
Trace Impurities – Cobalt (Co)			2.3 ppb
Trace Impurities - Copper (Cu)  Trace Impurities - Gallium (Ga)  Trace Impurities - Germanium (Ge)  Trace Impurities - Gold (Au)  Example 10.0 ppb			< 1.0 ppb
Trace Impurities – Gallium (Ga)  Trace Impurities – Germanium (Ge)  Trace Impurities – Gold (Au)  Heavy Metals (as Pb)  Trace Impurities – Iron (Fe)  Trace Impurities – Lead (Pb)  Trace Impurities – Lead (Pb)  Trace Impurities – Lithium (Li)  Trace Impurities – Magnesium (Mg)  Trace Impurities – Magnese (Mn)  Trace Impurities – Nickel (Ni)		• •	< 1.0 ppb
Trace Impurities – Germanium (Ge)  Trace Impurities – Gold (Au)  Heavy Metals (as Pb)  Trace Impurities – Iron (Fe)  Trace Impurities – Lead (Pb)  Trace Impurities – Lead (Pb)  Trace Impurities – Lithium (Li)  Trace Impurities – Magnesium (Mg)  Trace Impurities – Magnesium (Mg)  Trace Impurities – Manganese (Mn)  Trace Impurities – Nickel (Ni)  Trace Impurities – Nickel (Ni)		• •	< 1.0 ppb
Trace Impurities – Gold (Au)  4 20 ppb  5 ppb  6 5 ppb  7 Trace Impurities – Iron (Fe)  6 40.0 ppb  6 20.0 ppb  7 Trace Impurities – Lithium (Li)  6 10.0 ppb  7 Trace Impurities – Magnesium (Mg)  7 Trace Impurities – Manganese (Mn)  7 Trace Impurities – Manganese (Mn)  7 Trace Impurities – Mickel (Ni)	· •		< 1.0 ppb
Heavy Metals (as Pb)    Second Policy   Second Policy		• • •	< 10 ppb
Trace Impurities – Iron (Fe)  \$\leq\$ 40.0 ppb \$\leq\$ 40.0 ppb \$\leq\$ 20.0 ppb \$\leq\$ 20.0 ppb \$\leq\$ 10.0 ppb \$\leq\$ 10.0 ppb \$\leq\$ 10.0 ppb \$\leq\$ 10.0 ppb \$\leq\$ 20 ppb \$\leq\$ 20 ppb \$\leq\$ 10.0 ppb \$\leq\$ 20 ppb \$\leq\$ 20 ppb \$\leq\$ 21 ppb			< 5 ppb
Trace Impurities – Lead (Pb)  ≤ 20.0 ppb  ≤ 20.0 ppb  < 10.0 ppb  < 10.0 ppb  < 1.0 ppb		• •	100 ppb
Frace Impurities – Lithium (Li)  Frace Impurities – Magnesium (Mg)  Frace Impurities – Manganese (Mn)  Frace Impurities – Manganese (Mn)  Frace Impurities – Nickel (Ni)  Frace Impurities – Nickel (Ni)		• •	< 1.0 ppb
Frace Impurities – Magnesium (Mg)  Frace Impurities – Manganese (Mn)  ≤ 20 ppb  ≤ 1.0 ppb  < 1 ppb  < 1.0 ppb  < 1.0 ppb		• •	< 10.0 ppb
Frace Impurities – Manganese (Mn) ≤ 10.0 ppb < 1.0 ppb			< 1.0 ppb
race Impurities - Nickel (Ni)			< 1 ppb
≤ 20.0 ppb < 5.0 ppb		• •	< 1.0 ppb
	THERET (INI)	≤ 20.0 ppb	< 5.0 ppb

>>> Continued on page 2 >>>





Material No.: 9606-03 Batch No.: 24D1062002

Test	Specification	D 1
Trace Impurities – Niobium (Nb)		Result
Trace Impurities – Potassium (K)	≤ 50.0 ppb	< 1.0 ppb
Trace Impurities – Silicon (Si)	≤ 50 ppb	16 ppb
	≤ 50 ppb	< 10 ppb
Trace Impurities – Silver (Ag)	≤ 20.0 ppb	< 1.0 ppb
Trace Impurities - Sodium (Na)	≤ 150.0 ppb	
Trace Impurities - Strontium (Sr)	≤ 30.0 ppb	< 5.0 ppb
Trace Impurities – Tantalum (Ta)		< 1.0 ppb
Trace Impurities – Thallium (TI)	≤ 10.0 ppb	< 5.0 ppb
Trace Impurities – Tin (Sn)	≤ 10.0 ppb	< 5.0 ppb
	≤ 20.0 ppb	< 10.0 ppb
Trace Impurities – Titanium (Ti)	≤ 10.0 ppb	< 1.0 ppb
Frace Impurities – Vanadium (V)	≤ 10.0 ppb	
Frace Impurities – Zinc (Zn)	≤ 20.0 ppb	< 1.0 ppb
race Impurities – Zirconium (Zr)		< 1.0 ppb
Particle Count – 0.5 µm and greater	≤ 10.0 ppb	< 1.0 ppb
Particle Count – 1.0 µm and greater	≤ 60 par/mi	10 par/ml
and greater	≤ 10 par/ml	3 par/ml

Nitric Acid 69% **CMOS** 





Material No.: 9606-03 Batch No.: 24D1062002

Test Specification Result

For Microelectronic Use

Country of Origin: USA Packaging Site: Phillipsburg Mfg Ctr & DC

Jamie Croak Director Quality Operations, Bioscience Production





M-6162

R. Date & 0412712025

Material No.: 9606-03 Batch No.: 24H0162012 Manufactured Date: 2024-06-28

Retest Date: 2029-06-27 Revision No.: 0

### Certificate of Analysis

Assay (HNOs) Appearance Passes Test Passes Test Passes Test Color (APHA)  Residue after Ignition  S 2 ppm  Chloride (Cl)  Choride (Cl)  Choride (SOa)  Sulfate (SOa)  Sulfate (SOa)  Arsenic and Antimony (as As)  Trace Impurities - Barlum (Ba)  Trace Impurities - Barlum (Ba)  Trace Impurities - Barlum (Cd)  Trace Impurities - Barlum (Cd)  Trace Impurities - Coper (Cu)  Trace Impurities - Coper (Cu)  Trace Impurities - Coper (Cu)  Trace Impurities - Cold (Au)  Frace Impurities - Gold (Au)  Frace Impurities - Iron (Fe)  Trace Impurities - Iron (Fe)  Trace Impurities - Lind must (Magnesium	Test	Specification	Result
Appearance Color (APHA)	Assay (HNO3)	69.0 - 70.0 %	69.7 %
Color (APHA)       ≤ 10       5         Residue after Ignition       ≤ 2 ppm       < 1 ppm	Appearance		
Residue after Ignition       ≤ 2 ppm       < 1 ppm	Color (APHA)	≤ 10	
Chloride (CI)       ≤ 0.08 ppm       0.03 ppm         Phosphate (PO4)       ≤ 0.10 ppm       < 0.03 ppm	Residue after Ignition	≤ 2 ppm	
Phosphate (PO₄)         ≤ 0.10 ppm         < 0.03 ppm	Chloride (CI)	≤ 0.08 ppm	
Sulfate (SO <sub>4</sub> )       ≤ 0.2 ppm       < 0.2 ppm	Phosphate (PO <sub>4</sub> )	≤ 0.10 ppm	• •
Trace Impurities - Aluminum (Al)       ≤ 40.0 ppb       < 1.0 ppb	Sulfate (SO <sub>4</sub> )	≤ 0.2 ppm	
Arsenic and Antimony (as As)    \$\leq\$ 5.0 ppb	Trace Impurities - Aluminum (Al)	≤ 40.0 ppb	• •
Trace Impurities – Barium (Ba)	Arsenic and Antimony (as As)	≤ 5.0 ppb	
Trace Impurities – Beryllium (Be)  Trace Impurities – Bismuth (Bi)  Trace Impurities – Boron (B)  Trace Impurities – Cadmium (Cd)  Trace Impurities – Calcium (Ca)  Trace Impurities – Calcium (Cr)  Trace Impurities – Chromium (Cr)  Trace Impurities – Cobalt (Co)  Trace Impurities – Cobalt (Co)  Trace Impurities – Copper (Cu)  Trace Impurities – Copper (Cu)  Trace Impurities – Gallium (Ga)  Trace Impurities – Gallium (Ga)  Trace Impurities – Germanium (Ge)  Trace Impurities – Gold (Au)  Heavy Metals (as Pb)  Trace Impurities – Iron (Fe)  Trace Impurities – Lead (Pb)  Trace Impurities – Lead (Pb)  Trace Impurities – Magnesium (Mg)  Trace Impurities – Manganese (Mn)  Trace Impurities – Mickel (Ni)  ■ 200 ppb  ■ 21.0 ppb  ▼ 10.0 ppb  ▼ 10.0 ppb  ▼ 21.0 ppb  ▼ 10.0 ppb  ▼ 10.0 ppb  ▼ 21.0 ppb  ▼ 22.0 ppb  ▼ 21.0 ppb  ▼ 22.0 ppb  ▼ 23.0 ppb  ▼ 24.0 ppb  ▼ 25.0 ppb  ▼ 26.0 ppb  ▼ 27.0 ppb  ▼ 27.0 ppb  ▼ 28.0 ppb  ▼ 29.0 ppb  ▼ 20.0 ppb	Trace Impurities - Barium (Ba)	≤ 10.0 ppb	
Trace Impurities – Bismuth (Bi)    \$\leq 20.0 ppb	Trace Impurities - Beryllium (Be)	≤ 10.0 ppb	• •
Trace Impurities – Boron (B) ≤ 10.0 ppb 0.1 ppb  Trace Impurities – Cadmium (Cd) ≤ 50 ppb < 1 ppb  Trace Impurities – Calcium (Ca) ≤ 50.0 ppb 0.3 ppb  Trace Impurities – Chromium (Cr) ≤ 30.0 ppb 0.1 ppb  Trace Impurities – Cobalt (Co) ≤ 10.0 ppb	Trace Impurities - Bismuth (Bi)	≤ 20.0 ppb	• •
Trace Impurities - Cadmium (Cd) ≤ 50 ppb 0.3 ppb  Trace Impurities - Calcium (Ca) ≤ 50.0 ppb 0.3 ppb  Trace Impurities - Chromium (Cr) ≤ 30.0 ppb 0.1 ppb  Trace Impurities - Cobalt (Co) ≤ 10.0 ppb < 1.0 ppb  Trace Impurities - Copper (Cu) ≤ 10.0 ppb < 1.0 ppb  Trace Impurities - Gallium (Ga) ≤ 10.0 ppb < 1.0 ppb  Trace Impurities - Germanium (Ge) ≤ 20 ppb < 1 ppb  Trace Impurities - Gold (Au) ≤ 20 ppb < 1 ppb  Trace Impurities - Gold (Au) ≤ 20 ppb < 1.0 ppb  Trace Impurities - Iron (Fe) ≤ 40.0 ppb < 1.0 ppb  Trace Impurities - Lead (Pb) ≤ 20.0 ppb < 1.0 ppb  Trace Impurities - Lithium (Li) ≤ 10.0 ppb < 1.0 ppb  Trace Impurities - Magnesium (Mg) ≤ 20 ppb < 1.0 ppb  Trace Impurities - Magnesee (Mn) ≤ 10.0 ppb < 1.0 ppb	Trace Impurities - Boron (B)	≤ 10.0 ppb	• •
Trace Impurities - Calcium (Ca) ≤ 50.0 ppb 0.3 ppb  Trace Impurities - Chromium (Cr) ≤ 30.0 ppb 0.1 ppb  Trace Impurities - Cobalt (Co) ≤ 10.0 ppb < 1.0 ppb  Trace Impurities - Copper (Cu) ≤ 10.0 ppb < 1.0 ppb  Trace Impurities - Gallium (Ga) ≤ 10.0 ppb < 1.0 ppb  Trace Impurities - Germanium (Ge) ≤ 20 ppb < 1 ppb  Trace Impurities - Gold (Au) ≤ 20 ppb < 1 ppb  Trace Impurities - Iron (Fe) ≤ 40.0 ppb < 1.0 ppb  Trace Impurities - Lead (Pb) ≤ 20.0 ppb < 1.0 ppb  Trace Impurities - Lithium (Li) ≤ 10.0 ppb < 1.0 ppb  Trace Impurities - Magnesium (Mg) ≤ 20 ppb < 1 ppb  Trace Impurities - Magnesium (Mg) ≤ 20 ppb < 1.0 ppb	Trace Impurities - Cadmium (Cd)	≤ 50 ppb	
Trace Impurities - Chromium (Cr) ≤ 30.0 ppb 0.1 ppb  Trace Impurities - Cobalt (Co) ≤ 10.0 ppb < 1.0 ppb  Trace Impurities - Copper (Cu) ≤ 10.0 ppb < 1.0 ppb  Trace Impurities - Gallium (Ga) ≤ 10.0 ppb < 1.0 ppb  Trace Impurities - Germanium (Ge) ≤ 20 ppb < 1 ppb  Trace Impurities - Gold (Au) ≤ 20 ppb < 1 ppb  Heavy Metals (as Pb) ≤ 100 ppb < 50 ppb  Trace Impurities - Iron (Fe) ≤ 40.0 ppb < 1.0 ppb  Trace Impurities - Lead (Pb) ≤ 20.0 ppb < 1.0 ppb  Trace Impurities - Lithium (Li) ≤ 10.0 ppb < 1.0 ppb  Trace Impurities - Magnesium (Mg) ≤ 20 ppb < 1 ppb  Trace Impurities - Magnesium (Mg) ≤ 20 ppb < 1.0 ppb  Trace Impurities - Magnesium (Mg) ≤ 20 ppb < 1.0 ppb	Trace Impurities - Calcium (Ca)		• •
Trace Impurities - Cobalt (Co) ≤ 10.0 ppb < 1.0 ppb  Trace Impurities - Copper (Cu) ≤ 10.0 ppb < 1.0 ppb  Trace Impurities - Gallium (Ga) ≤ 10.0 ppb < 1.0 ppb  Trace Impurities - Germanium (Ge) < 20 ppb < 1 ppb  Trace Impurities - Gold (Au) ≤ 20 ppb < 1 ppb  Heavy Metals (as Pb) ≤ 100 ppb < 50 ppb  Trace Impurities - Iron (Fe) ≤ 40.0 ppb < 1.0 ppb  Trace Impurities - Lead (Pb) < 20.0 ppb < 1.0 ppb  Trace Impurities - Lithium (Li) ≤ 10.0 ppb < 1.0 ppb  Trace Impurities - Magnesium (Mg) ≤ 20 ppb < 1 ppb  Trace Impurities - Magnesee (Mn) ≤ 10.0 ppb < 1.0 ppb	Trace Impurities - Chromium (Cr)	≤ 30.0 ppb	
Trace Impurities - Copper (Cu) ≤ 10.0 ppb < 1.0 ppb  Trace Impurities - Gallium (Ga) ≤ 10.0 ppb < 1.0 ppb  Trace Impurities - Germanium (Ge) ≤ 20 ppb < 1 ppb  Trace Impurities - Gold (Au) ≤ 20 ppb < 1 ppb  Heavy Metals (as Pb) ≤ 100 ppb < 50 ppb  Trace Impurities - Iron (Fe) ≤ 40.0 ppb < 1.0 ppb  Trace Impurities - Lead (Pb) ≤ 20.0 ppb < 1.0 ppb  Trace Impurities - Lithium (Li) ≤ 10.0 ppb < 1.0 ppb  Trace Impurities - Magnesium (Mg) ≤ 20 ppb < 1 ppb  Trace Impurities - Magnesium (Mg) ≤ 10.0 ppb < 1.0 ppb	Trace Impurities - Cobalt (Co)	≤ 10.0 ppb	
Trace Impurities – Gallium (Ga) ≤ 10.0 ppb < 1.0 ppb  Trace Impurities – Germanium (Ge) ≤ 20 ppb < 1 ppb  Trace Impurities – Gold (Au) ≤ 20 ppb < 1 ppb  Heavy Metals (as Pb) ≤ 100 ppb < 50 ppb  Trace Impurities – Iron (Fe) ≤ 40.0 ppb < 1.0 ppb  Trace Impurities – Lead (Pb) ≤ 20.0 ppb < 1.0 ppb  Trace Impurities – Lithium (Li) ≤ 10.0 ppb < 1.0 ppb  Trace Impurities – Magnesium (Mg) ≤ 20 ppb < 1 ppb  Trace Impurities – Magnesium (Mg) ≤ 20 ppb < 1 ppb  Trace Impurities – Manganese (Mn) ≤ 10.0 ppb	Trace Impurities - Copper (Cu)	≤ 10.0 ppb	• •
Trace Impurities – Germanium (Ge) ≤ 20 ppb < 1 ppb  Trace Impurities – Gold (Au) ≤ 20 ppb < 1 ppb  Heavy Metals (as Pb) ≤ 100 ppb < 50 ppb  Trace Impurities – Iron (Fe) ≤ 40.0 ppb < 1.0 ppb  Trace Impurities – Lead (Pb) ≤ 20.0 ppb < 1.0 ppb  Trace Impurities – Lithium (Li) ≤ 10.0 ppb < 1.0 ppb  Trace Impurities – Magnesium (Mg) ≤ 20 ppb < 1 ppb  Trace Impurities – Manganese (Mn) ≤ 10.0 ppb < 1.0 ppb	Trace Impurities - Gallium (Ga)	≤ 10.0 ppb	
Trace Impurities - Gold (Au)       ≤ 20 ppb       < 1 ppb	Trace Impurities - Germanium (Ge)	≤ 20 ppb	
Heavy Metals (as Pb) ≤ 100 ppb < 50 ppb  Trace Impurities – Iron (Fe) ≤ 40.0 ppb < 1.0 ppb  Trace Impurities – Lead (Pb) ≤ 20.0 ppb < 1.0 ppb  Trace Impurities – Lithium (Li) ≤ 10.0 ppb < 1.0 ppb  Trace Impurities – Magnesium (Mg) ≤ 20 ppb < 1 ppb  Trace Impurities – Manganese (Mn) ≤ 10.0 ppb < 1.0 ppb	Trace Impurities - Gold (Au)	≤ 20 ppb	• •
Trace Impurities – Iron (Fe)       ≤ 40.0 ppb       < 1.0 ppb	Heavy Metals (as Pb)	≤ 100 ppb	
Trace Impurities – Lead (Pb)       ≤ 20.0 ppb       < 1.0 ppb	Trace Impurities – Iron (Fe)	≤ 40.0 ppb	
Trace Impurities – Lithium (Li)       ≤ 10.0 ppb       < 1.0 ppb	Trace Impurities - Lead (Pb)	≤ 20.0 ppb	• • • • • • • • • • • • • • • • • • • •
Trace Impurities – Magnesium (Mg) ≤ 20 ppb < 1 ppb  Trace Impurities – Manganese (Mn) ≤ 10.0 ppb < 1.0 ppb  Trace Impurities – Mickel (Ni)	Trace Impurities - Lithium (Li)	≤ 10.0 ppb	. ,
Trace Impurities - Manganese (Mn) ≤ 10.0 ppb < 1.0 ppb	Trace Impurities – Magnesium (Mg)	≤ 20 ppb	• •
Trace Impurities Mickel (Ni)	Trace Impurities - Manganese (Mn)	≤ 10.0 ppb	
	Trace Impurities – Nickel (Ni)	≤ 20.0 ppb	< 1.0 ppb

>>> Continued on page 2 >>>





Material No.: 9606-03 Batch No.: 24H0162012

Test	Specification	Result
Trace Impurities - Niobium (Nb)	≤ 50.0 ppb	< 1.0 ppb
Trace Impurities - Potassium (K)	≤ 50 ppb	< i ppb
Trace Impurities - Silicon (Si)	≤ 50 ppb	1 ppb
Trace Impurities - Silver (Ag)	≤ 20.0 ppb	< 1.0 ppb
Trace Impurities – Sodium (Na)	≤ 150.0 ppb	< 1.0 ppb
Trace Impurities - Strontium (Sr)	≤ 30.0 ppb	< 1.0 ppb
Trace Impurities - Tantalum (Ta)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities - Thallium (TI)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Tin (Sn)	≤ 20.0 ppb	< 1.0 ppb
Trace Impurities - Titanium (Ti)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities - Vanadium (V)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities - Zinc (Zn)	≤ 20.0 ppb	< 1.0 ppb
Trace Impurities - Zirconium (Zr)	≤ 10.0 ppb	< 1.0 ppb
Particle Count – 0.5 µm and greater	≤ 60 par/ml	13 par/ml
Particle Count - 1.0 µm and greater	≤ 10 par/ml	5 par/ml

Nitric Acid 69% **CMOS** 





Material No.: 9606-03 Batch No.: 24H0162012

Test Specification Result

For Microelectronic Use

Country of Origin: USA Packaging Site: Phillipsburg Mfg Ctr & DC



### Certificate of Analysis

300 Technology Drive Christiansburg, VA 24073 USA inorganicventures.com P: 800-669-6799/540-585-3030 F: 540-585-3012 info@inorganicventures.com

### 1.0 ACCREDITATION / REGISTRATION

**INORGANIC VENTURES** is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Ventures is also an ISO 9001 registered manufacturer (QSR Certificate Number QSR-1034).



### 2.0 PRODUCT DESCRIPTION

Product Code: Multi Analyte Custom Grade Solution

 Catalog Number:
 QCP-CICV-1

 Lot Number:
 V2-MEB744107

 Matrix:
 7% (v/v) HNO3

Value / Analyte(s): 2 500 μg/mL ea:

Calcium, Potassium,
Magnesium, Sodium,

1 000 µg/mL ea:

Aluminum, Barium,

500 μg/mL ea:

Iron,

250 μg/mL ea:

Nickel, Vanadium, Zinc, Cobalt,

Manganese,

125 μg/mL ea:

Silver, Copper,

100 μg/mL ea: Chromium, 25 μg/mL ea: Beryllium

**Second Source**: Whenever possible, this solution was manufactured from a second set of concentrates in our manufacturing facility.

### 3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE Aluminum, Al	CERTIFIED VALUE 1 000 ± 4 µg/mL	ANALYTE Barium, Ba	CERTIFIED VALUE 1 000 ± 6 μg/mL
Beryllium, Be	24.98 ± 0.12 μg/mL	Calcium, Ca	2 500 ± 8 μg/mL
Chromium, Cr	99.9 ± 0.6 μg/mL	Cobalt, Co	250.2 ± 1.2 μg/mL
Copper, Cu	125.0 ± 0.5 μg/mL	Iron, Fe	500.0 ± 2.2 μg/mL
Magnesium, Mg	2 500 ± 11 μg/mL	Manganese, Mn	249.9 ± 1.1 μg/mL
Nickel, Ni	250.0 ± 1.2 μg/mL	Potassium, K	2 500 ± 11 μg/mL
Silver, Ag	125.0 ± 0.6 μg/mL	Sodium, Na	2 500 ± 11 μg/mL
Vanadium, V	250.0 ± 1.1 μg/mL	Zinc, Zn	249.9 ± 1.1 μg/mL

**Density:** 1.081 g/mL (measured at 20  $\pm$  4 °C)

### **Assay Information:**

133	ay iiiioiiiiatioii.			
	ANALYTE	METHOD	NIST SRM#	SRM LOT#
	Ag	ICP Assay	3151	160729
	Ag	Volhard	999c	999c
	Al	ICP Assay	3101a	140903
	Al	EDTA	928	928
	Ва	ICP Assay	3104a	140909
	Ва	Gravimetric		See Sec. 4.2
	Be	ICP Assay	3105a	090514
	Be	Calculated		See Sec. 4.2
	Ca	ICP Assay	3109a	130213
	Ca	EDTA	928	928
	Co	ICP Assay	3113	190630
	Co	EDTA	928	928
	Cr	ICP Assay	3112a	170630
	Cu	ICP Assay	3114	120618
	Cu	EDTA	928	928
	Fe	ICP Assay	3126a	140812
	Fe	EDTA	928	928
	K	ICP Assay	3141a	140813
	K	Gravimetric		See Sec. 4.2
	Mg	ICP Assay	3131a	140110
	Mg	EDTA	928	928
	Mn	ICP Assay	3132	050429
	Mn	EDTA	928	928
	Na	ICP Assay	3152a	200413
	Na	Gravimetric		See Sec. 4.2
	Ni	ICP Assay	3136	120619
	Ni	EDTA	928	928
	V	ICP Assay	3165	160906
	V	EDTA	928	928
	Zn	ICP Assay	3168a	120629
	Zn	EDTA	928	928

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

### Characterization of CRM/RM by Two or More Methods

Certified Value, X<sub>CRM/RM</sub>, where two or more methods of characterization are used is the weighted mean of the results:

 $X_{CRM/RM} = \Sigma(w_i) (X_i)$ 

X<sub>i</sub> = mean of Assay Method i with standard uncertainty u<sub>char i</sub>

w<sub>i</sub> = the weighting factors for each method calculated using the inverse square of the variance:

 $\mathbf{w_i} = (1/\mathsf{u_{char\;i}})^2 \, / \, (\Sigma (1/(\mathsf{u_{char\;i}})^2)$ 

CRM/RM Expanded Uncertainty (±) =  $U_{CRM/RM}$  = k ( $u_{char}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2$ )<sup>1/2</sup>

k = coverage factor = 2

 $\mathbf{u_{char}} = [\Sigma((\mathbf{w_i})^2 (\mathbf{u_{char}}_i)^2)]^{1/2}$  where  $\mathbf{u_{char}}_i$  are the errors from each characterization method

 $egin{align*} \mathbf{u_{bb}} = \mathbf{bottle} \ \mathbf{to} \ \mathbf{bottle} \ \mathbf{homogeneity} \ \mathbf{standard} \ \mathbf{uncertainty} \ \mathbf{u_{lts}} = \mathbf{long} \ \mathbf{term} \ \mathbf{stability} \ \mathbf{standard} \ \mathbf{uncertainty} \ (\mathbf{storage}) \ \end{aligned}$ 

uts = transport stability standard uncertainty

Characterization of CRM/RM by One Method

Certified Value,  $X_{CRM/RM}$ , where one method of characterization is used is the mean of individual results:

 $X_{CRM/RM} = (X_a) (u_{char a})$ 

Xa = mean of Assay Method A with

u<sub>char a</sub> = the standard uncertainty of characterization Method A

CRM/RM Expanded Uncertainty (±) =  $U_{CRM/RM}$  = k ( $u_{char}^2$  a +  $u_{bb}^2$  +  $u_{lts}^2$  +  $u_{ts}^2$ )  $v_{ts}^{1/2}$ 

k = coverage factor = 2

u<sub>char a</sub> = the errors from characterization

 $\mathbf{u_{bb}}$  = bottle to bottle homogeneity standard uncertainty  $\mathbf{u_{lts}}$  = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

### 4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

### 4.1 Thermometer Calibration

- All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

### 4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

### 4.3 Glassware Calibration

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM/RMs.

### 5.0 TRACE METALLIC IMPURITIES (TMI ) DETERMINED BY ICP-MS AND ICP-OES (µg/mL)

N/A

### 6.0 INTENDED USE

- **6.1** This standard is intended for the calibration of analytical instruments and validation of analytical methods as appropriate. This CRM may be used in connection with EPA Methods 6010, 6020 (all versions), Standard Methods 3120 B and USP <232> / ICH Q3D.
- **6.2** For products attaining traceability through Inorganic Ventures' Primary Certified Reference Materials (PCRM™) see the Limited License to Use PCRM™ in the Inorganic Ventures <u>Terms and Conditions of Sale</u>, <a href="https://www.inorganicventures.com/terms-and-conditions-sale">https://www.inorganicventures.com/terms-and-conditions-sale</a>. The Terms and Conditions contain information on the use of materials traceable to PCRM™ certified reference materials. This Limited License agreement is especially pertinent for laboratories accredited under ISO:17034.

### 7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

### 7.1 Storage and Handling Recommendations

- Store between approximately 4° 30° C while in sealed TCT bag.
- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.
- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between  $4^{\circ}$   $24^{\circ}$  C to minimize the effects of transpiration. Use at  $20^{\circ} \pm 4^{\circ}$  C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.
- For more information, visit <a href="https://www.inorganicventures.com/TCT">www.inorganicventures.com/TCT</a>

**Note**: This solution contains Silver (Ag), please refer to our Sample Preparation Guide for more information (https://www.inorganicventures.com/sample-preparation-guide/samples-containing-silver)

### 8.0 HAZARDOUS INFORMATION

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.

### 9.0 HOMOGENEITY

- This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous. Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

### 10.0 QUALITY STANDARD DOCUMENTATION

### 10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

### 10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

### 10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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### 11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

### 11.1 Certification Issue Date

May 22, 2024

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

### 11.2 Lot Expiration Date

- May 22, 2029
- The date after which this CRM/RM should not be used.
- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

### 11.3 Period of Validity

- Sealed TCT Bag Open Date:	

### NAMES AND SIGNATURES OF CERTIFYING OFFICERS 12.0 **Certificate Prepared By:**

Justin Dirico Stock Processing Supervisor

Juster Dilies Juster Wall Parel R. Laines

**Certificate Approved By:** 

Jodie Wall Stock VSM Coordinator

**Certifying Officer:** 

Paul Gaines Chairman / Senior Technical Director

<sup>-</sup> This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.



### Certificate of Analysis

300 Technology Drive Christiansburg, VA 24073 USA inorganicventures.com P: 800-669-6799/540-585-3030 F: 540-585-3012 info@inorganicventures.com

### 1.0 ACCREDITATION / REGISTRATION

**INORGANIC VENTURES** is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Ventures is also an ISO 9001 registered manufacturer (QSR Certificate Number QSR-1034).



### 2.0 PRODUCT DESCRIPTION

Product Code: Multi Analyte Custom Grade Solution

Catalog Number: QCP-CICV-2 Lot Number: U2-MEB733713

Matrix: 3% (w/v) Tartaric acid

1% (v/v) HNO3

Value / Analyte(s): 500 µg/mL ea:

Antimony

**Second Source**: Whenever possible, this solution was manufactured from a second set of concentrates in our manufacturing facility.

### 3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE CERTIFIED VALUE ANALYTE CERTIFIED VALUE

Antimony, Sb 500.0  $\pm$  2.8  $\mu$ g/mL

**Density:** 1.017 g/mL (measured at 20  $\pm$  4 °C)

**Assay Information:** 

 ANALYTE
 METHOD
 NIST SRM#
 SRM LOT#

 Sb
 ICP Assay
 3102a
 140911

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

### Characterization of CRM/RM by Two or More Methods

Certified Value, X<sub>CRM/RM</sub>, where two or more methods of characterization are used is the weighted mean of the results:

 $X_{CRM/RM} = \Sigma(w_i) (X_i)$ 

X<sub>i</sub> = mean of Assay Method i with standard uncertainty u<sub>char i</sub>

 $\mathbf{w}_i$  = the weighting factors for each method calculated using the inverse square of

 $\mathbf{w_i} = (1/u_{\text{char i}})^2 / (\Sigma (1/(u_{\text{char i}})^2))$ 

CRM/RM Expanded Uncertainty (±) =  $U_{CRM/RM} = k (u^2_{char} + u^2_{bb} + u^2_{lts} + u^2_{ts})^{1/2}$ 

 $\mathbf{u}_{\mathbf{char}} = [\Sigma((\mathbf{w}_i)^2 (\mathbf{u}_{\mathbf{char}})^2)]^{1/2}$  where  $\mathbf{u}_{\mathbf{char}}$  are the errors from each characterization method

 $\mathbf{u}_{\mathbf{bb}}$  = bottle to bottle homogeneity standard uncertainty  $\mathbf{u}_{\mathbf{lts}}$  = long term stability standard uncertainty (storage)

u<sub>ts</sub> = transport stability standard uncertainty

### Characterization of CRM/RM by One Method

Certified Value, X<sub>CRM/RM</sub>, where one method of characterization is used is the mean of individual results:

 $X_{CRM/RM} = (X_a) (u_{char a})$ 

X<sub>a</sub> = mean of Assay Method A with

u<sub>char a</sub> = the standard uncertainty of characterization Method A

CRM/RM Expanded Uncertainty (±) =  $U_{CRM/RM}$  = k ( $u_{char}^2$  a +  $u_{bb}^2$  +  $u_{lts}^2$  +  $u_{ts}^2$ )  $v_{ts}^{1/2}$ 

**k** = coverage factor = 2

 $\mathbf{u}_{\mathbf{char}\;\mathbf{a}}$  = the errors from characterization

 $\mathbf{u_{bb}}$  = bottle to bottle homogeneity standard uncertainty  $\mathbf{u_{lts}}$  = long term stability standard uncertainty (storage)

u<sub>ts</sub> = transport stability standard uncertainty

### 4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

### 4.1 Thermometer Calibration

- All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

### 4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

### 4.3 Glassware Calibration

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM/RMs.

### 5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES (µg/mL)

N/A

### 6.0 INTENDED USE

- **6.1** This standard is intended for the calibration of analytical instruments and validation of analytical methods as appropriate. This CRM may be used in connection with EPA Methods 6010, 6020 (all versions), Standard Methods 3120 B and USP <232> / ICH Q3D.
- **6.2** For products attaining traceability through Inorganic Ventures' Primary Certified Reference Materials (PCRM™) see the Limited License to Use PCRM™ in the Inorganic Ventures <u>Terms and Conditions of Sale</u>, <a href="https://www.inorganicventures.com/terms-and-conditions-sale">https://www.inorganicventures.com/terms-and-conditions-sale</a>. The Terms and Conditions contain information on the use of materials traceable to PCRM™ certified reference materials. This Limited License agreement is especially pertinent for laboratories accredited under ISO:17034.

### 7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

### 7.1 Storage and Handling Recommendations

- Store between approximately 4° 30° C while in sealed TCT bag.
- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.
- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between  $4^{\circ}$   $24^{\circ}$  C to minimize the effects of transpiration. Use at  $20^{\circ} \pm 4^{\circ}$  C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.
- For more information, visit <a href="www.inorganicventures.com/TCT">www.inorganicventures.com/TCT</a>

### 8.0 HAZARDOUS INFORMATION

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.

### 9.0 HOMOGENEITY

- This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous. Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

### 10.0 QUALITY STANDARD DOCUMENTATION

### 10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

### 10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

### 10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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### 11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

### 11.1 Certification Issue Date

June 01, 2023

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

### 11.2 Lot Expiration Date

- June 01, 2028
- The date after which this CRM/RM should not be used.
- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

### 11.3 Period of Validity

· Sealed TCT Bag Open Date:	
· Scalcu I C I Dau Obell Dale.	

- This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.

### 12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

### Certificate Approved By:

Thomas Kozikowski Manager, Quality Control

### Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director

20178Ci.



### Certificate of Analysis

300 Technology Drive Christiansburg, VA 24073 USA inorganicventures.com P: 800-669-6799/540-585-3030 F: 540-585-3012 info@inorganicventures.com

### 1.0 ACCREDITATION / REGISTRATION

**INORGANIC VENTURES** is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Ventures is also an ISO 9001 registered manufacturer (QSR Certificate Number QSR-1034).



### 2.0 PRODUCT DESCRIPTION

Product Code: Multi Analyte Custom Grade Solution

Catalog Number: QCP-CICV-3

Lot Number: V2-MEB749572

Matrix: 7% (v/v) HNO3

Value / Analyte(s):

500 μg/mL ea:

Arsenic, Lead, Selenium, Thallium,

250 μg/mL ea: Cadmium

**Second Source**: Whenever possible, this solution was manufactured from a second set of concentrates in our manufacturing facility.

### 3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE CERTIFIED VALUE ANALYTE CERTIFIED VALUE Arsenic, As 500.0  $\pm$  3.1  $\mu$ g/mL Cadmium, Cd 250.1  $\pm$  1.1  $\mu$ g/mL Lead, Pb 500.0  $\pm$  2.3  $\mu$ g/mL Selenium, Se 500.0  $\pm$  3.2  $\mu$ g/mL

Thallium, TI 500.0  $\pm$  3.0  $\mu$ g/mL

**Density:** 1.040 g/mL (measured at 20  $\pm$  4 °C)

### **Assay Information:**

ANALYTE	METHOD	NIST SRM#	SRM LOT#
As	ICP Assay	3103a	100818
Cd	ICP Assay	3108	130116
Cd	EDTA	928	928
Pb	ICP Assay	3128	101026
Pb	EDTA	928	928
Se	ICP Assay	3149	100901
TI	ICP Assay	3158	151215

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

### Characterization of CRM/RM by Two or More Methods

Certified Value, X<sub>CRM/RM</sub>, where two or more methods of characterization are used is the weighted mean of the results:

 $X_{CRM/RM} = \Sigma(w_i) (X_i)$ 

X<sub>i</sub> = mean of Assay Method i with standard uncertainty u<sub>char i</sub>

w<sub>i</sub> = the weighting factors for each method calculated using the inverse square of

 $\mathbf{w_i} = (1/u_{\text{char i}})^2 / (\Sigma (1/(u_{\text{char i}})^2))$ 

CRM/RM Expanded Uncertainty (±) =  $U_{CRM/RM}$  = k ( $u^2_{char}$  +  $u^2_{bb}$  +  $u^2_{lts}$  +  $u^2_{ts}$ )<sup>1/2</sup>

k = coverage factor = 2

 $\mathbf{u_{char}} = [\Sigma((\mathbf{w_i})^2 (\mathbf{u_{char}}_i)^2)]^{1/2}$  where  $\mathbf{u_{char}}_i$  are the errors from each characterization method

 $egin{align*} \mathbf{u_{bb}} = \mathbf{bottle} \ \mathbf{to} \ \mathbf{bottle} \ \mathbf{homogeneity} \ \mathbf{standard} \ \mathbf{uncertainty} \ \mathbf{u_{lts}} = \mathbf{long} \ \mathbf{term} \ \mathbf{stability} \ \mathbf{standard} \ \mathbf{uncertainty} \ (\mathbf{storage}) \ \end{aligned}$ 

uts = transport stability standard uncertainty

Characterization of CRM/RM by One Method

Certified Value,  $X_{CRM/RM}$ , where one method of characterization is used is the mean of individual results:

 $X_{CRM/RM} = (X_a) (u_{char a})$ 

Xa = mean of Assay Method A with

 $\mathbf{u_{char}}$  a = the standard uncertainty of characterization Method A

CRM/RM Expanded Uncertainty (±) =  $U_{CRM/RM}$  = k ( $u^2_{char}$  a +  $u^2_{bb}$  +  $u^2_{lts}$  +  $u^2_{ts}$ ) $^{1/2}$ 

k = coverage factor = 2

u<sub>char a</sub> = the errors from characterization

 $\mathbf{u_{bb}}$  = bottle to bottle homogeneity standard uncertainty

ults = long term stability standard uncertainty (storage)
uts = transport stability standard uncertainty

### 4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

### 4.1 Thermometer Calibration

- All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

### 4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

### 4.3 Glassware Calibration

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM/RMs.

### 5.0 TRACE METALLIC IMPURITIES (TMI ) DETERMINED BY ICP-MS AND ICP-OES (µg/mL)

N/A

### 6.0 INTENDED USE

- **6.1** This standard is intended for the calibration of analytical instruments and validation of analytical methods as appropriate. This CRM may be used in connection with EPA Methods 6010, 6020 (all versions), Standard Methods 3120 B and USP <232> / ICH Q3D.
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### 7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

### 7.1 Storage and Handling Recommendations

- Store between approximately 4° 30° C while in sealed TCT bag.
- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.
- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between  $4^{\circ}$   $24^{\circ}$  C to minimize the effects of transpiration. Use at  $20^{\circ} \pm 4^{\circ}$  C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.
- For more information, visit

www.inorganicventures.com/TCT

# 8.0 HAZARDOUS INFORMATION

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.

# 9.0 HOMOGENEITY

- This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous. Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

# 10.0 QUALITY STANDARD DOCUMENTATION

# 10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

# 10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

# 10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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# 11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

# 11.1 Certification Issue Date

January 02, 2025

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

# 11.2 Lot Expiration Date

- January 02, 2030
- The date after which this CRM/RM should not be used.
- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

# 11.3 Period of Validity

Sealed TCT	Bag Open Date:	
Ocalca IOI	Day Open Date.	

#### NAMES AND SIGNATURES OF CERTIFYING OFFICERS 12.0 **Certificate Prepared By:**

Justin Dirico Stock Processing Supervisor

Juster Dilies Juster Wall Parel R. Laines

**Certificate Approved By:** 

Jodie Wall Stock VSM Coordinator

**Certifying Officer:** 

Paul Gaines Chairman / Senior Technical Director

<sup>-</sup> This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.

Lot # 011525

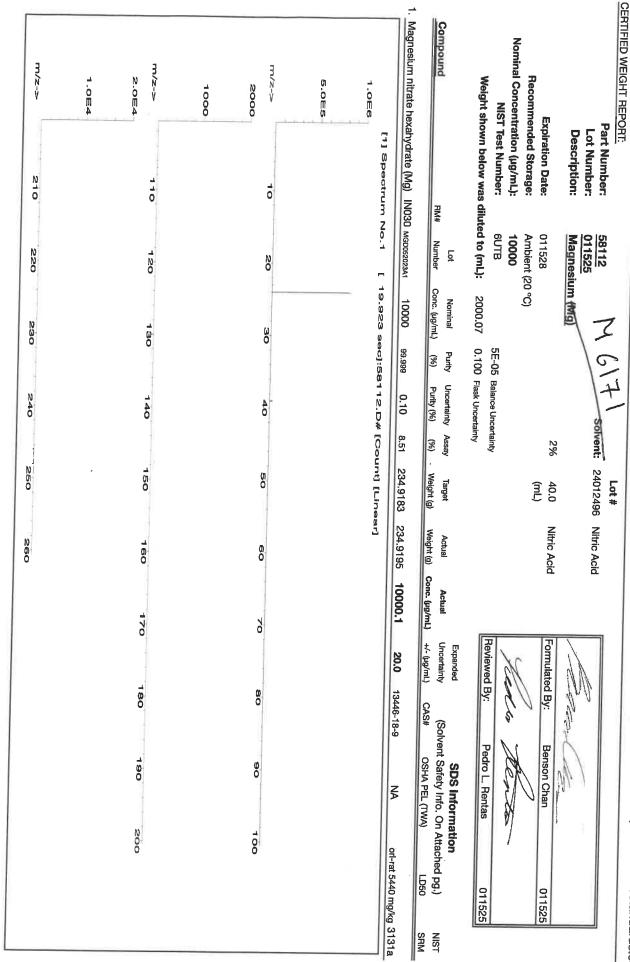
R->2015124

# Certified Reference Material CRM

Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com



ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com





https://Absolutestandards.com ANAB ISO 17034 Accredited AR-1539 Certificate Number

# Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

	Al Sb Ba Be Bi
	<0.02 <0.02 <0.02 <0.02 <0.01 <0.01 <0.02
	58585
	40.02 40.02 40.02 40.02 40.02 40.02
	Dy Er Gd Ga
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	etals Li Li Mg Mg Mo Nd
(T) = Target analyte	<b>Verific:</b>
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	Th Th Sn
	4000
	Z;

# Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

\* The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.

\* Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.

\* All standard containers are meticulously cleaned prior to use.

\* Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
\* Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated.

\* All standards should be stored with caps tight and under appropriate laboratory conditions.
\* Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



# Certificate of Analysis

300 Technology Drive Christiansburg, VA 24073 USA inorganicventures.com P: 800-669-6799/540-585-3030 F: 540-585-3012 info@inorganicventures.com

# 1.0 ACCREDITATION / REGISTRATION

**INORGANIC VENTURES** is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Ventures is also an ISO 9001 registered manufacturer (QSR Certificate Number QSR-1034).



# 2.0 PRODUCT DESCRIPTION

Product Code:

Multi Analyte Custom Grade Solution

Catalog Number:

CLPP-CAL-1

Lot Number:

V2-MEB742428

Matrix:

5% (v/v) HNO3

Value / Analyte(s):

5 000 µg/mL ea:

Calcium,

Potassium,

Magnesium,

Sodium,

2 000 µg/mL ea:

Aluminum,

Barium,

1 000 µg/mL ea:

Iron,

500 μg/mL ea:

Nickel,

Vanadium,

Zinc,

Cobalt,

Manganese,

250 µg/mL ea:

Silver,

Copper,

200 µg/mL ea: Chromium,

50 µg/mL ea:

Beryllium

# 3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE Aluminum, Al	CERTIFIED VALUE 2 000 ± 7 µg/mL	ANALYTE Barium, Ba	CERTIFIED VALUE 2 000 ± 9 µg/mL
Beryllium, Be	50.03 ± 0.30 μg/mL	Calcium, Ca	5 000 ± 16 μg/mL
Chromium, Cr	200.0 ± 1.1 μg/mL	Cobalt, Co	500.0 ± 2.3 μg/mL
Copper, Cu	250.0 ± 1.1 μg/mL	Iron, Fe	1 000 ± 4 μg/mL
Magnesium, Mg	5 000 ± 22 μg/mL	Manganese, Mn	499.9 ± 2.2 μg/mL
Nickel, NI	500.1 ± 2.3 μg/mL	Potassium, K	5 000 ± 22 μg/mL
Silver, Ag	250.0 ± 1.1 μg/mL	Sodium, Na	5 000 ± 22 µg/mL
Vanadium, V	500.0 ± 2.2 μg/ml.	Zinc, Zn	500.0 ± 2.2 μg/mL

Density:

1.117 g/mL (measured at 20 ± 4 °C)

# **Assay Information:**

ssay imormation:			
ANALYTE	METHOD	NIST SRM#	SRM LOT#
Ag	ICP Assay	3151	160729
Ag	Volhard	999c	999c
Al	ICP Assay	3101a	140903
Al	EDTA	928	928
Ва	ICP Assay	3104a	140909
Ва	Gravimetric		See Sec. 4.2
Be	ICP Assay	3105a	090514
Ca	ICP Assay	3109a	130213
Ca	EDTA	928	928
Co	ICP Assay	3113	190630
Co	EDTA	928	928
Cr	ICP Assay	3112a	170630
Cu	ICP Assay	3114	120618
Cu	EDTA	928	928
Fe	ICP Assay	3126a	140812
Fe	EDTA	928	928
K	ICP Assay	3141a	140813
K	Gravimetric		See Sec. 4.2
Mg	ICP Assay	3131a	140110
Mg	EDTA	928	928
Mn	ICP Assay	3132	050429
Mn	EDTA	928	928
Na	ICP Assay	3152a	200413
Na	Gravimetric		See Sec. 4.2
Ni	ICP Assay	3136	120619
Ni	EDTA	928	928
V	ICP Assay	3165	160906
V	EDTA	928	928
Zn	ICP Assay	3168a	120629
Zn	EDTA	928	928

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

# Characterization of CRM/RM by Two or More Methods

Certified Value, X<sub>CRM/RM</sub>, where two or more methods of characterization are used is the weighted mean of the results:

# $X_{CRM/RM} = \Sigma(w_i) (X_i)$

 $X_i$  = mean of Assay Method i with standard uncertainty  $u_{char}$  i

w; = the weighting factors for each method calculated using the inverse square of

 $\mathbf{w_i} = (1/\mathbf{u_{char\ i}})^2 / (\Sigma (1/(\mathbf{u_{char\ i}})^2)$ 

CRM/RM Expanded Uncertainty (±) =  $U_{CRM/RM} = k (u^2_{char} + u^2_{bb} + u^2_{its} + u^2_{ts})^{\frac{1}{2}}$ 

k = coverage factor = 2

 $u_{char} = [\Sigma((w_i)^2 (u_{char})^2)]^{\frac{1}{2}}$  where  $u_{char}$  i are the errors from each characterization method

ubb = bottle to bottle homogeneity standard uncertainty ults = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

## Characterization of CRM/RM by One Method

Certified Value,  $\mathbf{X}_{\text{CRM/RM}}$ , where one method of characterization is used is the mean of individual results:

 $X_{CRM/RM} = (X_a) \{u_{char a}\}$ 

Xa = mean of Assay Method A with

uchar a = the standard uncertainty of characterization Method A

CRM/RM Expanded Uncertainty (±) =  $U_{CRM/RM} = k \left(u^2_{char} + u^2_{bb} + u^2_{lts} + u^2_{ts}\right)^{1/2}$ 

k = coverage factor = 2

uchar a = the errors from characterization

ubb = bottle to bottle homogeneity standard uncertainty

ults = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

#### 4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

#### 4.1 Thermometer Calibration

- All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

## 4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

# 4.3 Glassware Calibration

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM/RMs.

#### TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES (µg/mL) 5.0

#### **INTENDED USE** 6.0

- 6.1 This standard is intended for the calibration of analytical instruments and validation of analytical methods as appropriate. This CRM may be used in connection with EPA Methods 6010, 6020 (all versions), Standard Methods 3120 B and USP <232> / ICH Q3D.
- 6.2 For products attaining traceability through Inorganic Ventures' Primary Certified Reference Materials (PCRM™) see the Limited License to Use PCRM™ in the Inorganic Ventures Terms and Conditions of Sale, https://www.inorganicventures.com/terms-and-conditions-sale. The Terms and Conditions contain information on the use of materials traceable to PCRM™ certified reference materials. This Limited License agreement is especially pertinent for laboratories accredited under ISO:17034.

#### 7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

# 7.1 Storage and Handling Recommendations

- Store between approximately 4° 30° C while in sealed TCT bag.
- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.
- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between 4° 24° C to minimize the effects of transpiration. Use at 20° ± 4° C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.
- For more information, visit www.inorganicventures.com/TCT

Note: This solution contains Silver (Ag), please refer to our Sample Preparation Guide for more information (https://www.inorganicventures.com/sample-preparation-guide/samples-containing-silver)

# 8.0 HAZARDOUS INFORMATION

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.

#### 9.0 HOMOGENEITY

This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous.
 Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

#### 10.0 QUALITY STANDARD DOCUMENTATION

# 10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

# 10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratorles"

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

# 10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

Inorganic Ventures, 300 Technology Drive, Christiansburg, Va. 24073, USA; Telephone: 800.669.6799; 540.585.3030, Fax: 540.585.3012; inorganic ventures.com; Info@inorganic ventures.com

# 11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

## 11.1 Certification Issue Date

March 22, 2024

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

# 11.2 Lot Expiration Date

- March 22, 2029
- The date after which this CRM/RM should not be used.
- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

# 11.3 Period of Validity

- Sealed TCT Bag Open Date:		
This CDM/DM should not be used	 	 

- This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.

#### 12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

**Certificate Prepared By:** 

**Uyen Truong Custom Processing Supervisor** 

Mega Truong

Certificate Approved By:

Jodie Wall Stock VSM Coordinator

**Certifying Officer:** 

Paul Gaines Chairman / Senior Technical Director July Will
Paul R Laine



# Certified Reference Material CRM

ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com

m/z-y	22.55 Fin	s.oms	7)	1.000	2.5 Ee	8.0E6	1. Strontium nitrate (Sr)	Compound	Weight show	Nominal Concentration (µg/ml.): NIST Test Number:	Expiration Date: Recommended Storage:	De	Part
N.			2	10		[1] Spectrum No.1	INO17	RM#	Weight shown below was diluted to (mL):	centration (µg/mL): NIST Test Number:	Expiration Date: nended Storage:	Description:	Part Number:
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			,			eo]:681	99.997	Purity (	0.100 FI	5E-05	3	_	8/6
		Č		ð		14.495 aso]:68138.D# [Count] [Linear]	0.10 41.2	Uncertainty Assay Purity (%) (%)	0.100 Flask Uncertainty	5E-05 Balance Uncertainty	,	. 1 2%	2-38/6/ Solvent:
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		0		0		۵	1	Actual Weight (g)				Nitric Acid	Nitric Acid
		170		70			1000.0	Actual Conc. (µg/mL)					
							2.0	Expanded Uncertainty +/- (µg/mL)	The state of the s	Reviewed By:	N	Formulated By:	
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		190	, ,	0	athicists for facilities.			SDS Information (Solvent Safety Info. On Attached pg.) OSHA PEL (TWA) LC	a control and the land	Parim Bentas	A	Benson Chan	
		NOO		100			orl-rat >2000mg/kg 3153a	nation On Attached pg.) (A) LD50	77700	'	/	092724	



# Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

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(I) = Target analyte

# Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard

Certifled by:

\* The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated. \* Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in

the preparation of all standards.

\* All standard containers are meticulously cleaned prior to use.

\* Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).

\* Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated.

\* All Standards should be stored with caps tight and under appropriate laboratory conditions.

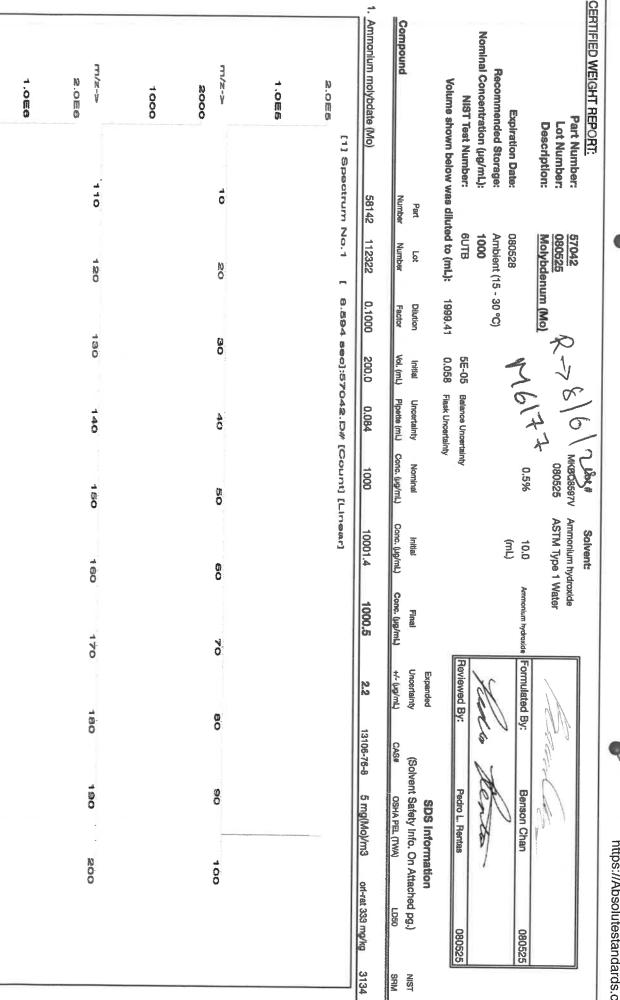
\* Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



Certified Reference Material CRM

Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com

https://Absolutestandards.com ANAB ISO 17034 Accredited AR-1539 Certificate Number



1 of 2

Part # 57042

Lot # 080525

0

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230

240

2000

2000

# Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

							Trace M	<b>Metals</b>	Verificat	ion by	ICP-MS	(µg/1	(ImL)						
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U	<0.02	ဂ္ဂ	<0.02	9	<b>^0.02</b>	5	^0.02	N <sub>o</sub>	-1	Ŗ	<0.02	Sm.	<b>♦</b> 0.02	ഗ	<b>∆0.02</b>	Sn	<0.02	5	<0.02
0)	<b>△0.02</b>	5	0.02	2	A 0.02	Po	A,02	Nd.	<0.02	~	<0.2	Sc	<0.02	Tie C	<0.02	7	<0.02	21	<0.02

(T) = Target analyte

# Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard

Certified by:

- \* The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.

  \* Purified acids, 18.2 megohm deionized water, calibrated Class A glassware, and the highest purity raw materials are used in the preparation of all standards.
- \* All standard containers are meticulously cleaned prior to use.
- Standards are prepared gravimetrically using balances that are calibrated by an ISO17025 certified organization with weights traceable through NIST to the SI kilogram (see above).
- $^*$  Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated.

- \* All standards should be stored with caps tight and under appropriate laboratory conditions.

  \* Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com

Lead (Pb)   Company   Lead (Pb)   Lead (Pb)   Company   Lead (Pb)   Lead (Pb)   Company   Lead (Pb)		1.0 Mg	N.OE6	O . O . M . 4	1.0E5	5.0 M 4	1.0E6	1. Lead(II) nitrate (Pb)	Compound	Weight shown	Recommended Storage: Nominal Concentration (µg/mL):	Des	Part I Lot	CERTIFIED WEIGHT REPORT:
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SE-05 Balance Uncertainty  294 40.0 Nitric Acid    Commutated By: Glovanni Esposito			N O		N: O:			29 PBD122016A:		luted to (mL)	Ambient (2	Lead (Pb	57082 031525	
(mL)  Nitric Acid  Formulated By: Giovanni Esposito  Weight (a)  Weight (b)  Weight (c)  Weight (c)  Weight (c)  Conc. (ug/mL)  2.0 10099-74-8 0.05 mg/m3  County (Lineeur)  SO 90 70 80 90 10					<u>.</u>				Nominai Conc. (µg/mL		0°C)	4	260	a p
(mL)  Nitric Acid  Formulated By: Giovanni Esposito  Weight (a)  Weight (b)  Weight (c)  Weight (c)  Weight (c)  Formulated By: Pedro L. Rentas  Expanded  Expanded  Expanded  SDS Information  Expanded  CAS# OSHA PEL (TWA)  2.0 10089-74-8 0.05 mg/m3  COUNT! [Linear]			ŏ		0		90]:500	99.999	Purity (%)	0.10 FM		20	18/1	, )
(mL)  Nitric Acid  Formulated By: Giovanni Esposito  Weight (a)  Weight (b)  Weight (c)  Weight (c)  Weight (c)  Weight (d)  Conc. (ug/mL)  Conc. (ug/mL)  Weight (d)  Conc. (ug/mL)  Conc. (			140		0		90. D#	11	ncertainty A	lance Uncertal		, x	Solvent:	P
tric Acid  Formulated By: Giovanni Esposito  When the part of the			150		O.		Count) [L			T mby		%	int: 2	Lot #
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ito  mation On Attached pg.) WA) LD  and LD  are the state of the stat			9		9				Solvent Safety Info. ( OSHA PEL (TV	Pedro L. Rentas	the	Giovanni	2	
031525 031525			200		100			3 intrvns-rat 93 mg/kg	On Attached pg.) VA) LD50		1		B	

www.absolutestandards.com

# Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

								yte	et analyte	(T) = Target									
40.02	Zr	40,02	Ħ	<0.02	Ta	<0.02	Sc	<0.2	*	<0.02	Z		8	<0.02	Au	<0.02	රී	<0.02	œ
40.02	Zn	<0,02	Sn	<0.02	S	<0.02	Sm	<0.02	72	△0.02	Mo	<0.02	5	40.02	ဂ္ဂ	<0.02	င္ပ	<0.02	B
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<0.02	¥	<0.02	41	<0.2	Sc	<0.02	ħ	<0.02	Z	<0.02	Ξ	<0.02	Ж	<0.02	Dy	<0.02	Ω	<0.02	Α
									I		1								
						ug/mL)	VS (	by ICP-I	tion	Verifica	etals	Trace Me							
																	I		Ì

# Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- \* Purified acids, 18.2 megohm delonized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- \* All standard containers are meticulously cleaned prior to use.
- \* Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
  \* Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated.
- \* All standards should be stored with caps tight and under appropriate laboratory conditions.
- \* Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



# Certificate of Analysis

300 Technology Drive Christiansburg, VA 24073 USA inorganicventures.com

P: 800-669-6799/540-585-3030 F: 540-585-3012

info@inorganicventures.com

# **ACCREDITATION / REGISTRATION**

INORGANIC VENTURES is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Ventures is also an ISO 9001 registered manufacturer (QSR Certificate Number QSR-1034).



#### 2.0 **PRODUCT DESCRIPTION**

Product Code:

Single Analyte Custom Grade Solution

Catalog Number:

CGY10

Lot Number:

V2-Y740548

Matrix:

2% (v/v) HNO3

Value / Analyte(s):

10 000 µg/mL ea:

Yttrium

Starting Material:

Yttrium Oxide

Starting Material Lot#:

2661 and 06230520YL

Starting Material Purity:

99.9984%

#### **CERTIFIED VALUES AND UNCERTAINTIES** 3.0

**Certifled Value:** 

 $10000 \pm 30 \mu g/mL$ 

Density:

1.032 g/mL (measured at 20  $\pm$  4 °C)

# **Assay Information:**

Assay Method #1

10011 ± 25 µg/mL

EDTA NIST SRM 928 Lot Number: 928

Assay Method #2

9997 ± 50 µg/mL

ICP Assay NIST SRM 3167a Lot Number: 190730

Assay Method #3

9984 ± 31 µg/mL

Calculated NIST SRM Lot Number: See Sec. 4.2

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a National Institute of Standards and Technology (NIST) SRM/RM. See Sec 4.2 for balance traceability.

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

# Characterization of CRM/RM by Two or More Methods

Certified Value, X<sub>CRM/RM</sub>, where two or more methods of characterization are used is the weighted mean of the results:

# $X_{CRM/RM} = \Sigma(w_i) (X_i)$

X<sub>i</sub> = mean of Assay Method i with standard uncertainty u<sub>char</sub> i

w; = the weighting factors for each method calculated using the inverse square of the variance.

 $w_i = (1/u_{char_i})^2 / (\Sigma (1/(u_{char_i})^2)$ 

CRM/RM Expanded Uncertainty (±) =  $U_{CRM/RM} \simeq k (u^2_{char} + u^2_{bb} + u^2_{lts} + u^2_{ts})^{\frac{1}{2}}$ 

k = coverage factor = 2

 $u_{char} = [\Sigma((w_i)^2 (u_{char})^2)]^{1/4}$  where  $u_{char}$  i are the errors from each characterization method

u<sub>bb</sub> = bottle to bottle homogeneity standard uncertainty u<sub>lts</sub> = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

#### 4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

Characterization of CRM/RM by One Method
Certified Value, X<sub>CRM/RM</sub>, where one method of characterization
is used is the mean of individual results:

ucher a = the standard uncertainty of characterization Method A

CRM/RM Expanded Uncertainty (±) =  $U_{CRM/RM} = k (u^2_{chara} + u^2_{bb} + u^2_{lts} + u^2_{ts})^{1/2}$ 

X<sub>a</sub> = mean of Assay Method A with

u<sub>bb</sub> = bottle to bottle homogeneity standard uncertainty

ults = long term stability standard uncertainty (storage)

X<sub>CRM/RM</sub> = (X<sub>a</sub>) (u<sub>char a</sub>)

uchar a = the errors from characterization

uts = transport stability standard uncertainty

#### 4.1 Thermometer Calibration

 All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

# 4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

# 4.3 Glassware Calibration

An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control
of CRM/RMs.

# 5.0 TRACE METALLIC IMPURITIES (TMI ) DETERMINED BY ICP-MS AND ICP-OES (μg/mL)

CRM/RMs are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

M	Ag	<	0.004600	М	Eu		0.009037	M	Na		0.086360	М	Se	<	0.005200	М	Zn		0.030125
М	Αl		0.014862	0	Fe		0.002410	М	Nb	<	0.000570	0	Si		0.024100	0	Zr	<	0.002600
М	As	<	0.003500	М	Ga	<	0.000570	M	Nd		0.000923	М	Sm		0.000461				
М	Au	<	0.001700	M	Gd	<	0.003500	M	Ni	<	0.005700	М	Sn	<	0.002300				
0	В		0.002209	M	Ge	<	0.005200	M	Os	<	0.001200	M	Sr	<	0.004600				
0	Ba	<	0.002500	M	Hf	<	0.000570	n	Р	<		М	Ta	<	0.000570				
0	Ве	<	0.001400	M	Hg	<	0.000570	M	Pb		0.005020	М	Tb		0.001044				
M	Bi	<	0.003500	М	Но		0.009037	М	Pd	<	0.005100	М	Te	<	0.002300				
0	Ca		0.009841	М	in	<	0.002300	M	Pr	<	0.002300	М	Th	<	0.000570				
M	Cd	<	0.000570	М	lr	<	0.000570	М	Pt	<	0.000570	М	Ti	<	0.003500				
M	Ce	<	0.002300	0	K		0.018677	М	Rb	<	0.000570	М	TI	<	0.000570				
М	Co	<	0.000570	М	La		0.000461	M	Re	<	0.000570	M	Tm	<	0.003500				
M	Cr	<	0.004000	0	Li	<	0.009300	M	Rh	<	0.008000	М	U	<	0.000570				
М	Cs	<	0.000570	M	Lu		0.000582	М	Ru	<	0.000570	М	V		0.001265				
М	Cu		0.002610	0	Mg		0.001486	n	S	<		М	W	<	0.002300				
M	Dy		0.003815	М	Mn		0.000582	M	Sb		0.005422	s	Υ	<					
M	Er		0.003615	М	Мо	<	0.005700	M	Sc	<	0.001200	М	Yb		0.001827				

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

# 6.0 INTENDED USE

6.1 This standard is intended for the calibration of analytical instruments and validation of analytical methods as appropriate. This CRM may be used in connection with EPA Methods 6010, 6020 (all versions), Standard Methods 3120 B and USP <232> / ICH Q3D.

6.2 For products attaining traceability through Inorganic Ventures' Primary Certified Reference Materials (PCRM™) see the Limited License to Use PCRM™ in the Inorganic Ventures <u>Terms and Conditions of Sale.</u>

<a href="https://www.inorganicventures.com/terms-and-conditions-sale">https://www.inorganicventures.com/terms-and-conditions-sale</a>. The Terms and Conditions contain information on the use of materials traceable to PCRM™ certified reference materials. This Limited License agreement is especially pertinent for laboratories accredited under ISO:17034.

# 7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

# 7.1 Storage and Handling Recommendations

- Store between approximately 4° 30° C while in sealed TCT bag.
- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.
- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between  $4^{\circ}$   $24^{\circ}$  C to minimize the effects of transpiration. Use at  $20^{\circ} \pm 4^{\circ}$  C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.
- For more information, visit www.inorganicventures.com/TCT

Atomic Weight; Valence; Coordination Number; Chemical Form In Solution - 88.91 +3 6 Y(OH)(H2O)x+2 Chemical Compatibility -Soluble in HCl, H2SO4 and HNO3. Avoid HF, H3PO4 and neutral to basic media. Stable with most metals and inorganic anions forming an insoluble carbonate, oxide, oxalate, and fluoride. Avoid mixing with elements / solutions containing moderate amounts of fluoride.

Stability - 2-100 ppb levels stable for months in 1% HNO3 / LDPE container. 1-10,000 ppm solutions

Stability - 2-100 ppb levels stable for months in 1% HNO3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 2-5% HNO3 / LDPE container.

Y Containing Samples (Preparation and Solution) - Metal (Soluble in acids); Oxide (Dissolve by heating in H2O/ HNO3); Ores (Carbonate fusion in Pt0 followed by HCl dissolution); Organic Matrices (Dry ash and dissolve in 1:1 H2O / HCl or HNO3).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Interferences (underlined indicates severe)
ICP-MS 89 amu	0.8 ppt	N/A	73Ge16O, 178Hf+2
ICP-OES 360.073 nm	0.005 / 0.000036 μg/mL	1	Ce, Th
ICP-OES 371.030 nm	0.004 / 0.00007 μg/mL	1	Ce
ICP-OES 377.433 nm	0.005 / 0.0009 μg/mL	1	Ta, Th

# 8.0 HAZARDOUS INFORMATION

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.

# 9.0 HOMOGENEITY

- This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous. Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

# 10.0 QUALITY STANDARD DOCUMENTATION

## 10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

# 10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

#### 10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

Inorganic Ventures, 300 Technology Drive, Christiansburg, Va. 24073, USA; Telephone: 800.669.6799; 540.685.3030, Fax: 540.585.3012; Inorganicventures.com; info@inorganicventures.com

#### 11.0 **CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY**

# 11.1 Certification Issue Date

February 20, 2024

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

# 11.2 Lot Expiration Date

- February 20, 2029
- The date after which this CRM/RM should not be used.
- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

# 11.3 Period of Validity

- This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.

#### 12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS **Certificate Prepared By:**

**Uyen Truong Custom Processing Supervisor**  Mayyand Man
Paul R Laine

# Certificate Approved By:

Muzzammil Khan Stock Laboratory Supervisor

**Certifying Officer:** 

Paul Gaines Chairman / Senior Technical Director



# Certificate of Analysis

300 Technology Drive Christiansburg, VA 24073 USA inorganicventures.com P: 800-669-6799/540-585-3030 F: 540-585-3012 info@inorganicventures.com

#### 1.0 ACCREDITATION / REGISTRATION

INORGANIC VENTURES is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Ventures is also an ISO 9001 registered manufacturer (QSR Certificate Number QSR-1034).



# 2.0 PRODUCT DESCRIPTION

**Product Code:** 

Multi Analyte Custom Grade Solution

Catalog Number:

WW-LFS-1

Lot Number:

W2-MEB752149

Matrix:

5% (v/v) HNO3

M6180 R37/22/23 Value / Analyte(s):

1 000 µg/mL ea: Potassium, 600 µg/mL ea: Phosphorus,

300 µg/mL ea:

Sodium, Iron,

200 μg/mL ea:

Magnesium, Aluminum, Cerium, Selenium,

Thallium,

100 µg/mL ea:

Lead, Calcium,

80 μg/mL ea: Arsenic,

70 μg/mL ea: Mercury, 50 µg/mL ea:

Nickel,

40 µg/mL ea: Chromium,

30 µg/mL ea:

Copper, Boron,

Vanadium,

20 µg/mL ea:

Zinc, Strontium, Barium, Beryllium, Cadmium, Cobalt, Manganese, Lithium,

7.5 µg/mL ea:

Silver

#### 3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

ANALYTE Aluminum, Ai	CERTIFIED VALUE 200.2 ± 0.7 μg/mL	ANALYTE Arsenic, As	CERTIFIED VALUE 80.1 ± 0.5 µg/mL
Barium, Ba	20.02 ± 0.12 μg/mL	Beryllium, Be	20.02 ± 0.11 μg/mL
Boron, B	30.02 ± 0.15 µg/mL	Cadmium, Cd	20.04 ± 0.09 μg/mL
Calclum, Ca	100.1 ± 0.3 μg/mL	Cerlum, Ce	200.2 ± 1.0 μg/mL
Chromium, Cr	40.02 ± 0.26 μg/mL	Cobalt, Co	20.03 ± 0.09 µg/mL
Copper, Cu	30.03 ± 0.13 µg/mL	iron, Fe	300.3 ± 1.3 μg/mL
Lead, Pb	100.1 ± 0.5 μg/mL	Lithium, Li	20.03 ± 0.09 μg/mL
Magnesium, Mg	200.2 ± 0.9 μg/mL	Manganese, Mn	19.99 ± 0.09 μg/mL
Mercury, Hg	70.0 ± 0.3 µg/mL	Nickel, Ni	50.05 ± 0.22 µg/mL
Phosphorus, P	600.5 ± 2.9 μg/mL	Potassium, K	1 001 ± 4 µg/mL
Selenium, Se	200.2 ± 1.1 μg/mL	Silver, Ag	7.52 ± 0.03 μg/mL
Sodium, Na	300.3 ± 1.3 μg/mL	Strontium, Sr	20.02 ± 0.10 μg/mL
Thallium, Ti	200.2 ± 1.0 μg/mL	Vanadium, V	30.02 ± 0.13 μg/mL
Zinc, Zn	20.05 ± 0.09 μg/mL		

Density:

1.037 g/mL (measured at 20 ± 5 °C)

**Assay Information:** 

ANALYTE	METHOD	NIST SRM#	SRM LOT#
Ag	ICP Assay	3151	160729
Ag	Volhard	999c	999c
Al	ICP Assay	3101a	140903
Al	EDTA	928	928
As	ICP Assay	3103a	100818
В	ICP Assay	3107	190605
В	Calculated		See Sec. 4.2
Ва	ICP Assay	3104a	140909
Ва	Gravimetric		See Sec. 4.2
Be	ICP Assay	3105a	090514
Ca	ICP Assay	3109a	130213
Ca	EDTA	928	928
Cd	ICP Assay	3108	130116
Cd	EDTA	928	928
Ce	ICP Assay	3110	160830
Се	EDTA	928	928
Co	ICP Assay	3113	190630
Со	EDTA	928	928
Cr	ICP Assay	3112a	170630
Cu	ICP Assay	3114	120618
Cu	EDTA	928	928
Fe	ICP Assay	3126a	140812
Fe	EDTA	928	928
Hg	ICP Assay	3133	160921
Hg	EDTA	928	928
K	ICP Assay	3141a	140813
K	Gravimetric		See Sec. 4.2
Li	ICP Assay	3129a	100714
Li	Gravimetric	0404	See Sec. 4.2
Mg	ICP Assay	3131a	140110
Mg	EDTA	928	928
Mn	ICP Assay	3132	050429
Mn Na	EDTA	928	928
Na	ICP Assay Gravimetric	3152a	200413
Ni Ni	ICP Assay	3136	See Sec. 4.2
Ni	EDTA	928	120619 928
P	ICP Assay	3139a	060717
P	Acidimetric	84L	84L
Pb	ICP Assay	3128	101026
Pb	EDTA	928	928
Se	ICP Assay	3149	100901
Sr	EDTA	928	928
Sr	ICP Assay	Traceable to 3153a	K2-SR650985
TI	ICP Assay	3158	151215
V	ICP Assay	3165	160906
V	EDTA	928	928
Zn	ICP Assay	3168a	120629
Zn	EDTA	928	928

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

# Characterization of CRM/RM by Two or More Methods

Certified Value, X<sub>CRM/RM</sub>, where two or more methods of characterization are used is the weighted mean of the results:

#### $X_{CRM/RM} = \Sigma(w_i)(X_i)$

X<sub>i</sub> = mean of Assay Method i with standard uncertainty uchar i

w<sub>i</sub> = the weighting factors for each method calculated using the inverse square of

$$w_i = (1/u_{chari})^2 / (\Sigma (1/(u_{chari})^2))$$

CRM/RM Expanded Uncertainty (±) =  $U_{CRM/RM} = k (u^2_{char} + u^2_{bb} + u^2_{lts} + u^2_{ts})^{1/2}$ 

k = coverage factor = 2

 $u_{char} = [\Sigma((w_i)^2 (u_{char})^2)]^{1/2}$  where  $u_{char}$  i are the errors from each characterization method

ubb = bottle to bottle homogeneity standard uncertainty

u<sub>its</sub> = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

X<sub>a</sub> = mean of Assay Method A with

uchar a = the standard uncertainty of characterization Method A

Characterization of CRM/RM by One Method

Certified Value, X<sub>CRM/RM</sub>, where one method of characterization is used is the mean of individual results:

CRM/RM Expanded Uncertainty (±) =  $U_{CRM/RM} = k (u^2_{char} + u^2_{bb} + u^2_{its} + u^2_{ts})^{1/2}$ 

k = coverage factor = 2

X<sub>CRM/RM</sub> = (X<sub>a</sub>) (u<sub>char a</sub>)

uchar a = the errors from characterization

ubb = bottle to bottle homogeneity standard uncertainty

ults = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

#### 4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

## 4.1 Thermometer Calibration

- All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

# 4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

#### 4.3 Glassware Calibration

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM/RMs.

#### 5.0 TRACE METALLIC IMPURITIES (TMI ) DETERMINED BY ICP-MS AND ICP-OES (µg/mL)

#### 6.0 **INTENDED USE**

- 6.1 This standard is intended for the calibration of analytical instruments and validation of analytical methods as appropriate. This CRM may be used in connection with EPA Methods 6010, 6020 (all versions), Standard Methods 3120 B and USP <232> / ICH Q3D.
- 6.2 For products attaining traceability through Inorganic Ventures' Primary Certified Reference Materials (PCRM™) see the Limited License to Use PCRM™ in the Inorganic Ventures Terms and Conditions of Sale, https://www.inorganicventures.com/terms-and-conditions-sale. The Terms and Conditions contain information on the use of materials traceable to PCRM™ certified reference materials. This Limited License agreement is especially pertinent for laboratories accredited under ISO:17034.

#### INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL 7.0

# 7.1 Storage and Handling Recommendations

- Store between approximately 4° 30° C while in sealed TCT bag.
- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.
- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between  $4^{\circ}$   $25^{\circ}$  C to minimize the effects of transpiration. Use at  $20^{\circ} \pm 5^{\circ}$  C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.
- For more information, visit www.inorganicventures.com/TCT

**Note**: This solution contains Silver (Ag), please refer to our Sample Preparation Guide for more Information (https://www.inorganicventures.com/sample-preparation-guide/samples-containing-silver)

# 8.0 HAZARDOUS INFORMATION

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.

# 9.0 HOMOGENEITY

This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous.
 Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

#### 10.0 QUALITY STANDARD DOCUMENTATION

# 10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

# 10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

# 10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

Inorganic Ventures, 300 Technology Drive, Christiansburg, Va. 24073, USA; Telephone: 800.669.6799; 540.585.3030, Fax: 540.585.3012; inorganicventures.com; Info@inorganicventures.com

# 11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

# 11.1 Certification Issue Date

April 08, 2025

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

# 11.2 Lot Expiration Date

- April 08, 2029
- The date after which this CRM/RM should not be used.
- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

# 11.3 Period of Validity

- Sealed TCT Bag Open Date:	

#### 12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS Certificate Prepared By:

Justin Dirico Stock Processing Supervisor

Juster Diling

# **Certificate Approved By:**

Jodie Wall Stock VSM Coordinator

# **Certifying Officer:**

**Paul Gaines** Chairman / Senior Technical Director Paul R Laine

<sup>-</sup> This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.



# Certificate of Analysis

300 Technology Drive Christiansburg, VA 24073 USA inorganicventures.com

M6181 R->7/22/28 P: 800-669-6799/540-585-3030 F: 540-585-3012 info@inorganicventures.com

# 1.0 ACCREDITATION / REGISTRATION

INORGANIC VENTURES is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Ventures is also an ISO 9001 registered manufacturer (QSR Certificate Number QSR-1034).



# 2.0 PRODUCT DESCRIPTION

Product Code:

Multi Analyte Custom Grade Solution

Catalog Number:

WW-LFS-2

Lot Number:

V2-MEB743480

Matrix:

5% (v/v) HNO3

tr. HF

Value / Analyte(s):

200 µg/mL ea:

Silica,

80 μg/mL ea: Antimony,

70 μg/mL ea:

Tin,

40 μg/mL ea: Molybdenum, 20 μg/mL ea:

Titanium

# 3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE
Antimony, Sb

**CERTIFIED VALUE** 

ANALYTE

CERTIFIED VALUE 40.05 ± 0.22 µg/mL

Silica, SIO2

80.1 ± 0.5 µg/mL 200.3 ± 1.4 µg/mL

Molybdenum, Mo

Tin, Sn

70.1 ± 0.4 µg/mL

Titanium. Ti

20.03 ± 0.12 µg/mL

Density:

1.025 g/mL (measured at 20 ± 4 °C)

# Assay Information:

-uj			
ANALYTE	METHOD	NIST SRM#	SRM LOT#
Мо	ICP Assay	3134	130418
Sb	ICP Assay	3102a	140911
SiO2	Calculated		See Sec. 4.2
Sn	ICP Assay	3161a	140917
Ti	ICP Assay	traceable to 3162a	T2-TI725816

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

## Characterization of CRM/RM by Two or More Methods

Certified Value, X<sub>CRM/RM</sub>, where two or more methods of characterization are used is the weighted mean of the results:

 $X_{CRM/RM} = \Sigma(w_i) (X_i)$ 

X<sub>i</sub> = mean of Assay Method I with standard uncertainty u<sub>char I</sub>

 $\mathbf{w_i}$  = the weighting factors for each method calculated using the inverse square of the variance:

 $w_i = (1/u_{char i})^2 / (\Sigma (1/(u_{char i})^2)$ 

CRM/RM Expanded Uncertainty (±) =  $U_{CRM/RM} = k (u^2_{char} + u^2_{bb} + u^2_{lts} + u^2_{ts})^{1/2}$ 

k = coverage factor = 2

 $u_{char} = [\Sigma((w_i)^2 (u_{char})^2)]^{1/2}$  where  $u_{char}$  are the errors from each characterization method

u<sub>bb</sub> = bottle to bottle homogeneity standard uncertainty

ults = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

# Characterization of CRM/RM by One Method

Certified Value, X<sub>CRM/RM</sub>, where one method of characterization is used is the mean of individual results:

X<sub>CRM/RM</sub> = (X<sub>a</sub>) (u<sub>char s</sub>)

X<sub>a</sub> = mean of Assay Method A with

uchar a = the standard uncertainty of characterization Method A

CRM/RM Expanded Uncertainty (±) =  $U_{CRM/RM} = k (u^2_{chare} + u^2_{bb} + u^2_{lts} + u^2_{ts})^{\frac{1}{2}}$ 

k = coverage factor = 2

uchar a = the errors from characterization

ubb = bottle to bottle homogeneity standard uncertainty

ults = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

# 4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

#### 4.1 Thermometer Calibration

- All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

# 4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

# 4.3 Glassware Calibration

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control
of CRM/RMs.

# 5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES (µg/mL)

N/A

## 6.0 INTENDED USE

- 6.1 This standard is intended for the calibration of analytical instruments and validation of analytical methods as appropriate. This CRM may be used in connection with EPA Methods 6010, 6020 (all versions), Standard Methods 3120 B and USP <232> / ICH Q3D.
- 6.2 For products attaining traceability through Inorganic Ventures' Primary Certified Reference Materials (PCRM™) see the Limited License to Use PCRM™ in the Inorganic Ventures Terms and Conditions of Sale, <a href="https://www.inorganicventures.com/terms-and-conditions-sale">https://www.inorganicventures.com/terms-and-conditions-sale</a>. The Terms and Conditions contain information on the use of materials traceable to PCRM™ certified reference materials. This Limited License agreement is especially pertinent for laboratories accredited under ISO:17034.

# 7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

# 7.1 Storage and Handling Recommendations

- Store between approximately 4° 30° C while in sealed TCT bag.
- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.
- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between  $4^{\circ}$   $24^{\circ}$  C to minimize the effects of transpiration. Use at  $20^{\circ} \pm 4^{\circ}$  C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.
- For more information, visit www.inorganicventures.com/TCT

HF Note: This standard should not be prepared or stored in glass.

# 8.0 HAZARDOUS INFORMATION

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.

# 9.0 HOMOGENEITY

- This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous. Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

# 10.0 QUALITY STANDARD DOCUMENTATION

# 10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

# 10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

# 10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

Inorganic Ventures, 300 Technology Drive, Christiansburg, Va. 24073, USA; Telephone: 800.669.6799; 540.585.3030, Fax: 540.585.3012; inorganicventures.com; info@inorganicventures.com

# 11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

# 11.1 Certification Issue Date

May 07, 2024

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

# 11.2 Lot Expiration Date

- May 07, 2029
- The date after which this CRM/RM should not be used.
- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

# 11.3 Period of Validity

- Sealed TCT Bag Open Date:	
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#### 12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS **Certificate Prepared By:**

Justin Dirico Stock Processing Supervisor

# **Certificate Approved By:**

Thomas Kozikowski Stock VS Manager

209781 Paul R Laine

# **Certifying Officer:**

**Paul Gaines** Chairman / Senior Technical Director

<sup>-</sup> This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.



Instructions for QATS Reference Material: ICP-AES ICS

# QATS LABORATORY INORGANIC REFERENCE MATERIAL INTERFERENCE CHECK SAMPLE SET FOR ICP-AES (ICSA WITH ICSB)

**NOTE:** These instructions are for advisory purposes only. If any apparent conflict exists between these instructions and the analytical protocol or your contract, disregard these instructions.

APPLICATION: For use with the CLP SFAM01.0 SOW and revisions.

**CAUTION:** Read instructions carefully before opening bottle(s) and proceeding with the

analyses,

Contains Heavy Metals
HAZARDOUS MATERIAL

Safety Data Sheets
Available Upon Request

M6182

# (A) SAMPLE DESCRIPTION

Enclosed is a set of one (1) or more bottles of Aqueous Reference Material, each composed of metals at various concentrations and prepared with nitrate salts and oxy-acids of the respective elements in a 5% nitric acid matrix. For the reference material source in reporting ICSA and ICSAB mixture use "USEPA". For the reference material lot number for the ICSA use "ICSA-1211" and for the ICSAB mixture use "ICSA-1211+ICSB-0710".

<u>CAUTION:</u> The bottle(s) should be protected from light during storage to ensure the stability of silver which is contained in the ICSB solution. The bottle(s) should be stored at room temperature. **Do not allow the solution(s) to freeze.** 

# (B) BREAKAGE OR MISSING ITEMS

Check the contents of the shipment carefully for any broken, leaking, or missing items. Check that the seal is intact on each bottle. Refer to the enclosed chain of custody record. Report any problems to Mr. Keith Strout, APTIM Federal Services, LLC, at (702) 895-8722. If requested, return the chain-of-custody record with appropriate annotations and signatures to the address provided below.

QUALITY ASSURANCE TECHNICAL SUPPORT LABORATORY
APTIM Federal Services, LLC
2700 Chandler Avenue - Building C
Las Vegas, NV 89120

# (C) ANALYSIS OF SAMPLES

The interference check sample set is to be used to verify inter-element and background correction factors of inductively-coupled plasma (ICP) spectrometers. This reference material set consists of two (2) concentrated solutions. The ICSA solution contains the four (4) interferent elements: Al, Ca, Fe, and Mg. The ICSB solution contains the analytes: Ag, As, Sb, Ba, Be,

Page 1 of 2











# APTIM

# Instructions for QATS Reference Material: ICP-AES ICS

Cd, Co, Cr, Cu, Mn, Ni, Pb, Tl, Se, V, and Zn. This instruction sheet provides the nominal values for ICP-AES Part A and Part B target analytes when diluted as directed.

Using Class "A" glassware, preparation and analysis must be performed according to the following instructions:

ICSA-1211, Interferents: Pipet 10 mL of the ICSA solution into a 100 mL volumetric flask and dilute to volume with 2% v/v HNO<sub>3</sub>. Analyze this ICSA solution by ICP-AES.

ICSB-0710, Analytes, mixed with ICSA-1211, Interferents: Pipet 10 mL of the ICSA solution and 10 mL of the ICSB solution into a 100 mL volumetric flask and dilute to volume with 2% v/v HNO<sub>3</sub>. Analyze this ICSAB solution by ICP-AES.

# (D) "CERTIFIED VALUE" CONCENTRATIONS OF QATS ICP-AES ICS SOLUTION(S)

The "Certified Value" concentrations of the elements, listed in Table 1 below, were derived from statistically pooled analysis results from the following sources, if available: QATS Laboratory, CLP laboratories, Quarterly Blind (QB)/Proficiency Testing (PT) events, CLP pre-award events, and external referee laboratories.

Table 1. "CERTIFIED VALUES" FOR INTERFERENCE CHECK SAMPLE ICP-AES ICSA-1211, AND ICSA-1211 MIXED WITH ICSB-0710							
Element	CRQL	Part A (µg/L)	Low Limit (µg/L)	High Limit (µg/L)	Part A +Part B (µg/L)	Low Limit (µg/L)	High Limit (µg/L)
Al	200	255000	216000	294000	247000	209000	285000
Sb	60	(0.0)	-60.0	60.0	618	525	711
As	10	(0.0)	-10.0	10.0	104	88.4	120
Ва	200	(6.0)	-194	206	(537)	337	737
Ве	5.0	(0.0)	-5.0	5.0	495	420	570
Cd	5.0	(1.0)	-4.0	6.0	972	826	1120
Ca	5000	245000	208000	282000	235000	199000	271000
Cr	10	(52.0)	42.0	62.0	542	460	624
Co	50	(0.0)	-50.0	50.0	476	404	548
Cu	25	(2.0)	-23.0	27.0	511	434	588
Fe	100	101000	85600	116500	99300	84400	114500
Pb	10	(0.0)	-10.0	10.0	(49.0)	39.0	59.0
Mg	5000	255000	216000	294000	248000	210000	286000
Mn	15	(7.0)	-8.0	22.0	507	430	584
Ni	40	(2.0)	-38.0	42.0	954	810	1100
Se	35	(0.0)	-35.0	35.0	(46.0)	11.0	81.0
Ag	10	(0.0)	-10.0	10.0	201	170	232
TI	25	(0.0)	-25.0	25.0	(108)	83.0	133
V	50	(0.0)	-50.0	50.0	491	417	565
Zn	60	(0.0)	-60.0	60.0	952	809	1095

The acceptance ranges for all analytes in parentheses in the above table were determined using the listed certified value  $\pm$  1 times the associated CLP SOW CRQL. The acceptance ranges for all other analytes were determined using the certified value  $\pm$  15 percent of the listed certified value.



Instructions for QATS Reference Material: ICP-AES ICS

# QATS LABORATORY INORGANIC REFERENCE MATERIAL INTERFERENCE CHECK SAMPLE SET FOR ICP-AES (ICSA WITH ICSB)

NOTE: These instructions are for advisory purposes only. If any apparent conflict exists between these instructions and the analytical protocol or your contract, disregard these instructions.

APPLICATION: For use with the CLP SFAM01.0 SOW and revisions.

CAUTION:

Read instructions carefully before opening bottle(s) and proceeding with the

analyses.

**Contains Heavy Metals** HAZARDOUS MATERIAL

Safety Data Sheets Available Upon Request M6184

# (A) SAMPLE DESCRIPTION

Enclosed is a set of one (1) or more bottles of Aqueous Reference Material, each composed of metals at various concentrations and prepared with nitrate salts and oxy-acids of the respective elements in a 5% nitric acid matrix. For the reference material source in reporting ICSA and ICSAB mixture use "USEPA". For the reference material lot number for the ICSA use "ICSA-1211" and for the ICSAB mixture use "ICSA-1211+ICSB-0710".

**CAUTION:** The bottle(s) should be protected from light during storage to ensure the stability of silver which is contained in the ICSB solution. The bottle(s) should be stored at room temperature. Do not allow the solution(s) to freeze.

# (B) BREAKAGE OR MISSING ITEMS

Check the contents of the shipment carefully for any broken, leaking, or missing items. Check that the seal is intact on each bottle. Refer to the enclosed chain of custody record. Report any problems to Mr. Keith Strout, APTIM Federal Services, LLC, at (702) 895-8722, If requested, return the chain-of-custody record with appropriate annotations and signatures to the address provided below.

> QUALITY ASSURANCE TECHNICAL SUPPORT LABORATORY **APTIM Federal Services, LLC** 2700 Chandler Avenue - Building C Las Vegas, NV 89120

# (C) ANALYSIS OF SAMPLES

The interference check sample set is to be used to verify inter-element and background correction factors of inductively-coupled plasma (ICP) spectrometers. This reference material set consists of two (2) concentrated solutions. The ICSA solution contains the four (4) interferent elements: Al, Ca, Fe, and Mg. The ICSB solution contains the analytes: Ag, As, Sb, Ba, Be,

Page 1 of 2











# **APTIM**

# Instructions for QATS Reference Material: ICP-AES ICS

Cd, Co, Cr, Cu, Mn, Ni, Pb, Tl, Se, V, and Zn. This instruction sheet provides the nominal values for ICP-AES Part A and Part B target analytes when diluted as directed.

Using Class "A" glassware, preparation and analysis must be performed according to the following instructions:

ICSA-1211, Interferents: Pipet 10 mL of the ICSA solution into a 100 mL volumetric flask and dilute to volume with 2% v/v HNO<sub>3</sub>. Analyze this ICSA solution by ICP-AES.

ICSB-0710, Analytes, mixed with ICSA-1211, Interferents: Pipet 10 mL of the ICSA solution and 10 mL of the ICSB solution into a 100 mL volumetric flask and dilute to volume with 2% v/v HNO<sub>3</sub>. Analyze this ICSAB solution by ICP-AES.

# (D) "CERTIFIED VALUE" CONCENTRATIONS OF QATS ICP-AES ICS SOLUTION(S)

The "Certified Value" concentrations of the elements, listed in Table 1 below, were derived from statistically pooled analysis results from the following sources, if available: QATS Laboratory, CLP laboratories, Quarterly Blind (QB)/Proficiency Testing (PT) events, CLP pre-award events, and external referee laboratories.

Table 1. "CERTIFIED VALUES" FOR INTERFERENCE CHECK SAMPLE ICP-AES ICSA-1211, AND ICSA-1211 MIXED WITH ICSB-0710							
Element	CRQL	Part A (µg/L)	Low Limit (µg/L)	High Limit (µg/L)	Part A +Part B (µg/L)	Low Limit (µg/L)	High Limit (µg/L)
Al	200	255000	216000	294000	247000	209000	285000
Sb	60	(0.0)	-60.0	60.0	618	525	711
As	10	(0.0)	-10.0	10.0	104	88.4	120
Ва	200	(6.0)	-194	206	(537)	337	737
Be	5.0	(0.0)	-5.0	5.0	495	420	570
Cd	5.0	(1.0)	-4.0	6.0	972	826	1120
Ca	5000	245000	208000	282000	235000	199000	271000
Cr	10	(52.0)	42.0	62.0	542	460	624
Co	50	(0.0)	-50.0	50.0	476	404	548
Cu	25	(2.0)	-23.0	27.0	511	434	588
Fe	100	101000	85600	116500	99300	84400	114500
Pb	10	(0.0)	-10.0	10.0	(49.0)	39.0	59.0
Mg	5000	255000	216000	294000	248000	210000	286000
Mn	15	(7.0)	-8.0	22.0	507	430	584
Ni	40	(2.0)	-38.0	42.0	954	810	1100
Se	35	(0.0)	-35.0	35.0	(46.0)	11.0	81.0
Ag	10	(0.0)	-10.0	10.0	201	170	232
Ti	25	(0.0)	-25.0	25.0	(108)	83.0	133
V	50	(0.0)	-50.0	50.0	491	417	565
Zn	60	(0.0)	-60.0	60.0	952	809	1095

The acceptance ranges for all analytes in parentheses in the above table were determined using the listed certified value  $\pm$  1 times the associated CLP SOW CRQL. The acceptance ranges for all other analytes were determined using the certified value  $\pm$  15 percent of the listed certified value.





M6187 R.D:-08108125

Material No.: 9606-03 Batch No.: 24H0162012 Ifactured Date: 2024-06-28

Manufactured Date: 2024-06-28 Retest Date: 2029-06-27

Revision No.: 0

# Certificate of Analysis

Test	Specification	Result	
Assay (HNO3)	69.0 – 70.0 %	69.7 %	
Appearance	Passes Test	Passes Test	
Color (APHA)	≤ 10	5	
Residue after Ignition	≤ 2 ppm	< 1 ppm	
Chloride (CI)	≤ 0.08 ppm	0.03 ppm	
Phosphate (PO <sub>4</sub> )	≤ 0.10 ppm	< 0.03 ppm	
Sulfate (SO <sub>4</sub> )	≤ 0.2 ppm	< 0.2 ppm	
Trace Impurities - Aluminum (AI)	≤ 40.0 ppb	< 1.0 ppb	
Arsenic and Antimony (as As)	≤ 5.0 ppb	< 2.0 ppb	
Trace Impurities - Barium (Ba)	≤ 10.0 ppb	< 1.0 ppb	
Trace Impurities - Beryllium (Be)	≤ 10.0 ppb	< 1.0 ppb	
Trace Impurities - Bismuth (Bi)	≤ 20.0 ppb	< 1.0 ppb	
Trace Impurities - Boron (B)	≤ 10.0 ppb	0.1 ppb	
Trace Impurities – Cadmium (Cd)	≤ 50 ppb	< 1 ppb	
Trace Impurities – Calcium (Ca)	≤ 50.0 ppb	0.3 ppb	
Trace Impurities – Chromium (Cr)	≤ 30.0 ppb	0.1 ppb	
Trace Impurities – Cobalt (Co)	≤ 10.0 ppb	< 1.0 ppb	
Trace Impurities – Copper (Cu)	≤ 10.0 ppb	< 1.0 ppb	
Trace Impurities – Gallium (Ga)	≤ 10.0 ppb	< 1.0 ppb	
Trace Impurities – Germanium (Ge)	≤ 20 ppb	< 1 ppb	
Trace Impurities – Gold (Au)	≤ 20 ppb	< 1 ppb	
Heavy Metals (as Pb)	≤ 100 ppb	< 50 ppb	
Trace Impurities – Iron (Fe)	≤ 40.0 ppb	< 1.0 ppb	
Frace Impurities – Lead (Pb)	≤ 20.0 ppb	< 1.0 ppb	
Frace Impurities – Lithium (Li)	≤ 10.0 ppb	< 1.0 ppb	
Frace Impurities – Magnesium (Mg)	≤ 20 ppb	< 1 ppb	
race Impurities – Manganese (Mn)	≤ 10.0 ppb	< 1.0 ppb	
race Impurities - Nickel (Ni)	≤ 20.0 ppb	< 1.0 ppb	

>>> Continued on page 2 >>>





Material No.: 9606-03 Batch No.: 24H0162012

Test	Specification	Result
Trace Impurities - Niobium (Nb)	≤ 50.0 ppb	< 1.0 ppb
Trace Impurities – Potassium (K)	≤ 50 ppb	< 1 ppb
Trace Impurities – Silicon (Si)	≤ 50 ppb	1 ppb
Trace Impurities – Silver (Ag)	≤ 20.0 ppb	< 1.0 ppb
Trace Impurities - Sodium (Na)	≤ 150.0 ppb	< 1.0 ppb
Trace Impurities - Strontium (Sr)	≤ 30.0 ppb	< 1.0 ppb
Trace Impurities – Tantalum (Ta)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Thallium (TI)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities ~ Tin (Sn)	≤ 20.0 ppb	< 1.0 ppb
Trace Impurities – Titanium (Ti)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Vanadium (V)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities - Zinc (Zn)	≤ 20.0 ppb	< 1.0 ppb
Trace Impurities - Zirconium (Zr)	≤ 10.0 ppb	< 1.0 ppb
Particle Count - 0.5 µm and greater	≤ 60 par/ml	13 par/ml
Particle Count - 1.0 µm and greater	≤ 10 par/ml	5 par/ml

Nitric Acid 69% CMOS





Material No.: 9606-03 Batch No.: 24H0162012

Test Specification Result

For Microelectronic Use

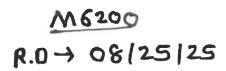
Country of Origin: USA

Packaging Site: Phillipsburg Mfg Ctr & DC

Jamie Croak

Director Quality Operations, Bioscience Production





Material No.: 9530-33 Batch No.: 24D1562005 Manufactured Date: 2024-03-18 Retest Date: 2029-03-17

Revision No.: 0

#### Certificate of Analysis

Test	Specification	Result
ACS - Assay (as HCI) (by acid-base titrn)	36.5 - 38.0 %	37.6 %
ACS – Color (APHA)	≤ 10	5
ACS – Residue after Ignition	≤ 3 ppm	< 1 ppm
ACS - Specific Gravity at 60°/60°F	1.185 - 1.192	1.192
ACS – Bromide (Br)	≤ 0.005 %	< 0.005 %
ACS – Extractable Organic Substances	≤ 5 ppm	< 1 ppm
ACS - Free Chlorine (as Cl2)	≤ 0.5 ppm	< 0.5 ppm
Phosphate (PO <sub>4</sub> )	≤ 0.05 ppm	0.03 ppm
Sulfate (SO <sub>4</sub> )	≤ 0.5 ppm	< 0.3 ppm
Sulfite (SO₃)	≤ 0.8 ppm	0.3 ppm
Ammonium (NH <sub>4</sub> )	≤ 3 ppm	< 1 ppm
Trace Impurities - Arsenic (As)	≤ 0.010 ppm	< 0.003 ppm
Trace Impurities - Aluminum (Al)	≤ 10.0 ppb	< 5.0 ppb
Arsenic and Antimony (as As)	≤ 5.0 ppb	< 3.0 ppb
Trace Impurities - Barium (Ba)	≤ 1.0 ppb	< 1.0 ppb
Trace Impurities - Beryllium (Be)	≤ 1.0 ppb	< 1.0 ppb
Trace Impurities - Bismuth (Bi)	≤ 10.0 ppb	< 10.0 ppb
Trace Impurities - Boron (B)	≤ 20.0 ppb	2.2 ppb
Trace Impurities - Cadmium (Cd)	≤ 1.0 ppb	< 1.0 ppb
Trace Impurities - Calcium (Ca)	≤ 50.0 ppb	31.0 ppb
Trace Impurities - Chromium (Cr)	≤ 1.0 ppb	0.5 ppb
Trace Impurities – Cobalt (Co)	≤ 1.0 ppb	0.2 ppb
Trace Impurities - Copper (Cu)	≤ 1.0 ppb	< 0.1 ppb
Trace Impurities - Gallium (Ga)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Germanium (Ge)	≤ 3.0 ppb	< 2.0 ppb
Trace Impurities – Gold (Au)	≤ 4.0 ppb	< 0.2 ppb
Heavy Metals (as Pb)	≤ 100 ppb	< 50 ppb
Trace Impurities – Iron (Fe)	≤ 15 ppb	3 ppb

>>> Continued on page 2 >>>





Material No.: 9530-33 Batch No.: 24D1562005

Test	Specification	Result
Trace Impurities - Lead (Pb)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Lithium (Li)	≤ 1.0 ppb	< 0.1 ppb
Trace Impurities - Magnesium (Mg)	≤ 10.0 ppb	2.2 ppb
Trace Impurities - Manganese (Mn)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities - Mercury (Hg)	≤ 0.5 ppb	< 0.1 ppb
Trace Impurities - Molybdenum (Mo)	≤ 10.0 ppb	< 5.0 ppb
Trace Impurities - Nickel (Ni)	≤ 4.0 ppb	0.2 ppb
Trace Impurities - Niobium (Nb)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Potassium (K)	≤ 9.0 ppb	< 1.0 ppb
Trace Impurities – Selenium (Se), For Information Only		< 1.0 ppb
Trace Impurities – Silicon (Si)	≤ 100.0 ppb	< 10.0 ppb
Trace Impurities – Silver (Ag)	≤ 1.0 ppb	< 0.3 ppb
Trace Impurities – Sodium (Na)	≤ 100.0 ppb	2.0 ppb
Trace Impurities – Strontium (Sr)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Tantalum (Ta)	≤ 1.0 ppb	< 0.9 ppb
Trace Impurities – Thallium (TI)	≤ 5.0 ppb	< 2.0 ppb
Trace Impurities - Tin (Sn)	≤ 5.0 ppb	< 0.4 ppb
Trace Impurities – Titanium (Ti)	≤ 1.0 ppb	0.2 ppb
Frace Impurities – Vanadium (V)	≤ 1.0 ppb	< 0.2 ppb
Frace Impurities – Zinc (Zn)	≤ 5.0 ppb	< 0.2 ppb
Frace Impurities – Zirconium (Zr)	≤ 1.0 ppb	< 0.1 ppb

Hydrochloric Acid, 36.5-38.0% BAKER INSTRA-ANALYZED® Reagent For Trace Metal Analysis





Material No.: 9530-33 Batch No.: 24D1562005

Test Specification

Result

For Laboratory, Research, or Manufacturing Use Product Information (not specifications): Appearance (clear, fuming liquid) Meets ACS Specifications Storage Condition: Store below 25 °C.

Country of Origin: USA

Packaging Site: Phillipsburg Mfg Ctr & DC

Jamie Croak

Director Quality Operations, Bioscience Production

### Absolute Standards, Inc. 800-368-1131

www.absolutestandards.com



## Certified Reference Material CRM

M6027

ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com

R1.8/5/24

CERTIFIED WEIGHT REPORT: Nominal Concentration (µg/mL): Recommended Storage: Expiration Date: Part Number: Lot Number: Description: 062027 57028 062024 Nickel (Ni) 1000 Ambient (20 °C) 24002546 2.0% Lot # Nitric Acid Solvent: 40.0 Nitric Acid Formulated By: Benson Chan

	Nickel(II) nitrate hexahydrate (Ni)	Compound	
	58128	Number	Part
	062023	Number	Lot
	0.1000	Factor	Dilution
	200.0	Vol. (mL)	Initial
	0.084	Pipette (mL)	Uncertainty
	1000	Conc. (µg/mL)	Nominal
	10000.4	Conc. (µg/mL)	Initial
	1000.0	Vol. (mL) Pipette (mL) Conc. (µg/mL) Conc. (µg/mL) Conc. (µg/mL) +/- (µg/mL)	Final
	2.2	+/- (µg/mL)	Uncertainty
	13478-00-7		(Solve
Ш	<b>1000.0</b> 2.2 13478-00-7 1 mg/m3	CAS# OSHA PEL (TWA)	(Solvent Safety Info. On Attached pg.)
	orl-rat 1620 mg/kg 3136	LD50	(ttached pg.)
	3136	SRM	TSIN

Volume shown below was diluted to (mL):

2000.07

0.100

Flask Uncertainty

5E-05 Balance Uncertainty

Reviewed By:

Pedro L. Rentas

062024

062024

Expanded

SDS Information

**NIST Test Number:** 

**BTUB** 

~-z/m	5.0E6	m/z->-	2500	m/z->	1.0E5	2.005
						3
N O		0		<b>1</b>		[1] Spectrum No.1
						3 Z 0
N N		200		N		pad pad
						9.136
230		30		30		9.135 sec]:58028.D# [Count] [Linear]
N		: 				58028
240		6		ð		.b# [0
N G		1) 0		Ø,		Burno
Ò		Ŏ <sub>į</sub>		0:		Linea
N 0		5		0		
		170		8		
		80		80		
				<i>(</i> 0 :		
		190		90		
		200		100		
		ŏ		ŏ		

Part # 57028



https://Absolutestandards.com ANAB ISO 17034 Accredited AR-1539 Certificate Number

# Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

	6	<u> </u>	Be	Ба	As	8	2			
	70.02	A).02	<b>A</b> 0.01	40.02	40.2	<b>△</b> 0.02	40.02	Action Science (W.S.		
	5	. ზ	ţ	రి	Ç	Ç	8			
	<0.02	0.02	40.02	40.02	40.02	40.2	<0.02			
	All	. පී	වූ	£	딸	덕	Дy			
	40.02	<b>∆</b> .02	40.02	<b>40.02</b>	40.02	40.02	40.02			
	3	<u> </u>	क्र	F	Б	Ж	Hf			
	<b>40.02</b>	0.02	<u> 0</u> 2	♦0.02	40.02	40.02	<0.02		Trace M	
	Z	Мо	Hg	Mn	Mg	Ę	Ľ		etals	
3=	40.02	40.02	40.2	<b>∆0.02</b>	10.0	0.02	40.02		Verifica	
	5	7	~	Pd	õ	R	Z		tion	
Target analyte	<b>⊕</b> 2	40.02	40,02	0.02	40.02	40,02	н		by ICP-N	
	જ	Sm	20	Rb	Rh	Re	꾸	DESCRIPTION OF THE PERSON OF T	S (h	
	40.02	₫002	40.02	40.02	40.02	40.02	<0.02		I/mL)	
	Ta	S	Ş	Na	Ag	83	Se			
	<0.02	40,02	40,02	402	40.02	40.02	40.2			
	=	Sn	Ħ	Ħ	∄	Te	4T			
	40.02	40.02	40.02	<b>∆</b> 0,02	40.02	40.02	<0.02			
	27	Zn	×	¥	۷	a a	₩			
	40.02	<b>∆</b> 0.02	A).02	40.02	<u>A</u>	<b>∆</b> 0.02	<b>∆</b> 0.02			

#### Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

\* Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in \* The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.

the preparation of all standards.

\* All standard containers are meticulously cleaned prior to use.

\* Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).

\* Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated

\* All Standards should be stored with caps tight and under appropriate laboratory conditions.

\* Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

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# Certified Reference Material CRM

M6030



AR-1539 Certificate Number https://Absolutestandards.com ANAB ISO 17034 Accredited

CERTIFIED WEIGHT REPORT: Part Number: 57047 122823 R = 8 | 5 | 24 Lot #

Solvent: 24002546

Nitric Acid

Ambient (20 °C) Silver (Ag) 122826 2% <u>E</u> 80.0 Nitric Acid

Formulated By:

Benson Chan

122823

122823

Recommended Storage:

**Expiration Date:** 

Lot Number:

Description:

Nominal Concentration (µg/mL): NIST Test Number: Weight shown below was diluted to (mL): 1000 **6UTB** 헏 4000.30 Nominal 0.058 Flask Uncertainty Purity Uncertainty Assay 5E-05 Balance Uncertainty Target Actual Actual Uncertainty Reviewed By: Expanded (Solvent Safety Info. On Attached pg.) Pedro L. Rentas SDS Information

 Silver nitrate (Ag) Compound IN035 J0612AGA1 RM# Number Conc. (µg/mL) 1000.0 8 Purity (%) 0.10 63.7 38 Weight (g) 6.27992 Weight (g) Conc. (µg/mL) 6.27998 1000.0 +/- (µg/mL) 2.0 7761-88-B CAS# 10 ug/m3 Z 3151 NIST SRM

[1] Spectrum No.1 [ 14.044 sec]:58147.D# [Count] [Linear]

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							race Me	letals	Verificat	tion	by ICP-I	S	ug/mL)						
	The state of the s						A STATE OF STATE	, j											
A	<0.02	Ω	<0.02	Dy	<0.02	出	<0.02	Ľ	<0.02	Z	<0.02	7	<0.02	Se	<0.2	4	40.02	W	<0.02
4S	40.02	ဂ္ဂ	40.2	덬	40.02	Ж	40.02	Li	<0.02	3	40.02	₽ Re	<b>40.02</b>	S:	40.02	ď	A 0.02	a	\$0.02
As	40.2	Ç	<0.02	땹	<0.02	In	<0.02	Mg	<0.01	တ္တ	40.02	짜	<0.02	Agr	7	∄	<0.02	<	40.02
Ва	<0.02	రి	40,02	82	<0.02	듁	40.02	Mn	<0.02	Pd	<0.02	R.	40.02	N	40.2	∄	<u>\$</u>	상	<0.02
Ве	40.01	Ω	<0.02	හු	<0.02	ਲੋਂ	40.2	Hg	40.2	Þ	40.02	R	A0.02	Ž,	40,02	ď	<b>♦</b> 0.02	<	40.02
쯨	<0.02	င္ပ	40.02	ନ	<0.02	5	<b>&lt;</b> 0.02	Mo	<0.02	77	40.02	Sin	<b>△</b> 0.02	c/a	40.02	S	A) (2)	Z <sub>n</sub>	40.07
В	<0.02	δ	<0.02	Au	<0.02	광	<0.02	Z	<0.02	*	40.2	Sc	<0.02	ī	<0.02	Ħ	<0.02	2	<0.02

Physical Characterization:

(T)= Target analyte

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- \* The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- \* Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- \* All standard containers are meticulously cleaned prior to use.
- \* Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated.
- \* All Standards should be stored with caps tight and under appropriate laboratory conditions.
  \* Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

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## Certified Reference Material CRM

ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com



Number:   57051					071724				071724	
Number:   57051										
Number:   57051   24002546   Nitric Acid		1	いっての日子	}	Giovanni Esposito	2	The state of the s	Hends	Pedro L. Rentas	
Number:   57051   24002546   Nitric Acid		1,1	プルガルが	3	Formulated By:	7	1	Leston	Reviewed By:	
Number:   57051   24002546   24002546   271724   24002546   271724   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   24002546   2400256   24002546   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256   2400256					Nitric Acid					
Number:   57051	Solvent:	Nitric Acid			40.0	(mL)				
Number:   57051	Fot #	24002546			2.0%				Inty	_
Number:   57051									Balance Uncerta	Flask Uncertaint
Number: 57051 Scription: 071724 Autimony ation Date: 071727 d Storage: Ambient (20 n (µg/mL): 6UTB nn below was diluted to (mL):	00								5E-05	0.058
Number: Number: Scription: ation Date: d Storage: n (µg/mL): rt Number:	10×			(qs)			<b>့</b>			
Part Number: Lot Number: Lot Number: Description: Expiration Date: ended Storage: tration (µg/mL): T Test Number: shown below was		57051	071724	Antimony		071727	Ambient (20	1000	6UTB	diluted to (mL):
E RECOMM IOMINAL CONCENT OMINAL CONCENT NIS	CERTIFIED WEIGHT REPORT:	Part Number:	Lot Number:	Description:		Expiration Date:	Recommended Storage:	Nominal Concentration (µg/mL):	NIST Test Number:	Volume shown below was

NIST SRM

LD50

(Solvent Safety Info. On Attached pg.)

OSHA PEL (TWA)

CAS#

+/- (µg/mL) Uncertainty Expanded

Conc. (µg/mL) Conc. (µg/mL)

Vol. (mL) Pipette (mL) Conc. (µg/mL)

Uncertainty

Initial

Dilution

Factor

Number Ľ

Number Part

Compound

SDS Information

1. Antimony (Sb)	58151	060324	0,1000	200.0	0.084	1000	10001.4	1000.0	2.2	7440-36-0	0.5 mg/m3	orl-rat 7000 mg/kg 3102a
5.0E5	[1] Spectrum No.1		17.964 se	9c]:5805	1.D# [C	[ 17.964 sec]:58051.D# [Count] [Linear]	eari					
2.68												
m/z->> 5.0E5 2.5E5	0	ON	08		0	Og	09	0		08	06	00
m/z->-	011	08 -	130		041	150	160	170		180	000	0 0 8
ν-z/ш	21,0	220	230		240	250	260					

## Certified Reference Material CRM



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800-368-1131



# Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

							Trace M	<b>letals</b>	S Verifical	tion	by ICP-N	n) SV	a/mF)						
					200				STATE OF THE PARTY									ı	
Al	<0.02	25	<0.02	Εğ	<0.02	HŁ	<0.02	ΙΞ	<0.02	ï	<0.02	본	<0.02	Se	<0.2	al l	<0.02	*	<0.02
Sb	Τ	ర	<0.2	臣	<0.02	Но	<0.02	2	<0.02	₽ R	<0.02	Re	<0.02	Si	<0.02	Тe	<0.02	n	<0.02
As	<0.2	රී	<0.02	En	<0.02	In	<0.02	Mg	<0.01	ő	<0.02	Rh	<0.02	Ag	<0.02	E	<0.02	>	<0.02
Ba	<0.02	చ	<0.02	3	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Za	<0.2	Th	<0.02	χp	<0.02
Be	<0.01	ڻ	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	Ь	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Ā	<0.02
Bi	<0.02	ပိ	<0.02	පී	<0.02	La	<0.02	Mo	<0.02	盂	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
В	<0.02	Çn	<0.02	Au	<0.02	Pb	<0.02	PN	<0.02	M	<0.2	Sc	<0.02	Та	<0.02	Ε	<0.02	Zr	<0.02

(T) = Target analyte

Certified by:

#### Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.



All standard containers are meticulously cleaned prior to use. Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above). the preparation of all standards.

Lot # 071724

Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated.

<sup>\*</sup> All Standards should be stored with caps tight and under appropriate laboratory conditions.
\* Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

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## Certified Reference Material CRM

M6023

ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com

		Weight shown below was diluted to (mL):	NIST Test Number:	Nominal Concentration (µg/mL):	Recommended Storage:	Expiration Date:		Description:	Lot Number:	Part Number:	CERTIFIED WEIGHT REPORT:
Lot		ted to (mL):	8TUB	1000	Ambient (20 °C)	062727		Thalllum (TI)	062724	57081	
Nominal		2000.1			င္ပိ						
Purity Uncertainty Assay		0.10 Flask Uncertainty	5E-05 Balance Uncertainty				2%			Solvent:	
Target						(mL)	40.0			Solvent: 24002546	Lot #
Actual							Nitric Acid			Nitric Acid	
Actual											
Uncertainty	Expanded		Reviewed By:	Juna	1		Formulated By:	4	TO SE	>	
(Solvent Safety Info. On Attached pg.)	SDS Information		Pedro L. Rentas	" freshies	A A		Aleah O'Brady	0	San O Basin	7	
ched pg.) NIST			062724				062724			,	
7											

RW#

Number

Conc. (µg/mL) (%)

Purity (%) (%)

Weight (g) Weight (g) Conc. (µg/mL) +/- (µg/mL)

CAS#

OSHA PEL (TWA)

LD50

SRM

-z/m	5.0E5	1.0E6	m/z->	5000	1.0€4	1.0E6	2.OE6	
N			-1				El opegrum No.	
210			10		ö		3	
220			120		N O			
							4 0	
230			130		<b>9</b>		[ ]4.044 sec]:57081.D# [Count] [Linear]	
240			<u> </u>		4		57081.	
ō			140		40		<u> </u>	
250			<b>1</b>		OI.			
0			160		60			
			4		70			
			170		0			
			180		80			100
			190		90			or any
			200		100			
			ŏ		ŏ			See all see al
								0

Part # 57081



https://Absolutestandards.com ANAB ISO 17034 Accredited AR-1539 Certificate Number

# Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

		œ	Id	: !	H.	52	į	As	30	2	2				
		40.02	20.02	5 8	200	20.02	e i	<u>۵</u>	20.02	3	40.02				
	ŀ	5	S	, (	,	C	, {	3	Ç	>	5				
		4000	40.02	20.02	3	<0.02	0.02	3	2.0	>	<0.02				
		A	ද	Ç,	?	Gd	į	ŗ	돡	,	ρ		l		
	20,02	3	<b>♦</b> 0.02	20.02	3	0.02	20.02	3	40.02		<b>∆</b> 0.02				
		ğ	L <sub>a</sub>	7	1	=	Е	- - -	Но	!	Hf		l.		
	70.02	3	<b>∆</b> .02	7.05	5	<b>∆</b> 0.02	20.02	3	A).02		40.02			race M	
		ź.	Mo	9H		š	1V192		Į,	ı	1.5	Service III		S	
(T) = Target analyte	20.02	3	A (2)	40.2	,	<b>∆</b> 0.02	10.02	2	&.02 20.02	40.04	4000	450 E 3 00 W	200	<b>Serifics</b>	
et anal	F	4 ;	<b>P</b>	70	· ¦	2	ç	,	Z	142	Z			₹. 2	
yte	2.05	0.01	3	<0.02	1000	<0.02	<0.02		<b>∆</b> 0.02	20.00	4		200	200	
	Sc	E	3	R	,	子	25	1	R.	2	P		4	このと	
	A0.02	20.02	3	<0.02	40.04	<n 02<="" td=""><td>40.02</td><td>10101</td><td>2000</td><td>20.02</td><td>2000</td><td></td><td>/HI /Br</td><td></td><td></td></n>	40.02	10101	2000	20.02	2000		/HI /Br		
	Ta	ū	n	Ş	744	Z	Ag	5	2	Ö					
	40,02	20.02	3	∆.02	7.07	3	A).02	40.04	3	46	,				
	11	DC	?	ď	120	7	Ħ	č	ş-1	10					ı
	40.02	20.02	3	40.02	70.02	4	H	70.02	3	<b>∆</b> .02					
	Zr	120	1	×	ID	ş	<	0	1	\$					
	40.02	<b>40.02</b>		A).02	20,02	8	A) (2)	70.02	3	<u>&amp;</u>					

### Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

\* The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.

\* Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.

\* All standard containers are meticulously cleaned prior to use.

\* Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).

\* Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated.

\* All Standards should be stored with caps tight and under appropriate laboratory conditions.

\* Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

#### 800-368-1131 Absolute Standards, Inc.

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## Certified Reference Material CRM

M6021

ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com

CERTIFIED WEIGHT REPORT: Part Number: Lot Number: 57023 062424 Solvent:

24002546 Nitric Acid

**Expiration Date:** Description: 062427 Vanadium (V) 2.0% (III) 40.0

Nitric Acid

Formulated By:

Aleah O'Brady

062424

062424

AND CORDA

Recommended Storage: **6UTB** 1000 Ambient (20 °C) 5E-05 **Balance Uncertainty** 

Nominal Concentration (µg/mL): Volume shown below was diluted to (mL): **NIST Test Number:** 2000.3 0.06 Flask Uncertainty Reviewed By: Expanded Pedro L. Rentas **SDS Information** 

orl-rat 58.1mg/kg 3165	2.2 7803-55-6 0.05 mg/m3	7803-55-6	2.2	1000.0	1 11	1000	0.084	0.1000 200.0	1 1	58123 021224	58123	Ammonium metavanadate (V)
	# OSHA PEL (TWA)	CAS#	+/- (ua/mL)	Conc. (ua/mL) +/- (ua/mL)	Conc. (ua/mL)	Vol. (mL) Pipette (mL) Conc. (ua/mL)	Pipette (mL)	Vol. (mL)	Factor	Number	Number	Compound
Attac	(Solvent Safety Info. On Attached pg.)	(Solver	Uncertainty	Final	Initial	Nominal	Uncertainty	Initial	Dilution	Lot	Part	

m/z->	2,5E8	m/z->- 5.0E8	1.0E7	m/z-> 2.0∈7	1.006	2.0€6
0 10		110		ō		
220		ที่ O		N.		
230		100		<b>3</b>		
240		140		<u>\$</u> .		
250		150		51		
260		160		60		
		170		70		
		180		90		
		190		90		
		200		100		

Part # 57023

# Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

	E	В	Ве	Ва	As	. 20	2 2			
	40,02	A),02	40.01	A).03	40.2	20.02	8 6 5	A PA		
	5	ပ	유	సి	೪	<u></u>	۶ د	2		
	40.02	40,02	<0.02	40.02	40.02	40.2	20.02	3		
	Au	ဂ္ဂ	స్ట	8	멸	耳	کِ ر			
	40.02	40.02	40,02	40.02	<b>60.02</b>	<0.02	20.02			
	3	<u>.</u>	737	5	rī.	Но	H			
	40.02	40.02	40,2	0.02	40.02	<b>∆</b> 0.02	40.02	INTERNATION OF THE PERSON NAMED IN	Trace M	
	폽	Mo	He	Mn	Mg	댭	Σ		etals	
(T) = Target analyte	40.02	40.02	402	40,02	10.0	40.02	40.02		Verifica	
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#### Physical Characterization:

Homogeneity: No heterogeneity was observed in the preparation of this standard.

Certified by:

- \* The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated. \* Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- \* All standard containers are meticulously cleaned prior to use.
- \* Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- \* Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated.
- \* All Standards should be stored with caps tight and under appropriate laboratory conditions.

  \* Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST

  \* Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



#### SHIPPING DOCUMENTS



#### 284 Sheffield Street, Mountainside, NJ 07092 (908) 789-8900 Fax: (908) 788-9222 www.chemtech.net

Alliance Project Number: Q3158

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2.	EFF-DAY1	-1-CN		W			9/19/25												
3.	EFF-DAY1	-2-CN		W			9/19/25												
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#### Alliance Technical Group, LLC - Newark

284 Sheffield Street Mountainside, NJ 07092

Laboratory Composite Sample log

Lab Project number: 03158

Date:\_\_\_ 9-22-25

Client Name: TANAGNO COND.

Client Project Name: SEM. AUNUM 2025

Instructions: Coup. Cyvide Sayres 4:1

Sample Custodian:

Client Sample ID	Weigh /Volume used	New ID	Sample Description	Sample Composite time	Comments
EFF-DAYI-1-CH	2504/62.5	EFFICENT -DAY-1-1-4CN	"Clear water"	0730	401. USED
EFF-DAY 1-7-CH				2	}
EFF- DAY-1-3-CN					
EFF- DAY-1-4-CH	1	1		1	
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#### Laboratory Certification

Certified By	License No.
Connecticut	PH-0830
DOD ELAP (ANAB)	L2219
Maine	2024021
Maryland	296
New Hampshire	255425
New Jersey	20012
New York	11376
Pennsylvania	68-00548
Soil Permit	525-24-234-08441
Texas	TX-C25-00189
Virginia	460312

QA Control Code: A2070148