

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	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
OR	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
H	Sample Analysis Out Of Hold Time

LAB CHRONICLE

OrderID: Q3277	OrderDate: 10/2/2025 3:50:00 PM
Client: G Environmental	Project: Newport
Contact: Gary Landis	Location: D31,VOA Ref. #2 Soil

LabID	ClientID	Matrix	Test	Method	Sample Date	Prep Date	Anal Date	Received
Q3277-01	WC1	SOIL			09/30/25			10/02/25
			Mercury	7471B		10/06/25	10/06/25	
			Metals ICP-TAL	6010D		10/03/25	10/07/25	
Q3277-02	WC1	TCLP			09/30/25			10/02/25
			TCLP ICP Metals	6010D		10/06/25	10/07/25	
			TCLP Mercury	7470A		10/06/25	10/07/25	

Hit Summary Sheet
SW-846

SDG No.: Q3277
Client: G Environmental

Order ID: Q3277
Project ID: Newport

Sample ID	Client ID	Matrix	Parameter	Concentration	C	MDL	RDL	Units
Client ID : WC1								
Q3277-01	WC1	SOIL	Aluminum	6620		0.75	4.45	mg/Kg
Q3277-01	WC1	SOIL	Arsenic	5.32		0.17	0.89	mg/Kg
Q3277-01	WC1	SOIL	Barium	57.3		0.65	4.45	mg/Kg
Q3277-01	WC1	SOIL	Beryllium	0.63		0.022	0.27	mg/Kg
Q3277-01	WC1	SOIL	Cadmium	0.87		0.021	0.27	mg/Kg
Q3277-01	WC1	SOIL	Calcium	11100		9.89	89.1	mg/Kg
Q3277-01	WC1	SOIL	Chromium	13.2		0.042	0.45	mg/Kg
Q3277-01	WC1	SOIL	Cobalt	7.18		0.089	1.34	mg/Kg
Q3277-01	WC1	SOIL	Copper	33.9		0.20	0.89	mg/Kg
Q3277-01	WC1	SOIL	Iron	18000		3.55	4.45	mg/Kg
Q3277-01	WC1	SOIL	Lead	116		0.12	0.54	mg/Kg
Q3277-01	WC1	SOIL	Magnesium	6300		10.7	89.1	mg/Kg
Q3277-01	WC1	SOIL	Manganese	235		0.13	0.89	mg/Kg
Q3277-01	WC1	SOIL	Mercury	0.27		0.0070	0.012	mg/Kg
Q3277-01	WC1	SOIL	Nickel	15.2		0.12	1.78	mg/Kg
Q3277-01	WC1	SOIL	Potassium	789		24.7	89.1	mg/Kg
Q3277-01	WC1	SOIL	Silver	0.46		0.11	0.45	mg/Kg
Q3277-01	WC1	SOIL	Sodium	439		15.9	89.1	mg/Kg
Q3277-01	WC1	SOIL	Vanadium	21.4		0.22	1.78	mg/Kg
Q3277-01	WC1	SOIL	Zinc	125		0.21	1.78	mg/Kg



SAMPLE DATA

Report of Analysis

Client:	G Environmental	Date Collected:	09/30/25
Project:	Newport	Date Received:	10/02/25
Client Sample ID:	WC1	SDG No.:	Q3277
Lab Sample ID:	Q3277-01	Matrix:	SOIL
Level (low/med):	low	% Solid:	97.6

Cas	Parameter	Conc.	Qua.	DF	MDL	LOQ / CRQL	Units(Dry Weight)	Prep Date	Date Ana.	Ana Met.	Prep Met.
7429-90-5	Aluminum	6620		1	0.75	4.45	mg/Kg	10/03/25 10:30	10/07/25 15:04	6010D	SW3050
7440-36-0	Antimony	0.20	UN	1	0.20	2.23	mg/Kg	10/03/25 10:30	10/07/25 15:04	6010D	SW3050
7440-38-2	Arsenic	5.32		1	0.17	0.89	mg/Kg	10/03/25 10:30	10/07/25 15:04	6010D	SW3050
7440-39-3	Barium	57.3		1	0.65	4.45	mg/Kg	10/03/25 10:30	10/07/25 15:04	6010D	SW3050
7440-41-7	Beryllium	0.63		1	0.022	0.27	mg/Kg	10/03/25 10:30	10/07/25 15:04	6010D	SW3050
7440-43-9	Cadmium	0.87	*	1	0.021	0.27	mg/Kg	10/03/25 10:30	10/07/25 15:04	6010D	SW3050
7440-70-2	Calcium	11100		1	9.89	89.1	mg/Kg	10/03/25 10:30	10/07/25 15:04	6010D	SW3050
7440-47-3	Chromium	13.2		1	0.042	0.45	mg/Kg	10/03/25 10:30	10/07/25 15:04	6010D	SW3050
7440-48-4	Cobalt	7.18	N	1	0.089	1.34	mg/Kg	10/03/25 10:30	10/07/25 15:04	6010D	SW3050
7440-50-8	Copper	33.9	N	1	0.20	0.89	mg/Kg	10/03/25 10:30	10/07/25 15:04	6010D	SW3050
7439-89-6	Iron	18000		1	3.55	4.45	mg/Kg	10/03/25 10:30	10/07/25 15:04	6010D	SW3050
7439-92-1	Lead	116		1	0.12	0.54	mg/Kg	10/03/25 10:30	10/07/25 15:04	6010D	SW3050
7439-95-4	Magnesium	6300		1	10.7	89.1	mg/Kg	10/03/25 10:30	10/07/25 15:04	6010D	SW3050
7439-96-5	Manganese	235		1	0.13	0.89	mg/Kg	10/03/25 10:30	10/07/25 15:04	6010D	SW3050
7439-97-6	Mercury	0.27		1	0.0070	0.012	mg/Kg	10/06/25 09:25	10/06/25 15:28	7471B	
7440-02-0	Nickel	15.2		1	0.12	1.78	mg/Kg	10/03/25 10:30	10/07/25 15:04	6010D	SW3050
7440-09-7	Potassium	789		1	24.7	89.1	mg/Kg	10/03/25 10:30	10/07/25 15:04	6010D	SW3050
7782-49-2	Selenium	0.23	U	1	0.23	0.89	mg/Kg	10/03/25 10:30	10/07/25 15:04	6010D	SW3050
7440-22-4	Silver	0.46		1	0.11	0.45	mg/Kg	10/03/25 10:30	10/07/25 15:04	6010D	SW3050
7440-23-5	Sodium	439		1	15.9	89.1	mg/Kg	10/03/25 10:30	10/07/25 15:04	6010D	SW3050
7440-28-0	Thallium	0.21	U	1	0.21	1.78	mg/Kg	10/03/25 10:30	10/07/25 15:04	6010D	SW3050
7440-62-2	Vanadium	21.4	N	1	0.22	1.78	mg/Kg	10/03/25 10:30	10/07/25 15:04	6010D	SW3050
7440-66-6	Zinc	125		1	0.21	1.78	mg/Kg	10/03/25 10:30	10/07/25 15:04	6010D	SW3050

Color Before:	Brown	Clarity Before:	Texture:	Medium
Color After:	Yellow	Clarity After:	Artifacts:	No
Comments:	METALS-TAL			

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

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

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
ICV59	Mercury	4.07	4.0	102	90 - 110	CV	10/06/2025	14:56	LB137429

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

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
CCV83	Mercury	4.89	5.0	98	90 - 110	CV	10/06/2025	15:01	LB137429
CCV84	Mercury	4.84	5.0	97	90 - 110	CV	10/06/2025	15:30	LB137429
CCV85	Mercury	4.83	5.0	97	90 - 110	CV	10/06/2025	15:59	LB137429

Metals

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INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Initial Calibration Source: EPA

Continuing Calibration Source: Inorganic Ventures

Sample ID	Analyte	Result ug/L	True Value	% Recovery	Acceptance Window (%R)	M	Analysis Date	Analysis Time	Run Number
ICV01	Aluminum	7920	8000	99	90 - 110	P	10/07/2025	10:54	LB137447
	Antimony	4110	4000	103	90 - 110	P	10/07/2025	10:54	LB137447
	Arsenic	4000	4000	100	90 - 110	P	10/07/2025	10:54	LB137447
	Barium	7940	8000	99	90 - 110	P	10/07/2025	10:54	LB137447
	Beryllium	201	200	100	90 - 110	P	10/07/2025	10:54	LB137447
	Cadmium	1980	2000	99	90 - 110	P	10/07/2025	10:54	LB137447
	Calcium	19900	20000	99	90 - 110	P	10/07/2025	10:54	LB137447
	Chromium	817	800	102	90 - 110	P	10/07/2025	10:54	LB137447
	Cobalt	1980	2000	99	90 - 110	P	10/07/2025	10:54	LB137447
	Copper	1020	1000	102	90 - 110	P	10/07/2025	10:54	LB137447
	Iron	4130	4000	103	90 - 110	P	10/07/2025	10:54	LB137447
	Lead	3890	4000	97	90 - 110	P	10/07/2025	10:54	LB137447
	Magnesium	19900	20000	100	90 - 110	P	10/07/2025	10:54	LB137447
	Manganese	1990	2000	100	90 - 110	P	10/07/2025	10:54	LB137447
	Nickel	1980	2000	99	90 - 110	P	10/07/2025	10:54	LB137447
	Potassium	20200	20000	101	90 - 110	P	10/07/2025	10:54	LB137447
	Selenium	4000	4000	100	90 - 110	P	10/07/2025	10:54	LB137447
	Silver	1030	1000	103	90 - 110	P	10/07/2025	10:54	LB137447
	Sodium	20100	20000	100	90 - 110	P	10/07/2025	10:54	LB137447
	Thallium	3720	4000	93	90 - 110	P	10/07/2025	10:54	LB137447
	Vanadium	1980	2000	99	90 - 110	P	10/07/2025	10:54	LB137447
	Zinc	2020	2000	101	90 - 110	P	10/07/2025	10:54	LB137447

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Initial Calibration Source: EPA

Continuing Calibration Source: Inorganic Ventures

Sample ID	Analyte	Result ug/L	True Value	% Recovery	Acceptance Window (%R)	M	Analysis Date	Analysis Time	Run Number
LLICV01	Aluminum	92.2	100	92	80 - 120	P	10/07/2025	12:01	LB137447
	Antimony	49.4	50.0	99	80 - 120	P	10/07/2025	12:01	LB137447
	Arsenic	18.4	20.0	92	80 - 120	P	10/07/2025	12:01	LB137447
	Barium	95.7	100	96	80 - 120	P	10/07/2025	12:01	LB137447
	Beryllium	6.20	6.0	103	80 - 120	P	10/07/2025	12:01	LB137447
	Cadmium	5.85	6.0	98	80 - 120	P	10/07/2025	12:01	LB137447
	Calcium	2020	2000	101	80 - 120	P	10/07/2025	12:01	LB137447
	Chromium	9.65	10.0	96	80 - 120	P	10/07/2025	12:01	LB137447
	Cobalt	29.0	30.0	97	80 - 120	P	10/07/2025	12:01	LB137447
	Copper	21.9	20.0	110	80 - 120	P	10/07/2025	12:01	LB137447
	Iron	119	100	119	80 - 120	P	10/07/2025	12:01	LB137447
	Lead	11.1	12.0	93	80 - 120	P	10/07/2025	12:01	LB137447
	Magnesium	2070	2000	104	80 - 120	P	10/07/2025	12:01	LB137447
	Manganese	20.8	20.0	104	80 - 120	P	10/07/2025	12:01	LB137447
	Nickel	39.6	40.0	99	80 - 120	P	10/07/2025	12:01	LB137447
	Potassium	1910	2000	95	80 - 120	P	10/07/2025	12:01	LB137447
	Selenium	23.6	20.0	118	80 - 120	P	10/07/2025	12:01	LB137447
	Silver	9.88	10.0	99	80 - 120	P	10/07/2025	12:01	LB137447
	Sodium	1890	2000	94	80 - 120	P	10/07/2025	12:01	LB137447
	Thallium	43.0	40.0	107	80 - 120	P	10/07/2025	12:01	LB137447
	Vanadium	37.3	40.0	93	80 - 120	P	10/07/2025	12:01	LB137447
	Zinc	36.9	40.0	92	80 - 120	P	10/07/2025	12:01	LB137447

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Initial Calibration Source: EPA

Continuing Calibration Source: Inorganic Ventures

Sample ID	Analyte	Result ug/L	True Value	% Recovery	Acceptance Window (%R)	M	Analysis Date	Analysis Time	Run Number
CCV01	Aluminum	10100	10000	101	90 - 110	P	10/07/2025	12:50	LB137447
	Antimony	5050	5000	101	90 - 110	P	10/07/2025	12:50	LB137447
	Arsenic	5080	5000	102	90 - 110	P	10/07/2025	12:50	LB137447
	Barium	9980	10000	100	90 - 110	P	10/07/2025	12:50	LB137447
	Beryllium	252	250	101	90 - 110	P	10/07/2025	12:50	LB137447
	Cadmium	2510	2500	100	90 - 110	P	10/07/2025	12:50	LB137447
	Calcium	25200	25000	101	90 - 110	P	10/07/2025	12:50	LB137447
	Chromium	1030	1000	103	90 - 110	P	10/07/2025	12:50	LB137447
	Cobalt	2490	2500	100	90 - 110	P	10/07/2025	12:50	LB137447
	Copper	1270	1250	101	90 - 110	P	10/07/2025	12:50	LB137447
	Iron	5200	5000	104	90 - 110	P	10/07/2025	12:50	LB137447
	Lead	4980	5000	100	90 - 110	P	10/07/2025	12:50	LB137447
	Magnesium	25200	25000	101	90 - 110	P	10/07/2025	12:50	LB137447
	Manganese	2490	2500	100	90 - 110	P	10/07/2025	12:50	LB137447
	Nickel	2490	2500	100	90 - 110	P	10/07/2025	12:50	LB137447
	Potassium	25500	25000	102	90 - 110	P	10/07/2025	12:50	LB137447
	Selenium	5150	5000	103	90 - 110	P	10/07/2025	12:50	LB137447
	Silver	1280	1250	103	90 - 110	P	10/07/2025	12:50	LB137447
	Sodium	25600	25000	102	90 - 110	P	10/07/2025	12:50	LB137447
	Thallium	4870	5000	97	90 - 110	P	10/07/2025	12:50	LB137447
	Vanadium	2520	2500	101	90 - 110	P	10/07/2025	12:50	LB137447
	Zinc	2600	2500	104	90 - 110	P	10/07/2025	12:50	LB137447
CCV02	Aluminum	9930	10000	99	90 - 110	P	10/07/2025	14:19	LB137447
	Antimony	5050	5000	101	90 - 110	P	10/07/2025	14:19	LB137447
	Arsenic	5080	5000	102	90 - 110	P	10/07/2025	14:19	LB137447
	Barium	9770	10000	98	90 - 110	P	10/07/2025	14:19	LB137447
	Beryllium	250	250	100	90 - 110	P	10/07/2025	14:19	LB137447
	Cadmium	2510	2500	100	90 - 110	P	10/07/2025	14:19	LB137447
	Calcium	24900	25000	100	90 - 110	P	10/07/2025	14:19	LB137447
	Chromium	1030	1000	103	90 - 110	P	10/07/2025	14:19	LB137447
	Cobalt	2480	2500	99	90 - 110	P	10/07/2025	14:19	LB137447
	Copper	1260	1250	101	90 - 110	P	10/07/2025	14:19	LB137447
	Iron	5340	5000	107	90 - 110	P	10/07/2025	14:19	LB137447
	Lead	4960	5000	99	90 - 110	P	10/07/2025	14:19	LB137447

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Initial Calibration Source: EPA

Continuing Calibration Source: Inorganic Ventures

Sample ID	Analyte	Result ug/L	True Value	% Recovery	Acceptance Window (%R)	M	Analysis Date	Analysis Time	Run Number
CCV02	Magnesium	24900	25000	100	90 - 110	P	10/07/2025	14:19	LB137447
	Manganese	2480	2500	99	90 - 110	P	10/07/2025	14:19	LB137447
	Nickel	2490	2500	100	90 - 110	P	10/07/2025	14:19	LB137447
	Potassium	26100	25000	104	90 - 110	P	10/07/2025	14:19	LB137447
	Selenium	5190	5000	104	90 - 110	P	10/07/2025	14:19	LB137447
	Silver	1290	1250	103	90 - 110	P	10/07/2025	14:19	LB137447
	Sodium	25000	25000	100	90 - 110	P	10/07/2025	14:19	LB137447
	Thallium	5200	5000	104	90 - 110	P	10/07/2025	14:19	LB137447
	Vanadium	2500	2500	100	90 - 110	P	10/07/2025	14:19	LB137447
	Zinc	2600	2500	104	90 - 110	P	10/07/2025	14:19	LB137447
CCV03	Aluminum	10000	10000	100	90 - 110	P	10/07/2025	15:08	LB137447
	Antimony	4960	5000	99	90 - 110	P	10/07/2025	15:08	LB137447
	Arsenic	4970	5000	99	90 - 110	P	10/07/2025	15:08	LB137447
	Barium	9860	10000	99	90 - 110	P	10/07/2025	15:08	LB137447
	Beryllium	253	250	101	90 - 110	P	10/07/2025	15:08	LB137447
	Cadmium	2440	2500	98	90 - 110	P	10/07/2025	15:08	LB137447
	Calcium	25100	25000	100	90 - 110	P	10/07/2025	15:08	LB137447
	Chromium	1010	1000	101	90 - 110	P	10/07/2025	15:08	LB137447
	Cobalt	2420	2500	97	90 - 110	P	10/07/2025	15:08	LB137447
	Copper	1240	1250	99	90 - 110	P	10/07/2025	15:08	LB137447
	Iron	5120	5000	102	90 - 110	P	10/07/2025	15:08	LB137447
	Lead	4840	5000	97	90 - 110	P	10/07/2025	15:08	LB137447
	Magnesium	25100	25000	101	90 - 110	P	10/07/2025	15:08	LB137447
	Manganese	2510	2500	100	90 - 110	P	10/07/2025	15:08	LB137447
	Nickel	2430	2500	97	90 - 110	P	10/07/2025	15:08	LB137447
	Potassium	24200	25000	97	90 - 110	P	10/07/2025	15:08	LB137447
	Selenium	5070	5000	101	90 - 110	P	10/07/2025	15:08	LB137447
	Silver	1250	1250	100	90 - 110	P	10/07/2025	15:08	LB137447
	Sodium	23700	25000	95	90 - 110	P	10/07/2025	15:08	LB137447
	Thallium	4850	5000	97	90 - 110	P	10/07/2025	15:08	LB137447
	Vanadium	2540	2500	102	90 - 110	P	10/07/2025	15:08	LB137447
	Zinc	2520	2500	101	90 - 110	P	10/07/2025	15:08	LB137447
CCV04	Aluminum	9980	10000	100	90 - 110	P	10/07/2025	16:00	LB137447
	Antimony	5080	5000	102	90 - 110	P	10/07/2025	16:00	LB137447

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Initial Calibration Source: EPA

Continuing Calibration Source: Inorganic Ventures

Sample ID	Analyte	Result ug/L	True Value	% Recovery	Acceptance Window (%R)	M	Analysis Date	Analysis Time	Run Number
CCV04	Arsenic	5090	5000	102	90 - 110	P	10/07/2025	16:00	LB137447
	Barium	9920	10000	99	90 - 110	P	10/07/2025	16:00	LB137447
	Beryllium	254	250	102	90 - 110	P	10/07/2025	16:00	LB137447
	Cadmium	2490	2500	100	90 - 110	P	10/07/2025	16:00	LB137447
	Calcium	25100	25000	100	90 - 110	P	10/07/2025	16:00	LB137447
	Chromium	1020	1000	102	90 - 110	P	10/07/2025	16:00	LB137447
	Cobalt	2480	2500	99	90 - 110	P	10/07/2025	16:00	LB137447
	Copper	1260	1250	101	90 - 110	P	10/07/2025	16:00	LB137447
	Iron	5080	5000	102	90 - 110	P	10/07/2025	16:00	LB137447
	Lead	4950	5000	99	90 - 110	P	10/07/2025	16:00	LB137447
	Magnesium	25200	25000	101	90 - 110	P	10/07/2025	16:00	LB137447
	Manganese	2530	2500	101	90 - 110	P	10/07/2025	16:00	LB137447
	Nickel	2480	2500	99	90 - 110	P	10/07/2025	16:00	LB137447
	Potassium	24300	25000	97	90 - 110	P	10/07/2025	16:00	LB137447
	Selenium	5180	5000	104	90 - 110	P	10/07/2025	16:00	LB137447
	Silver	1260	1250	101	90 - 110	P	10/07/2025	16:00	LB137447
	Sodium	23700	25000	95	90 - 110	P	10/07/2025	16:00	LB137447
	Thallium	5000	5000	100	90 - 110	P	10/07/2025	16:00	LB137447
	Vanadium	2540	2500	102	90 - 110	P	10/07/2025	16:00	LB137447
	Zinc	2550	2500	102	90 - 110	P	10/07/2025	16:00	LB137447
CCV05	Aluminum	9820	10000	98	90 - 110	P	10/07/2025	16:50	LB137447
	Antimony	4960	5000	99	90 - 110	P	10/07/2025	16:50	LB137447
	Arsenic	5000	5000	100	90 - 110	P	10/07/2025	16:50	LB137447
	Barium	9540	10000	95	90 - 110	P	10/07/2025	16:50	LB137447
	Beryllium	245	250	98	90 - 110	P	10/07/2025	16:50	LB137447
	Cadmium	2480	2500	99	90 - 110	P	10/07/2025	16:50	LB137447
	Calcium	24500	25000	98	90 - 110	P	10/07/2025	16:50	LB137447
	Chromium	1030	1000	103	90 - 110	P	10/07/2025	16:50	LB137447
	Cobalt	2450	2500	98	90 - 110	P	10/07/2025	16:50	LB137447
	Copper	1250	1250	100	90 - 110	P	10/07/2025	16:50	LB137447
	Iron	5320	5000	106	90 - 110	P	10/07/2025	16:50	LB137447
	Lead	4890	5000	98	90 - 110	P	10/07/2025	16:50	LB137447
	Magnesium	24700	25000	99	90 - 110	P	10/07/2025	16:50	LB137447
	Manganese	2430	2500	97	90 - 110	P	10/07/2025	16:50	LB137447

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Initial Calibration Source: EPA

Continuing Calibration Source: Inorganic Ventures

Sample ID	Analyte	Result ug/L	True Value	% Recovery	Acceptance Window (%R)	M	Analysis Date	Analysis Time	Run Number
CCV05	Nickel	2460	2500	98	90 - 110	P	10/07/2025	16:50	LB137447
	Potassium	26200	25000	105	90 - 110	P	10/07/2025	16:50	LB137447
	Selenium	5090	5000	102	90 - 110	P	10/07/2025	16:50	LB137447
	Silver	1280	1250	103	90 - 110	P	10/07/2025	16:50	LB137447
	Sodium	26000	25000	104	90 - 110	P	10/07/2025	16:50	LB137447
	Thallium	5150	5000	103	90 - 110	P	10/07/2025	16:50	LB137447
	Vanadium	2490	2500	99	90 - 110	P	10/07/2025	16:50	LB137447
	Zinc	2620	2500	105	90 - 110	P	10/07/2025	16:50	LB137447
CCV06	Aluminum	9870	10000	99	90 - 110	P	10/07/2025	17:49	LB137447
	Antimony	5030	5000	100	90 - 110	P	10/07/2025	17:49	LB137447
	Arsenic	5040	5000	101	90 - 110	P	10/07/2025	17:49	LB137447
	Barium	9460	10000	95	90 - 110	P	10/07/2025	17:49	LB137447
	Beryllium	244	250	98	90 - 110	P	10/07/2025	17:49	LB137447
	Cadmium	2460	2500	98	90 - 110	P	10/07/2025	17:49	LB137447
	Calcium	24400	25000	98	90 - 110	P	10/07/2025	17:49	LB137447
	Chromium	1000	1000	100	90 - 110	P	10/07/2025	17:49	LB137447
	Cobalt	2440	2500	98	90 - 110	P	10/07/2025	17:49	LB137447
	Copper	1250	1250	100	90 - 110	P	10/07/2025	17:49	LB137447
	Iron	4840	5000	97	90 - 110	P	10/07/2025	17:49	LB137447
	Lead	4880	5000	98	90 - 110	P	10/07/2025	17:49	LB137447
	Magnesium	24700	25000	99	90 - 110	P	10/07/2025	17:49	LB137447
	Manganese	2420	2500	97	90 - 110	P	10/07/2025	17:49	LB137447
	Nickel	2450	2500	98	90 - 110	P	10/07/2025	17:49	LB137447
	Potassium	25200	25000	101	90 - 110	P	10/07/2025	17:49	LB137447
	Selenium	5150	5000	103	90 - 110	P	10/07/2025	17:49	LB137447
	Silver	1230	1250	98	90 - 110	P	10/07/2025	17:49	LB137447
	Sodium	23800	25000	95	90 - 110	P	10/07/2025	17:49	LB137447
	Thallium	4750	5000	95	90 - 110	P	10/07/2025	17:49	LB137447
	Vanadium	2460	2500	98	90 - 110	P	10/07/2025	17:49	LB137447
	Zinc	2480	2500	99	90 - 110	P	10/07/2025	17:49	LB137447
CCV07	Aluminum	9840	10000	98	90 - 110	P	10/07/2025	18:44	LB137447
	Antimony	5100	5000	102	90 - 110	P	10/07/2025	18:44	LB137447
	Arsenic	5120	5000	102	90 - 110	P	10/07/2025	18:44	LB137447
	Barium	9570	10000	96	90 - 110	P	10/07/2025	18:44	LB137447

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Initial Calibration Source: EPA

Continuing Calibration Source: Inorganic Ventures

Sample ID	Analyte	Result ug/L	True Value	% Recovery	Acceptance Window (%R)	M	Analysis Date	Analysis Time	Run Number
CCV07	Beryllium	244	250	98	90 - 110	P	10/07/2025	18:44	LB137447
	Cadmium	2470	2500	99	90 - 110	P	10/07/2025	18:44	LB137447
	Calcium	24400	25000	98	90 - 110	P	10/07/2025	18:44	LB137447
	Chromium	997	1000	100	90 - 110	P	10/07/2025	18:44	LB137447
	Cobalt	2460	2500	98	90 - 110	P	10/07/2025	18:44	LB137447
	Copper	1260	1250	101	90 - 110	P	10/07/2025	18:44	LB137447
	Iron	4950	5000	99	90 - 110	P	10/07/2025	18:44	LB137447
	Lead	4920	5000	98	90 - 110	P	10/07/2025	18:44	LB137447
	Magnesium	24600	25000	98	90 - 110	P	10/07/2025	18:44	LB137447
	Manganese	2440	2500	98	90 - 110	P	10/07/2025	18:44	LB137447
	Nickel	2470	2500	99	90 - 110	P	10/07/2025	18:44	LB137447
	Potassium	24000	25000	96	90 - 110	P	10/07/2025	18:44	LB137447
	Selenium	5280	5000	106	90 - 110	P	10/07/2025	18:44	LB137447
	Silver	1230	1250	98	90 - 110	P	10/07/2025	18:44	LB137447
	Sodium	24600	25000	98	90 - 110	P	10/07/2025	18:44	LB137447
	Thallium	5050	5000	101	90 - 110	P	10/07/2025	18:44	LB137447
	Vanadium	2480	2500	99	90 - 110	P	10/07/2025	18:44	LB137447
	Zinc	2480	2500	99	90 - 110	P	10/07/2025	18:44	LB137447
CCV08	Aluminum	9510	10000	95	90 - 110	P	10/07/2025	19:20	LB137447
	Antimony	4850	5000	97	90 - 110	P	10/07/2025	19:20	LB137447
	Arsenic	4850	5000	97	90 - 110	P	10/07/2025	19:20	LB137447
	Barium	9160	10000	92	90 - 110	P	10/07/2025	19:20	LB137447
	Beryllium	238	250	95	90 - 110	P	10/07/2025	19:20	LB137447
	Cadmium	2370	2500	95	90 - 110	P	10/07/2025	19:20	LB137447
	Calcium	23500	25000	94	90 - 110	P	10/07/2025	19:20	LB137447
	Chromium	967	1000	97	90 - 110	P	10/07/2025	19:20	LB137447
	Cobalt	2360	2500	94	90 - 110	P	10/07/2025	19:20	LB137447
	Copper	1210	1250	96	90 - 110	P	10/07/2025	19:20	LB137447
	Iron	4810	5000	96	90 - 110	P	10/07/2025	19:20	LB137447
	Lead	4720	5000	94	90 - 110	P	10/07/2025	19:20	LB137447
	Magnesium	23900	25000	96	90 - 110	P	10/07/2025	19:20	LB137447
	Manganese	2350	2500	94	90 - 110	P	10/07/2025	19:20	LB137447
	Nickel	2360	2500	94	90 - 110	P	10/07/2025	19:20	LB137447
	Potassium	23100	25000	92	90 - 110	P	10/07/2025	19:20	LB137447

Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Initial Calibration Source: EPA

Continuing Calibration Source: Inorganic Ventures

Sample ID	Analyte	Result ug/L	True Value	% Recovery	Acceptance Window (%R)	M	Analysis Date	Analysis Time	Run Number
CCV08	Selenium	4950	5000	99	90 - 110	P	10/07/2025	19:20	LB137447
	Silver	1200	1250	96	90 - 110	P	10/07/2025	19:20	LB137447
	Sodium	24000	25000	96	90 - 110	P	10/07/2025	19:20	LB137447
	Thallium	4540	5000	91	90 - 110	P	10/07/2025	19:20	LB137447
	Vanadium	2380	2500	95	90 - 110	P	10/07/2025	19:20	LB137447
	Zinc	2420	2500	97	90 - 110	P	10/07/2025	19:20	LB137447



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

- 2b -

CRDL STANDARD FOR AA & ICP

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Initial Calibration Source: _____

Continuing Calibration Source: _____

Sample ID	Analyte	Result ug/L	True Value ug/L	% Recovery	Acceptance Window (%R)	M	Analysis Date	Analysis Time	Run Number
CRA	Mercury	0.20	0.2	98	70 - 130	CV	10/06/2025	15:06	LB137429
CRI01	Aluminum	90.0	100	90	65 - 135	P	10/07/2025	12:10	LB137447
	Antimony	49.9	50.0	100	65 - 135	P	10/07/2025	12:10	LB137447
	Arsenic	17.7	20.0	88	65 - 135	P	10/07/2025	12:10	LB137447
	Barium	97.4	100	97	65 - 135	P	10/07/2025	12:10	LB137447
	Beryllium	6.27	6.0	104	65 - 135	P	10/07/2025	12:10	LB137447
	Cadmium	5.96	6.0	99	65 - 135	P	10/07/2025	12:10	LB137447
	Calcium	2040	2000	102	65 - 135	P	10/07/2025	12:10	LB137447
	Chromium	9.90	10.0	99	65 - 135	P	10/07/2025	12:10	LB137447
	Cobalt	29.6	30.0	99	65 - 135	P	10/07/2025	12:10	LB137447
	Copper	22.2	20.0	111	65 - 135	P	10/07/2025	12:10	LB137447
	Iron	123	100	123	65 - 135	P	10/07/2025	12:10	LB137447
	Lead	12.1	12.0	101	65 - 135	P	10/07/2025	12:10	LB137447
	Magnesium	2090	2000	104	65 - 135	P	10/07/2025	12:10	LB137447
	Manganese	20.9	20.0	105	65 - 135	P	10/07/2025	12:10	LB137447
	Nickel	40.1	40.0	100	65 - 135	P	10/07/2025	12:10	LB137447
	Potassium	1880	2000	94	65 - 135	P	10/07/2025	12:10	LB137447
	Selenium	22.6	20.0	113	65 - 135	P	10/07/2025	12:10	LB137447
	Silver	9.85	10.0	98	65 - 135	P	10/07/2025	12:10	LB137447
	Sodium	1910	2000	95	65 - 135	P	10/07/2025	12:10	LB137447
	Thallium	45.0	40.0	113	65 - 135	P	10/07/2025	12:10	LB137447
	Vanadium	37.6	40.0	94	65 - 135	P	10/07/2025	12:10	LB137447
	Zinc	37.9	40.0	95	65 - 135	P	10/07/2025	12:10	LB137447



284 Sheffield Street, Mountainside, New Jersey 07092, Phone : 908 789 8900,
Fax : 908 789 8922

Metals

- 3a -

INITIAL AND CONTINUING CALIBRATION BLANK SUMMARY

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Sample ID	Analyte	Result ug/L	Acceptance Limit	Conc Qual	CRQL	M	Analysis Date	Analysis Time	Run Number
ICB59	Mercury	0.076	+/-0.2	U	0.20	CV	10/06/2025	14:58	LB137429

Metals

- 3a -

INITIAL AND CONTINUING CALIBRATION BLANK SUMMARY

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Sample ID	Analyte	Result ug/L	Acceptance Limit	Conc Qual	CRQL	M	Analysis Date	Analysis Time	Run Number
CCB83	Mercury	0.076	+/-0.2	U	0.20	CV	10/06/2025	15:03	LB137429
CCB84	Mercury	0.076	+/-0.2	U	0.20	CV	10/06/2025	15:33	LB137429
CCB85	Mercury	0.076	+/-0.2	U	0.20	CV	10/06/2025	16:02	LB137429

Metals

- 3a -

INITIAL AND CONTINUING CALIBRATION BLANK SUMMARY

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Sample ID	Analyte	Result ug/L	Acceptance Limit	Conc Qual	CRQL	M	Analysis Date	Analysis Time	Run Number
ICB01	Aluminum	11.3	+/-50	U	100	P	10/07/2025	12:06	LB137447
	Antimony	6.76	+/-25	U	50.0	P	10/07/2025	12:06	LB137447
	Arsenic	5.12	+/-10	U	20.0	P	10/07/2025	12:06	LB137447
	Barium	14.6	+/-50	U	100	P	10/07/2025	12:06	LB137447
	Beryllium	0.56	+/-3	U	6.00	P	10/07/2025	12:06	LB137447
	Cadmium	0.50	+/-3	U	6.00	P	10/07/2025	12:06	LB137447
	Calcium	234	+/-1000	U	2000	P	10/07/2025	12:06	LB137447
	Chromium	2.12	+/-5	U	10.0	P	10/07/2025	12:06	LB137447
	Cobalt	2.26	+/-15	U	30.0	P	10/07/2025	12:06	LB137447
	Copper	4.60	+/-10	U	20.0	P	10/07/2025	12:06	LB137447
	Iron	23.4	+/-50	U	100	P	10/07/2025	12:06	LB137447
	Lead	2.30	+/-6	U	12.0	P	10/07/2025	12:06	LB137447
	Magnesium	244	+/-1000	U	2000	P	10/07/2025	12:06	LB137447
	Manganese	5.94	+/-10	U	20.0	P	10/07/2025	12:06	LB137447
	Nickel	3.06	+/-20	U	40.0	P	10/07/2025	12:06	LB137447
	Potassium	918	+/-1000	U	2000	P	10/07/2025	12:06	LB137447
	Selenium	9.64	+/-10	U	20.0	P	10/07/2025	12:06	LB137447
	Silver	1.62	+/-5	U	10.0	P	10/07/2025	12:06	LB137447
	Sodium	868	+/-1000	U	2000	P	10/07/2025	12:06	LB137447
	Thallium	5.24	+/-20	J	40.0	P	10/07/2025	12:06	LB137447
	Vanadium	6.26	+/-20	U	40.0	P	10/07/2025	12:06	LB137447
	Zinc	16.7	+/-20	U	40.0	P	10/07/2025	12:06	LB137447

Metals

- 3a -

INITIAL AND CONTINUING CALIBRATION BLANK SUMMARY

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Sample ID	Analyte	Result ug/L	Acceptance Limit	Conc Qual	CRQL	M	Analysis Date	Analysis Time	Run Number
CCB01	Aluminum	11.3	+/-50	U	100	P	10/07/2025	12:58	LB137447
	Antimony	6.76	+/-25	U	50.0	P	10/07/2025	12:58	LB137447
	Arsenic	5.12	+/-10	U	20.0	P	10/07/2025	12:58	LB137447
	Barium	14.6	+/-50	U	100	P	10/07/2025	12:58	LB137447
	Beryllium	0.56	+/-3	U	6.00	P	10/07/2025	12:58	LB137447
	Cadmium	0.50	+/-3	U	6.00	P	10/07/2025	12:58	LB137447
	Calcium	234	+/-1000	U	2000	P	10/07/2025	12:58	LB137447
	Chromium	2.12	+/-5	U	10.0	P	10/07/2025	12:58	LB137447
	Cobalt	2.26	+/-15	U	30.0	P	10/07/2025	12:58	LB137447
	Copper	4.60	+/-10	U	20.0	P	10/07/2025	12:58	LB137447
	Iron	23.4	+/-50	U	100	P	10/07/2025	12:58	LB137447
	Lead	2.30	+/-6	U	12.0	P	10/07/2025	12:58	LB137447
	Magnesium	244	+/-1000	U	2000	P	10/07/2025	12:58	LB137447
	Manganese	5.94	+/-10	U	20.0	P	10/07/2025	12:58	LB137447
	Nickel	3.06	+/-20	U	40.0	P	10/07/2025	12:58	LB137447
	Potassium	918	+/-1000	U	2000	P	10/07/2025	12:58	LB137447
	Selenium	9.64	+/-10	U	20.0	P	10/07/2025	12:58	LB137447
	Silver	1.62	+/-5	U	10.0	P	10/07/2025	12:58	LB137447
	Sodium	868	+/-1000	U	2000	P	10/07/2025	12:58	LB137447
	Thallium	4.38	+/-20	U	40.0	P	10/07/2025	12:58	LB137447
	Vanadium	6.26	+/-20	U	40.0	P	10/07/2025	12:58	LB137447
	Zinc	16.7	+/-20	U	40.0	P	10/07/2025	12:58	LB137447
CCB02	Aluminum	14.4	+/-50	J	100	P	10/07/2025	14:24	LB137447
	Antimony	6.76	+/-25	U	50.0	P	10/07/2025	14:24	LB137447
	Arsenic	5.12	+/-10	U	20.0	P	10/07/2025	14:24	LB137447
	Barium	14.6	+/-50	U	100	P	10/07/2025	14:24	LB137447
	Beryllium	0.56	+/-3	U	6.00	P	10/07/2025	14:24	LB137447
	Cadmium	0.50	+/-3	U	6.00	P	10/07/2025	14:24	LB137447
	Calcium	234	+/-1000	U	2000	P	10/07/2025	14:24	LB137447
	Chromium	2.12	+/-5	U	10.0	P	10/07/2025	14:24	LB137447
	Cobalt	2.26	+/-15	U	30.0	P	10/07/2025	14:24	LB137447
	Copper	4.60	+/-10	U	20.0	P	10/07/2025	14:24	LB137447
	Iron	28.4	+/-50	J	100	P	10/07/2025	14:24	LB137447
	Lead	2.30	+/-6	U	12.0	P	10/07/2025	14:24	LB137447
	Magnesium	244	+/-1000	U	2000	P	10/07/2025	14:24	LB137447
	Manganese	5.94	+/-10	U	20.0	P	10/07/2025	14:24	LB137447
	Nickel	3.06	+/-20	U	40.0	P	10/07/2025	14:24	LB137447
	Potassium	918	+/-1000	U	2000	P	10/07/2025	14:24	LB137447
	Selenium	9.64	+/-10	U	20.0	P	10/07/2025	14:24	LB137447

Metals

- 3a -

INITIAL AND CONTINUING CALIBRATION BLANK SUMMARY

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Sample ID	Analyte	Result ug/L	Acceptance Limit	Conc Qual	CRQL	M	Analysis Date	Analysis Time	Run Number
CCB02	Silver	1.62	+/-5	U	10.0	P	10/07/2025	14:24	LB137447
	Sodium	868	+/-1000	U	2000	P	10/07/2025	14:24	LB137447
	Thallium	5.15	+/-20	J	40.0	P	10/07/2025	14:24	LB137447
	Vanadium	6.26	+/-20	U	40.0	P	10/07/2025	14:24	LB137447
	Zinc	16.7	+/-20	U	40.0	P	10/07/2025	14:24	LB137447
CCB03	Aluminum	11.3	+/-50	U	100	P	10/07/2025	15:12	LB137447
	Antimony	6.76	+/-25	U	50.0	P	10/07/2025	15:12	LB137447
	Arsenic	5.12	+/-10	U	20.0	P	10/07/2025	15:12	LB137447
	Barium	14.6	+/-50	U	100	P	10/07/2025	15:12	LB137447
	Beryllium	0.56	+/-3	U	6.00	P	10/07/2025	15:12	LB137447
	Cadmium	0.50	+/-3	U	6.00	P	10/07/2025	15:12	LB137447
	Calcium	234	+/-1000	U	2000	P	10/07/2025	15:12	LB137447
	Chromium	2.12	+/-5	U	10.0	P	10/07/2025	15:12	LB137447
	Cobalt	2.26	+/-15	U	30.0	P	10/07/2025	15:12	LB137447
	Copper	4.60	+/-10	U	20.0	P	10/07/2025	15:12	LB137447
	Iron	23.4	+/-50	U	100	P	10/07/2025	15:12	LB137447
	Lead	2.30	+/-6	U	12.0	P	10/07/2025	15:12	LB137447
	Magnesium	244	+/-1000	U	2000	P	10/07/2025	15:12	LB137447
	Manganese	5.94	+/-10	U	20.0	P	10/07/2025	15:12	LB137447
	Nickel	3.06	+/-20	U	40.0	P	10/07/2025	15:12	LB137447
	Potassium	918	+/-1000	U	2000	P	10/07/2025	15:12	LB137447
	Selenium	9.64	+/-10	U	20.0	P	10/07/2025	15:12	LB137447
	Silver	1.62	+/-5	U	10.0	P	10/07/2025	15:12	LB137447
	Sodium	868	+/-1000	U	2000	P	10/07/2025	15:12	LB137447
	Thallium	6.22	+/-20	J	40.0	P	10/07/2025	15:12	LB137447
	Vanadium	6.26	+/-20	U	40.0	P	10/07/2025	15:12	LB137447
	Zinc	16.7	+/-20	U	40.0	P	10/07/2025	15:12	LB137447
CCB04	Aluminum	11.3	+/-50	U	100	P	10/07/2025	16:04	LB137447
	Antimony	6.76	+/-25	U	50.0	P	10/07/2025	16:04	LB137447
	Arsenic	5.12	+/-10	U	20.0	P	10/07/2025	16:04	LB137447
	Barium	14.6	+/-50	U	100	P	10/07/2025	16:04	LB137447
	Beryllium	0.56	+/-3	U	6.00	P	10/07/2025	16:04	LB137447
	Cadmium	0.50	+/-3	U	6.00	P	10/07/2025	16:04	LB137447
	Calcium	234	+/-1000	U	2000	P	10/07/2025	16:04	LB137447
	Chromium	2.12	+/-5	U	10.0	P	10/07/2025	16:04	LB137447
	Cobalt	2.26	+/-15	U	30.0	P	10/07/2025	16:04	LB137447
	Copper	4.60	+/-10	U	20.0	P	10/07/2025	16:04	LB137447
	Iron	23.4	+/-50	U	100	P	10/07/2025	16:04	LB137447
	Lead	2.30	+/-6	U	12.0	P	10/07/2025	16:04	LB137447

Metals

- 3a -

INITIAL AND CONTINUING CALIBRATION BLANK SUMMARY

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Sample ID	Analyte	Result ug/L	Acceptance Limit	Conc Qual	CRQL	M	Analysis Date	Analysis Time	Run Number
CCB04	Magnesium	244	+/-1000	U	2000	P	10/07/2025	16:04	LB137447
	Manganese	5.94	+/-10	U	20.0	P	10/07/2025	16:04	LB137447
	Nickel	3.06	+/-20	U	40.0	P	10/07/2025	16:04	LB137447
	Potassium	918	+/-1000	U	2000	P	10/07/2025	16:04	LB137447
	Selenium	9.64	+/-10	U	20.0	P	10/07/2025	16:04	LB137447
	Silver	1.62	+/-5	U	10.0	P	10/07/2025	16:04	LB137447
	Sodium	868	+/-1000	U	2000	P	10/07/2025	16:04	LB137447
	Thallium	5.51	+/-20	J	40.0	P	10/07/2025	16:04	LB137447
	Vanadium	6.26	+/-20	U	40.0	P	10/07/2025	16:04	LB137447
	Zinc	16.7	+/-20	U	40.0	P	10/07/2025	16:04	LB137447
CCB05	Aluminum	11.3	+/-50	U	100	P	10/07/2025	17:01	LB137447
	Antimony	6.76	+/-25	U	50.0	P	10/07/2025	17:01	LB137447
	Arsenic	5.12	+/-10	U	20.0	P	10/07/2025	17:01	LB137447
	Barium	14.6	+/-50	U	100	P	10/07/2025	17:01	LB137447
	Beryllium	0.56	+/-3	U	6.00	P	10/07/2025	17:01	LB137447
	Cadmium	0.50	+/-3	U	6.00	P	10/07/2025	17:01	LB137447
	Calcium	234	+/-1000	U	2000	P	10/07/2025	17:01	LB137447
	Chromium	2.12	+/-5	U	10.0	P	10/07/2025	17:01	LB137447
	Cobalt	2.26	+/-15	U	30.0	P	10/07/2025	17:01	LB137447
	Copper	4.60	+/-10	U	20.0	P	10/07/2025	17:01	LB137447
	Iron	23.4	+/-50	U	100	P	10/07/2025	17:01	LB137447
	Lead	2.30	+/-6	U	12.0	P	10/07/2025	17:01	LB137447
	Magnesium	244	+/-1000	U	2000	P	10/07/2025	17:01	LB137447
	Manganese	5.94	+/-10	U	20.0	P	10/07/2025	17:01	LB137447
	Nickel	3.06	+/-20	U	40.0	P	10/07/2025	17:01	LB137447
	Potassium	918	+/-1000	U	2000	P	10/07/2025	17:01	LB137447
	Selenium	9.64	+/-10	U	20.0	P	10/07/2025	17:01	LB137447
	Silver	1.62	+/-5	U	10.0	P	10/07/2025	17:01	LB137447
	Sodium	868	+/-1000	U	2000	P	10/07/2025	17:01	LB137447
	Thallium	5.07	+/-20	J	40.0	P	10/07/2025	17:01	LB137447
	Vanadium	6.26	+/-20	U	40.0	P	10/07/2025	17:01	LB137447
	Zinc	16.7	+/-20	U	40.0	P	10/07/2025	17:01	LB137447
CCB06	Aluminum	11.3	+/-50	U	100	P	10/07/2025	17:59	LB137447
	Antimony	6.76	+/-25	U	50.0	P	10/07/2025	17:59	LB137447
	Arsenic	5.12	+/-10	U	20.0	P	10/07/2025	17:59	LB137447
	Barium	14.6	+/-50	U	100	P	10/07/2025	17:59	LB137447
	Beryllium	0.56	+/-3	U	6.00	P	10/07/2025	17:59	LB137447
	Cadmium	0.50	+/-3	U	6.00	P	10/07/2025	17:59	LB137447
	Calcium	234	+/-1000	U	2000	P	10/07/2025	17:59	LB137447

Metals

- 3a -

INITIAL AND CONTINUING CALIBRATION BLANK SUMMARY

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Sample ID	Analyte	Result ug/L	Acceptance Limit	Conc Qual	CRQL	M	Analysis Date	Analysis Time	Run Number
CCB06	Chromium	2.12	+/-5	U	10.0	P	10/07/2025	17:59	LB137447
	Cobalt	2.26	+/-15	U	30.0	P	10/07/2025	17:59	LB137447
	Copper	4.60	+/-10	U	20.0	P	10/07/2025	17:59	LB137447
	Iron	23.4	+/-50	U	100	P	10/07/2025	17:59	LB137447
	Lead	2.30	+/-6	U	12.0	P	10/07/2025	17:59	LB137447
	Magnesium	244	+/-1000	U	2000	P	10/07/2025	17:59	LB137447
	Manganese	5.94	+/-10	U	20.0	P	10/07/2025	17:59	LB137447
	Nickel	3.06	+/-20	U	40.0	P	10/07/2025	17:59	LB137447
	Potassium	918	+/-1000	U	2000	P	10/07/2025	17:59	LB137447
	Selenium	9.64	+/-10	U	20.0	P	10/07/2025	17:59	LB137447
	Silver	1.62	+/-5	U	10.0	P	10/07/2025	17:59	LB137447
	Sodium	868	+/-1000	U	2000	P	10/07/2025	17:59	LB137447
	Thallium	4.38	+/-20	U	40.0	P	10/07/2025	17:59	LB137447
	Vanadium	6.26	+/-20	U	40.0	P	10/07/2025	17:59	LB137447
	Zinc	16.7	+/-20	U	40.0	P	10/07/2025	17:59	LB137447
CCB07	Aluminum	11.3	+/-50	U	100	P	10/07/2025	18:48	LB137447
	Antimony	6.76	+/-25	U	50.0	P	10/07/2025	18:48	LB137447
	Arsenic	5.12	+/-10	U	20.0	P	10/07/2025	18:48	LB137447
	Barium	14.6	+/-50	U	100	P	10/07/2025	18:48	LB137447
	Beryllium	0.56	+/-3	U	6.00	P	10/07/2025	18:48	LB137447
	Cadmium	0.50	+/-3	U	6.00	P	10/07/2025	18:48	LB137447
	Calcium	234	+/-1000	U	2000	P	10/07/2025	18:48	LB137447
	Chromium	2.12	+/-5	U	10.0	P	10/07/2025	18:48	LB137447
	Cobalt	2.26	+/-15	U	30.0	P	10/07/2025	18:48	LB137447
	Copper	4.60	+/-10	U	20.0	P	10/07/2025	18:48	LB137447
	Iron	23.4	+/-50	U	100	P	10/07/2025	18:48	LB137447
	Lead	2.30	+/-6	U	12.0	P	10/07/2025	18:48	LB137447
	Magnesium	244	+/-1000	U	2000	P	10/07/2025	18:48	LB137447
	Manganese	5.94	+/-10	U	20.0	P	10/07/2025	18:48	LB137447
	Nickel	3.06	+/-20	U	40.0	P	10/07/2025	18:48	LB137447
	Potassium	918	+/-1000	U	2000	P	10/07/2025	18:48	LB137447
	Selenium	9.64	+/-10	U	20.0	P	10/07/2025	18:48	LB137447
	Silver	1.62	+/-5	U	10.0	P	10/07/2025	18:48	LB137447
	Sodium	868	+/-1000	U	2000	P	10/07/2025	18:48	LB137447
	Thallium	4.38	+/-20	U	40.0	P	10/07/2025	18:48	LB137447
	Vanadium	6.26	+/-20	U	40.0	P	10/07/2025	18:48	LB137447
	Zinc	16.7	+/-20	U	40.0	P	10/07/2025	18:48	LB137447
CCB08	Aluminum	11.3	+/-50	U	100	P	10/07/2025	19:24	LB137447
	Antimony	6.76	+/-25	U	50.0	P	10/07/2025	19:24	LB137447

Metals

- 3a -

INITIAL AND CONTINUING CALIBRATION BLANK SUMMARY

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Sample ID	Analyte	Result ug/L	Acceptance Limit	Conc Qual	CRQL	M	Analysis Date	Analysis Time	Run Number
CCB08	Arsenic	5.12	+/-10	U	20.0	P	10/07/2025	19:24	LB137447
	Barium	14.6	+/-50	U	100	P	10/07/2025	19:24	LB137447
	Beryllium	0.56	+/-3	U	6.00	P	10/07/2025	19:24	LB137447
	Cadmium	0.50	+/-3	U	6.00	P	10/07/2025	19:24	LB137447
	Calcium	234	+/-1000	U	2000	P	10/07/2025	19:24	LB137447
	Chromium	2.12	+/-5	U	10.0	P	10/07/2025	19:24	LB137447
	Cobalt	2.26	+/-15	U	30.0	P	10/07/2025	19:24	LB137447
	Copper	4.60	+/-10	U	20.0	P	10/07/2025	19:24	LB137447
	Iron	23.4	+/-50	U	100	P	10/07/2025	19:24	LB137447
	Lead	2.30	+/-6	U	12.0	P	10/07/2025	19:24	LB137447
	Magnesium	244	+/-1000	U	2000	P	10/07/2025	19:24	LB137447
	Manganese	5.94	+/-10	U	20.0	P	10/07/2025	19:24	LB137447
	Nickel	3.06	+/-20	U	40.0	P	10/07/2025	19:24	LB137447
	Potassium	918	+/-1000	U	2000	P	10/07/2025	19:24	LB137447
	Selenium	9.64	+/-10	U	20.0	P	10/07/2025	19:24	LB137447
	Silver	1.62	+/-5	U	10.0	P	10/07/2025	19:24	LB137447
	Sodium	868	+/-1000	U	2000	P	10/07/2025	19:24	LB137447
	Thallium	4.38	+/-20	U	40.0	P	10/07/2025	19:24	LB137447
	Vanadium	6.26	+/-20	U	40.0	P	10/07/2025	19:24	LB137447
	Zinc	16.7	+/-20	U	40.0	P	10/07/2025	19:24	LB137447

Metals
- 3b -
PREPARATION BLANK SUMMARY

Client: G Environmental

SDG No.: Q3277

Instrument: CV1

Sample ID	Analyte	Result (mg/Kg)	Acceptance Limit	Conc Qual	CRQL mg/Kg	M	Analysis Date	Analysis Time	Run
PB169993BL		SOLID		Batch Number:	PB169993		Prep Date:	10/06/2025	
	Mercury	0.0070	<0.013	U	0.013	CV	10/06/2025	15:13	LB137429

Metals
- 3b -
PREPARATION BLANK SUMMARY

Client: G Environmental

SDG No.: Q3277

Instrument: P4

Sample ID	Analyte	Result (mg/Kg)	Acceptance Limit	Conc Qual	CRQL mg/Kg	M	Analysis Date	Analysis Time	Run
PB169979BL	SOLID			Batch Number:	PB169979		Prep Date:	10/03/2025	
	Aluminum	0.84	<2.5	U	5.00	P	10/07/2025	15:52	LB137447
	Antimony	0.22	<1.25	U	2.50	P	10/07/2025	15:52	LB137447
	Arsenic	0.19	<0.5	U	1.00	P	10/07/2025	15:52	LB137447
	Barium	0.73	<2.5	U	5.00	P	10/07/2025	15:52	LB137447
	Beryllium	0.025	<0.15	U	0.30	P	10/07/2025	15:52	LB137447
	Cadmium	0.024	<0.15	U	0.30	P	10/07/2025	15:52	LB137447
	Calcium	11.1	<50	U	100	P	10/07/2025	15:52	LB137447
	Chromium	0.047	<0.25	U	0.50	P	10/07/2025	15:52	LB137447
	Cobalt	0.10	<0.75	U	1.50	P	10/07/2025	15:52	LB137447
	Copper	0.22	<0.5	U	1.00	P	10/07/2025	15:52	LB137447
	Iron	3.99	<2.5	U	5.00	P	10/07/2025	15:52	LB137447
	Lead	0.13	<0.3	U	0.60	P	10/07/2025	15:52	LB137447
	Magnesium	12.0	<50	U	100	P	10/07/2025	15:52	LB137447
	Manganese	0.14	<0.5	U	1.00	P	10/07/2025	15:52	LB137447
	Nickel	0.13	<1	U	2.00	P	10/07/2025	15:52	LB137447
	Potassium	27.7	<50	U	100	P	10/07/2025	15:52	LB137447
	Selenium	0.26	<0.5	U	1.00	P	10/07/2025	15:52	LB137447
	Silver	0.12	<0.25	U	0.50	P	10/07/2025	15:52	LB137447
	Sodium	17.8	<50	U	100	P	10/07/2025	15:52	LB137447
	Thallium	0.23	<1	U	2.00	P	10/07/2025	15:52	LB137447
	Vanadium	0.25	<1	U	2.00	P	10/07/2025	15:52	LB137447
	Zinc	0.23	<1	U	2.00	P	10/07/2025	15:52	LB137447

Metals
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INTERFERENCE CHECK SAMPLE

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

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	Aluminum	243000	255000	95	216000	294000	10/07/2025	12:14	LB137447
	Antimony	-5.05			-50	50	10/07/2025	12:14	LB137447
	Arsenic	3.53			-20	20	10/07/2025	12:14	LB137447
	Barium	-8.30	6.0	138	-94	106	10/07/2025	12:14	LB137447
	Beryllium	1.74			-6	6	10/07/2025	12:14	LB137447
	Cadmium	2.40	1.0	240	-5	7	10/07/2025	12:14	LB137447
	Calcium	234000	245000	96	208000	282000	10/07/2025	12:14	LB137447
	Chromium	47.2	52.0	91	42	62	10/07/2025	12:14	LB137447
	Cobalt	1.06			-30	30	10/07/2025	12:14	LB137447
	Copper	13.8	2.0	690	-18	22	10/07/2025	12:14	LB137447
	Iron	94400	101000	94	85600	116500	10/07/2025	12:14	LB137447
	Lead	-1.11			-12	12	10/07/2025	12:14	LB137447
	Magnesium	246000	255000	96	216000	294000	10/07/2025	12:14	LB137447
	Manganese	6.71	7.0	96	-13	27	10/07/2025	12:14	LB137447
	Nickel	2.60	2.0	130	-38	42	10/07/2025	12:14	LB137447
	Potassium	-102			0	0	10/07/2025	12:14	LB137447
	Selenium	8.06			-20	20	10/07/2025	12:14	LB137447
	Silver	-0.34			-10	10	10/07/2025	12:14	LB137447
	Sodium	-109			0	0	10/07/2025	12:14	LB137447
	Thallium	33.6			-40	40	10/07/2025	12:14	LB137447
	Vanadium	-0.97			-40	40	10/07/2025	12:14	LB137447
	Zinc	-0.92			-40	40	10/07/2025	12:14	LB137447
ICSAB01	Aluminum	247000	247000	100	209000	285000	10/07/2025	12:37	LB137447
	Antimony	604	618	98	525	711	10/07/2025	12:37	LB137447
	Arsenic	107	104	103	88.4	120	10/07/2025	12:37	LB137447
	Barium	477	537	89	437	637	10/07/2025	12:37	LB137447
	Beryllium	496	495	100	420	570	10/07/2025	12:37	LB137447
	Cadmium	990	972	102	826	1120	10/07/2025	12:37	LB137447
	Calcium	231000	235000	98	199000	271000	10/07/2025	12:37	LB137447
	Chromium	540	542	100	460	624	10/07/2025	12:37	LB137447
	Cobalt	493	476	104	404	548	10/07/2025	12:37	LB137447
	Copper	489	511	96	434	588	10/07/2025	12:37	LB137447
	Iron	97100	99300	98	84400	114500	10/07/2025	12:37	LB137447
	Lead	50.4	49.0	103	37	61	10/07/2025	12:37	LB137447
	Magnesium	246000	248000	99	210000	286000	10/07/2025	12:37	LB137447
	Manganese	477	507	94	430	584	10/07/2025	12:37	LB137447
	Nickel	982	954	103	810	1100	10/07/2025	12:37	LB137447
	Potassium	-317			0	0	10/07/2025	12:37	LB137447
	Selenium	60.1	46.0	131	26	66	10/07/2025	12:37	LB137447
	Silver	205	201	102	170	232	10/07/2025	12:37	LB137447
	Sodium	-119			0	0	10/07/2025	12:37	LB137447
	Thallium	140	108	130	68	148	10/07/2025	12:37	LB137447

Metals

- 4 -

INTERFERENCE CHECK SAMPLE

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

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
ICSAB01	Vanadium	475	491	97	417	565	10/07/2025	12:37	LB137447
	Zinc	1020	952	107	809	1095	10/07/2025	12:37	LB137447



METAL

QC

DATA

metals
- 5a -
MATRIX SPIKE SUMMARY

client: G Environmental **level:** low **sdg no.:** Q3277
contract: GENV01 **lab code:** ACE
matrix: Solid **sample id:** Q3271-01 **client id:** 72-11929MS

Percent Solids for Sample: 90.1 **Spiked ID:** Q3271-01MS **Percent Solids for Spike Sample:** 90.1

Analyte	Units	Acceptance Limit %R	Spiked Result	C	Sample Result	C	Spike Added	% Recovery	Qual	M
Aluminum	mg/Kg	75 - 125	14800		14700		100	92		P
Antimony	mg/Kg	75 - 125	12.5		2.35	U	40.4	31	N	P
Arsenic	mg/Kg	75 - 125	36.8		3.92		40.4	81		P
Barium	mg/Kg	75 - 125	117		118		10.1	-13		P
Beryllium	mg/Kg	75 - 125	9.25		1.33		10.1	78		P
Cadmium	mg/Kg	75 - 125	11.0		1.06		10.1	99		P
Calcium	mg/Kg	75 - 125	2050		2580		50.4	-1060		P
Chromium	mg/Kg	75 - 125	38.1		22.9		20.2	75		P
Cobalt	mg/Kg	75 - 125	26.0		18.9		10.1	71	N	P
Copper	mg/Kg	75 - 125	30.3		19.7		15.1	70	N	P
Iron	mg/Kg	75 - 125	30500		31600		150	-726		P
Lead	mg/Kg	75 - 125	71.9		26.2		50.4	91		P
Magnesium	mg/Kg	75 - 125	5640		5950		100	-315		P
Manganese	mg/Kg	75 - 125	577		629		10.1	-521		P
Nickel	mg/Kg	75 - 125	54.5		32.5		25.2	87		P
Potassium	mg/Kg	75 - 125	1990		1540		500	90		P
Selenium	mg/Kg	75 - 125	81.2		0.78	J	100	80		P
Silver	mg/Kg	75 - 125	4.19		0.87		3.8	88		P
Sodium	mg/Kg	75 - 125	281		168		150	76		P
Thallium	mg/Kg	75 - 125	94.1		1.88	U	100	94		P
Vanadium	mg/Kg	75 - 125	52.7		40.3		15.1	82		P
Zinc	mg/Kg	75 - 125	78.9		78.0		10.1	9		P

metals
- 5a -
MATRIX SPIKE DUPLICATE SUMMARY

client: G Environmental **level:** low **sdg no.:** Q3277
contract: GENV01 **lab code:** ACE
matrix: Solid **sample id:** Q3271-01 **client id:** 72-11929MSD

Percent Solids for Sample: 90.1 **Spiked ID:** Q3271-01MSD **Percent Solids for Spike Sample:** 90.1

Analyte	Units	Acceptance Limit %R	MSD Result	C	Sample Result	C	Spike Added	% Recovery	Qual	M
Aluminum	mg/Kg	75 - 125	14900		14700		99.1	234		P
Antimony	mg/Kg	75 - 125	12.1		2.35	U	39.6	31	N	P
Arsenic	mg/Kg	75 - 125	36.2		3.92		39.6	81		P
Barium	mg/Kg	75 - 125	112		118		9.9	-65		P
Beryllium	mg/Kg	75 - 125	9.27		1.33		9.9	80		P
Cadmium	mg/Kg	75 - 125	10.9		1.06		9.9	100		P
Calcium	mg/Kg	75 - 125	1920		2580		49.5	-1326		P
Chromium	mg/Kg	75 - 125	37.7		22.9		19.8	75		P
Cobalt	mg/Kg	75 - 125	25.1		18.9		9.9	63	N	P
Copper	mg/Kg	75 - 125	29.9		19.7		14.9	68	N	P
Iron	mg/Kg	75 - 125	30100		31600		150	-993		P
Lead	mg/Kg	75 - 125	70.4		26.2		49.5	89		P
Magnesium	mg/Kg	75 - 125	5590		5950		99.1	-372		P
Manganese	mg/Kg	75 - 125	536		629		9.9	-939		P
Nickel	mg/Kg	75 - 125	53.5		32.5		24.8	85		P
Potassium	mg/Kg	75 - 125	1920		1540		500	76		P
Selenium	mg/Kg	75 - 125	79.0		0.78	J	99.1	79		P
Silver	mg/Kg	75 - 125	4.06		0.87		3.7	86		P
Sodium	mg/Kg	75 - 125	283		168		150	77		P
Thallium	mg/Kg	75 - 125	87.1		1.88	U	99.1	88		P
Vanadium	mg/Kg	75 - 125	50.1		40.3		14.9	66	N	P
Zinc	mg/Kg	75 - 125	77.7		78.0		9.9	-2		P

metals
- 5a -
MATRIX SPIKE SUMMARY

client: G Environmental **level:** low **sdg no.:** Q3277
contract: GENV01 **lab code:** ACE
matrix: Solid **sample id:** Q3290-01 **client id:** CL-02-100325MS

Percent Solids for Sample: 95.3 **Spiked ID:** Q3290-01MS **Percent Solids for Spike Sample:** 95.3

Analyte	Units	Acceptance Limit %R	Spiked Result	C	Sample Result	C	Spike Added	% Recovery	Qual	M
Mercury	mg/Kg	80 - 120	0.25		0.018		0.25	92		CV

metals
- 5a -
MATRIX SPIKE DUPLICATE SUMMARY

client:	G Environmental	level:	low	sdg no.:	Q3277
contract:	GENV01			lab code:	ACE
matrix:	Solid	sample id:	Q3290-01	client id:	CL-02-100325MSD
Percent Solids for Sample:	95.3	Spiked ID:	Q3290-01MSD	Percent Solids for Spike Sample:	95.3

Analyte	Units	Acceptance Limit %R	MSD Result	C	Sample Result	C	Spike Added	% Recovery	Qual	M
Mercury	mg/Kg	80 - 120	0.27		0.018		0.25	101		CV

Metals
- 5b -
POST DIGEST SPIKE SUMMARY

Client:	<u>G Environmental</u>	SDG No.:	<u>Q3277</u>
Contract:	<u>GENV01</u>	Lab Code:	<u>ACE</u>
Matrix:	<u>Solid</u>	Level:	<u>LOW</u>
Sample ID:	<u>Q3271-01</u>	Client ID:	<u>72-11929A</u>
	Spiked ID:	<u>Q3271-01A</u>	

Analyte	Units	Acceptance Limit %R	Spiked Result	C	Sample Result	C	Spike Added	% Recovery	Qual	M
Antimony	mg/Kg	75 - 125	32.9		2.35	U	37.6	88		P
Cobalt	mg/Kg	75 - 125	29.3		18.9		9.40	111		P
Copper	mg/Kg	75 - 125	31.8		19.7		14.1	86		P
Vanadium	mg/Kg	75 - 125	53.1		40.3		14.1	91		P

Metals

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DUPLICATE SAMPLE SUMMARY

Client:	<u>G Environmental</u>	Level:	<u>LOW</u>	SDG No.:	<u>Q3277</u>
Contract:	<u>GENV01</u>			Lab Code:	<u>ACE</u>
Matrix:	<u>Solid</u>	Sample ID:	<u>Q3271-01</u>	Client ID:	<u>72-11929DUP</u>
Percent Solids for Sample:	90.1	Duplicate ID	Q3271-01DUP	Percent Solids for Spike Sample:	90.1

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M
Aluminum	mg/Kg	20	14700		16600		12		P
Antimony	mg/Kg	20	2.35	U	2.57	U			P
Arsenic	mg/Kg	20	3.92		4.38		11		P
Barium	mg/Kg	20	118		130		10		P
Beryllium	mg/Kg	20	1.33		1.50		12		P
Cadmium	mg/Kg	20	1.06		1.40		28	*	P
Calcium	mg/Kg	20	2580		2860		10		P
Chromium	mg/Kg	20	22.9		25.1		9		P
Cobalt	mg/Kg	20	18.9		20.8		10		P
Copper	mg/Kg	20	19.7		21.4		8		P
Iron	mg/Kg	20	31600		33900		7		P
Lead	mg/Kg	20	26.2		28.8		9		P
Magnesium	mg/Kg	20	5950		6610		11		P
Manganese	mg/Kg	20	629		696		10		P
Nickel	mg/Kg	20	32.5		36.0		10		P
Potassium	mg/Kg	20	1540		1680		9		P
Selenium	mg/Kg	20	0.78	J	0.65	J	19		P
Silver	mg/Kg	20	0.87		0.76		13		P
Sodium	mg/Kg	20	168		186		10		P
Thallium	mg/Kg	20	1.88	U	2.06	U			P
Vanadium	mg/Kg	20	40.3		45.4		12		P
Zinc	mg/Kg	20	78.0		84.4		8		P

Metals

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DUPLICATE SAMPLE SUMMARY

Client:	<u>G Environmental</u>	Level:	<u>LOW</u>	SDG No.:	<u>Q3277</u>
Contract:	<u>GENV01</u>			Lab Code:	<u>ACE</u>
Matrix:	<u>Solid</u>	Sample ID:	<u>Q3271-01MS</u>	Client ID:	<u>72-11929MSD</u>
Percent Solids for Sample:	90.1	Duplicate ID	Q3271-01MSD	Percent Solids for Spike Sample:	90.1

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M
Aluminum	mg/Kg	20	14800		14900		1		P
Antimony	mg/Kg	20	12.5		12.1		3		P
Arsenic	mg/Kg	20	36.8		36.2		2		P
Barium	mg/Kg	20	117		112		4		P
Beryllium	mg/Kg	20	9.25		9.27		0		P
Cadmium	mg/Kg	20	11.0		10.9		1		P
Calcium	mg/Kg	20	2050		1920		7		P
Chromium	mg/Kg	20	38.1		37.7		1		P
Cobalt	mg/Kg	20	26.0		25.1		4		P
Copper	mg/Kg	20	30.3		29.9		1		P
Iron	mg/Kg	20	30500		30100		1		P
Lead	mg/Kg	20	71.9		70.4		2		P
Magnesium	mg/Kg	20	5640		5590		1		P
Manganese	mg/Kg	20	577		536		7		P
Nickel	mg/Kg	20	54.5		53.5		2		P
Potassium	mg/Kg	20	1990		1920		4		P
Selenium	mg/Kg	20	81.2		79.0		3		P
Silver	mg/Kg	20	4.19		4.06		3		P
Sodium	mg/Kg	20	281		283		1		P
Thallium	mg/Kg	20	94.1		87.1		8		P
Vanadium	mg/Kg	20	52.7		50.1		5		P
Zinc	mg/Kg	20	78.9		77.7		2		P

Metals

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DUPLICATE SAMPLE SUMMARY

Client:	<u>G Environmental</u>	Level:	<u>LOW</u>	SDG No.:	<u>Q3277</u>
Contract:	<u>GENV01</u>			Lab Code:	<u>ACE</u>
Matrix:	<u>Solid</u>	Sample ID:	<u>Q3290-01</u>	Client ID:	<u>CL-02-100325DUP</u>
Percent Solids for Sample:	95.3	Duplicate ID	Q3290-01DUP	Percent Solids for Spike Sample:	95.3

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M
Mercury	mg/Kg	20	0.018		0.020		11		CV

Metals

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DUPLICATE SAMPLE SUMMARY

Client:	<u>G Environmental</u>	Level:	<u>LOW</u>	SDG No.:	<u>Q3277</u>
Contract:	<u>GENV01</u>			Lab Code:	<u>ACE</u>
Matrix:	<u>Solid</u>	Sample ID:	<u>Q3290-01MS</u>	Client ID:	<u>CL-02-100325MSD</u>
Percent Solids for Sample:	95.3	Duplicate ID	Q3290-01MSD	Percent Solids for Spike Sample:	95.3

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M
Mercury	mg/Kg	20	0.25		0.27		9		CV

Metals

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LABORATORY CONTROL SAMPLE SUMMARY

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Analyte	Units	True Value	Result	C	% Recovery	Acceptance Limits	M
PB169979BS							
Aluminum	mg/Kg	100	97.8		98	80 - 120	P
Antimony	mg/Kg	40.0	41.0		102	80 - 120	P
Arsenic	mg/Kg	40.0	39.6		99	80 - 120	P
Barium	mg/Kg	10.0	9.09		91	80 - 120	P
Beryllium	mg/Kg	10.0	10.4		104	80 - 120	P
Cadmium	mg/Kg	10.0	9.53		95	80 - 120	P
Calcium	mg/Kg	50.0	50.3	J	101	80 - 120	P
Chromium	mg/Kg	20.0	22.1		110	80 - 120	P
Cobalt	mg/Kg	10.0	9.66		97	80 - 120	P
Copper	mg/Kg	15.0	15.5		103	80 - 120	P
Iron	mg/Kg	150	157		105	80 - 120	P
Lead	mg/Kg	50.0	47.4		95	80 - 120	P
Magnesium	mg/Kg	100	99.6	J	100	80 - 120	P
Manganese	mg/Kg	10.0	10.3		103	80 - 120	P
Nickel	mg/Kg	25.0	25.2		101	80 - 120	P
Potassium	mg/Kg	500	465		93	80 - 120	P
Selenium	mg/Kg	100	102		102	80 - 120	P
Silver	mg/Kg	3.8	3.78		100	80 - 120	P
Sodium	mg/Kg	150	131		87	80 - 120	P
Thallium	mg/Kg	100	84.5		84	80 - 120	P
Vanadium	mg/Kg	15.0	15.0		100	80 - 120	P
Zinc	mg/Kg	10.0	10.3		103	80 - 120	P

Metals

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LABORATORY CONTROL SAMPLE SUMMARY

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Analyte	Units	True Value	Result	C	% Recovery	Acceptance Limits	M
PB169993BS Mercury	mg/Kg	0.27	0.25		91	80 - 120	CV

Metals
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ICP SERIAL DILUTIONS

SAMPLE NO.

72-11929L

Lab Name: Alliance **Contract:** GENV01
Lab Code: ACE **Lb No.:** lb137447 **Lab Sample ID :** Q3271-01L **SDG No.:** Q3277
Matrix (soil/water): Solid **Level (low/med):** LOW
Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)		Serial Dilution Result (S)		% Differ-ence		Q	M
	C		C					
Aluminum	14700		17600		20			P
Antimony	2.35	U	11.8	U				P
Arsenic	3.92		3.29	J	16			P
Barium	118		137		16			P
Beryllium	1.33		1.79		34			P
Cadmium	1.06		0.64	J	39			P
Calcium	2580		3230		25			P
Chromium	22.9		28.9		26			P
Cobalt	18.9		18.8		0			P
Copper	19.7		27.9		42			P
Iron	31600		36800		17			P
Lead	26.2		27.0		3			P
Magnesium	5950		7340		23			P
Manganese	629		783		24			P
Nickel	32.5		33.1		2			P
Potassium	1540		1700		10			P
Selenium	0.78	J	4.70	U	100.0			P
Silver	0.87		2.35	U	100.0			P
Sodium	168		170	J	2			P
Thallium	1.88	U	9.41	U				P
Vanadium	40.3		49.5		23			P
Zinc	78.0		95.3		22			P

Metals

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ICP SERIAL DILUTIONS

SAMPLE NO.

CL-02-100325L

Lab Name: Alliance

Contract: GENV01

Lab Code: ACE

Lb No.: lb137429

Lab Sample ID : Q3290-01L

SDG No.: Q3277

Matrix (soil/water): Solid

Level (low/med): LOW

Concentration Units: mg/Kg

Analyte	Initial Sample Result (I) C	Serial Dilution Result (S) C	% Differ- ence	Q	M
Mercury	0.018	0.063 U	100.0		CV



METAL PREPARATION & INSTRUMENT DATA

Metals

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ICP INTERELEMENT CORRECTION FACTORS

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Instrument ID: _____

Date: _____

Interelement Correction Factors (apparent ppb analyte/ppm interferent)

Analyte	Wave- Length (nm)	ICP Interelement Correction Factors For:				
		Al	Ca	Fe	Mg	Ag
Aluminum	396.100	0.0000000	-0.0002060	0.0000000	0.0000000	0.0000000
Antimony	206.833	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	193.759	0.0000000	0.0000000	-0.0000440	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	234.861	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.502	0.0000000	0.0000000	0.0000930	0.0000000	0.0000000
Calcium	373.690	0.0000000	0.0000000	-0.0075970	0.0000000	0.0000000
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.616	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	224.700	0.0000000	0.0000000	0.0007850	0.0000000	0.0000000
Iron	240.488	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.353	-0.0000920	0.0000000	0.0000380	0.0000000	0.0000000
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.490	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.090	0.0000000	0.0000000	-0.0001440	0.0000000	0.0000000
Silver	328.068	0.0000000	0.0000000	-0.0001490	0.0000000	0.0000000
Sodium	589.592	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.856	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	213.800	0.0000000	0.0000000	0.0001050	0.0000000	0.0000000

Metals

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ICP INTERELEMENT CORRECTION FACTORS

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Instrument ID: _____

Date: _____

Interelement Correction Factors (apparent ppb analyte/ppm interferent)

Analyte	Wave- Length (nm)	ICP Interelement Correction Factors For:				
		As	Ba	Be	Cd	Co
Aluminum	396.100	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.833	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	193.759	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	234.861	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.502	0.0000000	0.0000000	0.0000000	0.0000000	0.0002870
Calcium	373.690	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.616	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	224.700	0.0000000	0.0000000	0.0000000	0.0000000	0.0009530
Iron	240.488	0.0000000	0.0000000	0.0000000	0.0000000	-0.0039600
Lead	220.353	0.0000000	0.0003170	0.0000000	0.0000000	0.0000000
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.490	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.090	0.0000000	0.0000000	0.0000000	0.0000000	-0.0003570
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	589.592	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.856	0.0000000	0.0000000	0.0000000	0.0000000	0.0054900
Vanadium	292.402	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	213.800	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000

Metals

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ICP INTERELEMENT CORRECTION FACTORS

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Instrument ID: _____

Date: _____

Interelement Correction Factors (apparent ppb analyte/ppm interferent)

Analyte	Wave- Length (nm)	ICP Interelement Correction Factors For:				
		Cr	Cu	K	Mn	Mo
Aluminum	396.100	0.0000000	0.0000000	0.0000590	0.0000000	0.0396900
Antimony	206.833	0.0122000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	193.759	-0.0029000	0.0000000	0.0000000	0.0000000	0.0004900
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	234.861	0.0000000	0.0000000	0.0000000	-0.0000710	-0.0003400
Cadmium	226.502	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	373.690	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000000	0.0000000	0.0000070	0.0002200	0.0000000
Cobalt	228.616	0.0000000	0.0000000	0.0000000	0.0000000	-0.0007860
Copper	224.700	0.0000000	0.0000000	0.0000000	0.0006510	0.0020500
Iron	240.488	0.0000000	0.0000000	0.0000730	0.0000000	-0.0015250
Lead	220.353	0.0000000	0.0000000	0.0000000	0.0001400	-0.0008600
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.490	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.090	0.0000000	0.0000000	0.0000000	0.0007460	0.0000000
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	-0.0000120
Sodium	589.592	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.856	0.0000000	0.0000000	0.0000000	0.0017400	-0.0100400
Vanadium	292.402	-0.0025100	0.0000000	0.0000000	0.0000000	-0.0072000
Zinc	213.800	0.0000000	0.0009010	0.0000000	0.0000000	0.0000000

Metals

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ICP INTERELEMENT CORRECTION FACTORS

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Instrument ID: _____

Date: _____

Interelement Correction Factors (apparent ppb analyte/ppm interferent)

Analyte	Wave- Length (nm)	ICP Interelement Correction Factors For:				
		Na	Ni	Pb	Sb	Se
Aluminum	396.100	0.0000000	0.0000000	0.0012800	0.0000000	0.0000000
Antimony	206.833	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	193.759	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	234.861	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.502	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	373.690	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.616	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	224.700	0.0000000	-0.0047000	0.0036100	0.0000000	0.0000000
Iron	240.488	0.0000000	-0.0017000	0.0000000	0.0000000	0.0000000
Lead	220.353	0.0000000	0.0006580	0.0000000	0.0000000	0.0001290
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.490	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.090	0.0000000	0.0000000	0.0003330	0.0000000	0.0000000
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	589.592	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.856	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	213.800	0.0000000	0.0067600	0.0000000	0.0000000	0.0000000

Metals

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ICP INTERELEMEN CORRECTION FACTORS

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Instrument ID: _____

Date: _____

Interement Correction Factors (apparent ppb analyte/ppm interferent)

Analyte	Wave- Length (nm)	ICP Interement Correction Factors For:				
		Sn	Ti	Tl	V	Zn
Aluminum	396.100	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.833	-0.0035600	-0.0007970	0.0000000	-0.0018900	0.0000000
Arsenic	193.759	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	234.861	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.502	0.0000000	0.0000630	0.0001280	0.0000000	0.0000000
Calcium	373.690	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0001110	0.0000000
Cobalt	228.616	0.0000000	0.0018800	0.0000000	0.0000000	0.0000000
Copper	224.700	0.0000000	0.0003840	0.0000000	0.0000000	0.0000000
Iron	240.488	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.353	0.0000000	-0.0003610	0.0000000	0.0000000	0.0000000
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.490	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.090	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.068	0.0000000	-0.0007420	0.0000000	0.0000000	0.0000000
Sodium	589.592	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.856	0.0000000	-0.0039700	0.0000000	-0.0115600	0.0000000
Vanadium	292.402	0.0000000	0.0005320	0.0000000	0.0000000	0.0000000
Zinc	213.800	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000



METAL PREPARATION & ANALYICAL SUMMARY

Metals

- 13 -

SAMPLE PREPARATION SUMMARY

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Method: _____

Sample ID	Client ID	Sample Type	Matrix	Prep Date	Initial Sample Size(g)	Final Sample Volume (mL)	Percent Solids
Batch Number: PB169979							
PB169979BL	PB169979BL	MB	SOLID	10/03/2025	2.00	100.0	100.00
PB169979BS	PB169979BS	LCS	SOLID	10/03/2025	2.00	100.0	100.00
Q3271-01DUP	72-11929DUP	DUP	SOLID	10/03/2025	2.16	100.0	90.10
Q3271-01MS	72-11929MS	MS	SOLID	10/03/2025	2.20	100.0	90.10
Q3271-01MSD	72-11929MSD	MSD	SOLID	10/03/2025	2.24	100.0	90.10
Q3277-01	WC1	SAM	SOLID	10/03/2025	2.30	100.0	97.60

Metals

- 13 -

SAMPLE PREPARATION SUMMARY

Client: G Environmental

SDG No.: Q3277

Contract: GENV01

Lab Code: ACE

Method:

Sample ID	Client ID	Sample Type	Matrix	Prep Date	Initial Sample Size(g)	Final Sample Volume (mL)	Percent Solids
Batch Number: PB169993							
PB169993BL	PB169993BL	MB	SOLID	10/06/2025	0.54	35.0	100.00
PB169993BS	PB169993BS	LCS	SOLID	10/06/2025	0.52	35.0	100.00
Q3277-01	WC1	SAM	SOLID	10/06/2025	0.58	35.0	97.60
Q3290-01DUP	CL-02-100325DUP	DUP	SOLID	10/06/2025	0.58	35.0	95.30
Q3290-01MS	CL-02-100325MS	MS	SOLID	10/06/2025	0.59	35.0	95.30
Q3290-01MSD	CL-02-100325MSD	MSD	SOLID	10/06/2025	0.58	35.0	95.30

metals
- 14 -
ANALYSIS RUN LOG

Client: G Environmental

Contract: GENV01

Lab code: ACE

Sdg no.: Q3277

Instrument id number: _____

Method: _____

Run number: LB137429

Start date: 10/06/2025

End date: 10/06/2025

Lab sample id.	Client Sample Id	d/f	Time	Parameter list
S0	S0	1	1439	HG
S0.2	S0.2	1	1442	HG
S2.5	S2.5	1	1445	HG
S5	S5	1	1447	HG
S7.5	S7.5	1	1449	HG
S10	S10	1	1452	HG
ICV59	ICV59	1	1456	HG
ICB59	ICB59	1	1458	HG
CCV83	CCV83	1	1501	HG
CCB83	CCB83	1	1503	HG
CRA	CRA	1	1506	HG
PB169993BL	PB169993BL	1	1513	HG
PB169993BS	PB169993BS	1	1516	HG
Q3277-01	WC1	1	1528	HG
CCV84	CCV84	1	1530	HG
CCB84	CCB84	1	1533	HG
Q3290-01DUP	CL-02-100325DUP	1	1547	HG
Q3290-01MS	CL-02-100325MS	1	1549	HG
Q3290-01MSD	CL-02-100325MSD	1	1552	HG
Q3290-01L	CL-02-100325L	5	1554	HG
CCV85	CCV85	1	1559	HG
CCB85	CCB85	1	1602	HG

metals
- 14 -
ANALYSIS RUN LOG

Client: G Environmental

Contract: GENV01

Lab code: ACE

Sdg no.: Q3277

Instrument id number: _____

Method: _____

Run number: LB137447

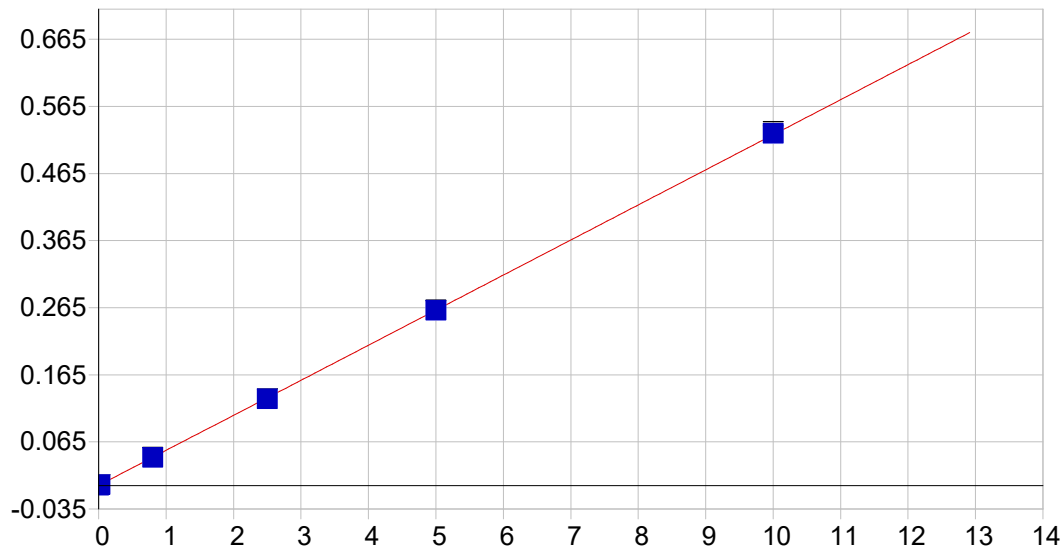
Start date: 10/07/2025

End date: 10/07/2025

Lab sample id.	Client Sample Id	d/f	Time	Parameter list
S0	S0	1	1029	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
S1	S1	1	1034	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
S2	S2	1	1038	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
S3	S3	1	1042	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
S4	S4	1	1046	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
S5	S5	1	1050	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
ICV01	ICV01	1	1054	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
LLICV01	LLICV01	1	1201	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
ICB01	ICB01	1	1206	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
CRI01	CRI01	1	1210	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
ICSA01	ICSA01	1	1214	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
ICSAB01	ICSAB01	1	1237	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
CCV01	CCV01	1	1250	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
CCB01	CCB01	1	1258	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
CCV02	CCV02	1	1419	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
CCB02	CCB02	1	1424	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
Q3271-01L	72-11929L	5	1440	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
Q3271-01MS	72-11929MS	1	1444	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
Q3271-01MSD	72-11929MSD	1	1448	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
Q3271-01A	72-11929A	1	1452	Co,Cu,Sb,V
Q3277-01	WC1	1	1504	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
CCV03	CCV03	1	1508	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
CCB03	CCB03	1	1512	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
Q3271-01DUP	72-11929DUP	1	1538	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
PB169979BL	PB169979BL	1	1552	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
PB169979BS	PB169979BS	1	1556	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
CCV04	CCV04	1	1600	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
CCB04	CCB04	1	1604	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
CCV05	CCV05	1	1650	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
CCB05	CCB05	1	1701	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
CCV06	CCV06	1	1749	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
CCB06	CCB06	1	1759	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
CCV07	CCV07	1	1844	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
CCB07	CCB07	1	1848	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
CCV08	CCV08	1	1920	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn
CCB08	CCB08	1	1924	Ag,Al,As,Ba,Be,Ca,Cd,Co,Cr,Cu,Fe,K,Mg,Mn,Na,Ni,Pb,Sb,Se,Tl,V,Zn



METAL RAW DATA

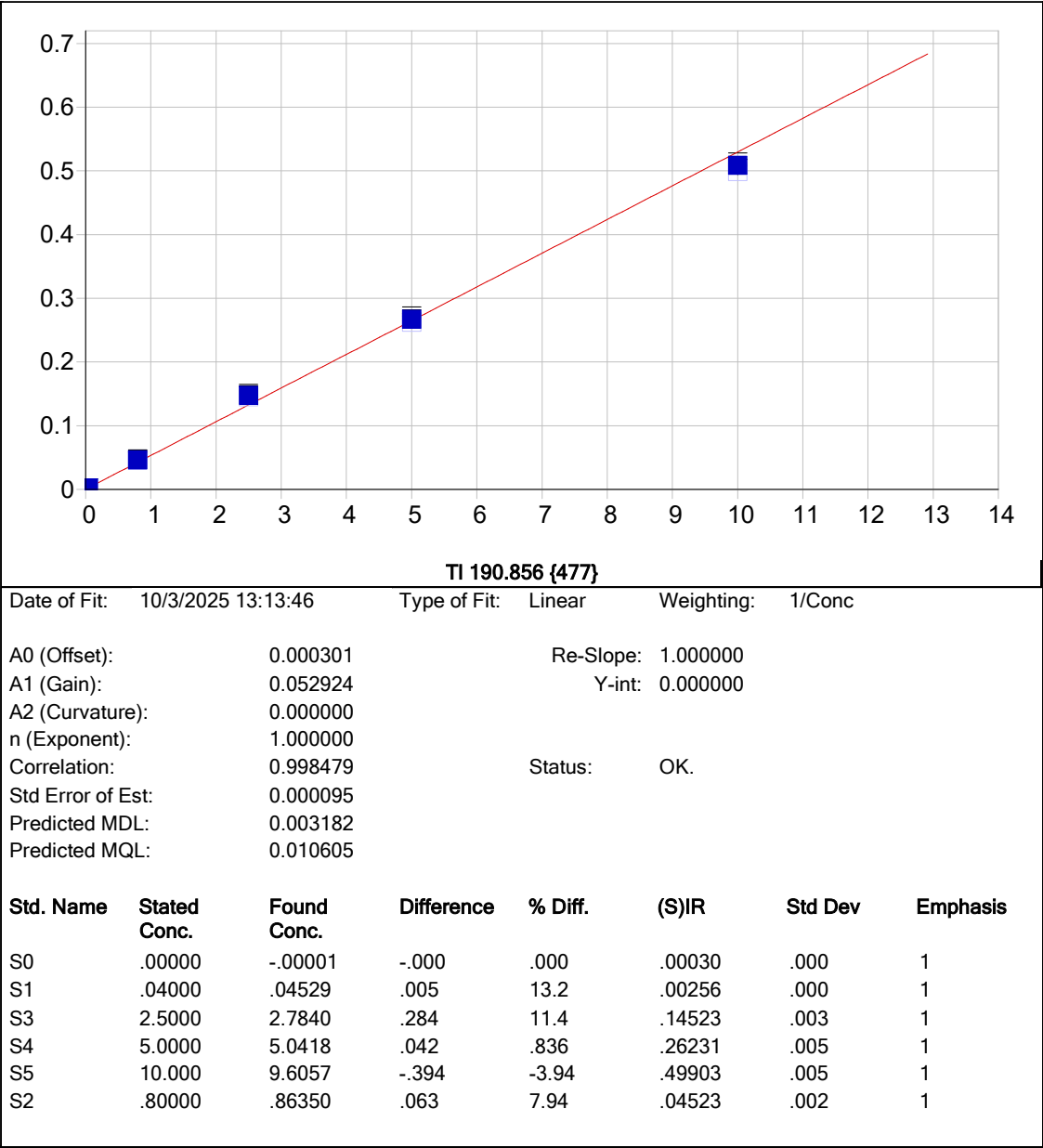


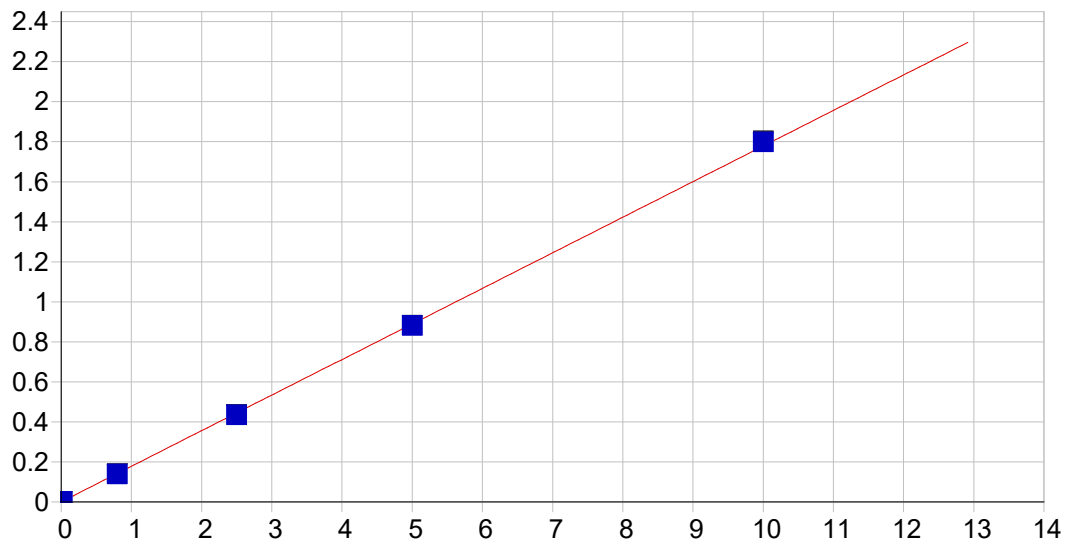
As 189.042 {479}

Date of Fit: 10/3/2025 13:13:46 Type of Fit: Linear Weighting: 1/Conc

A0 (Offset): 0.000072 Re-Slope: 1.000000
A1 (Gain): 0.052272 Y-int: 0.000000
A2 (Curvature): 0.000000
n (Exponent): 1.000000
Correlation: 0.999983 Status: OK.
Std Error of Est: 0.000007
Predicted MDL: 0.002187
Predicted MQL: 0.007289

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	-.00000	-.000	.000	.00007	.000	1
S1	.02000	.02167	.002	8.33	.00120	.000	1
S3	2.5000	2.4716	-.028	-1.14	.12913	.000	1
S4	5.0000	4.9941	-.006	-.118	.26086	.001	1
S5	10.000	10.037	.037	.373	.52420	.003	1
S2	.80000	.79531	-.005	-.586	.04160	.000	1



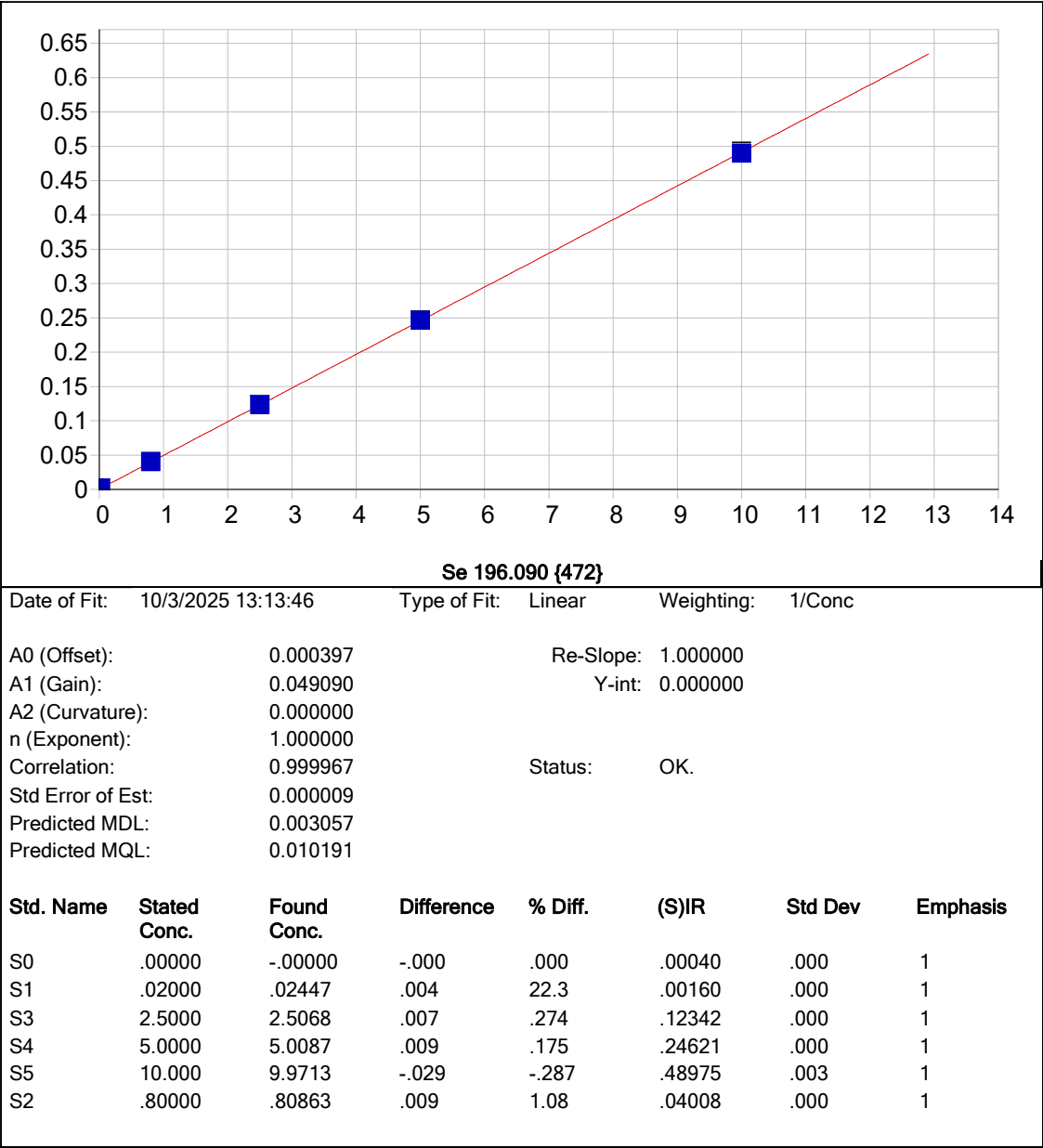


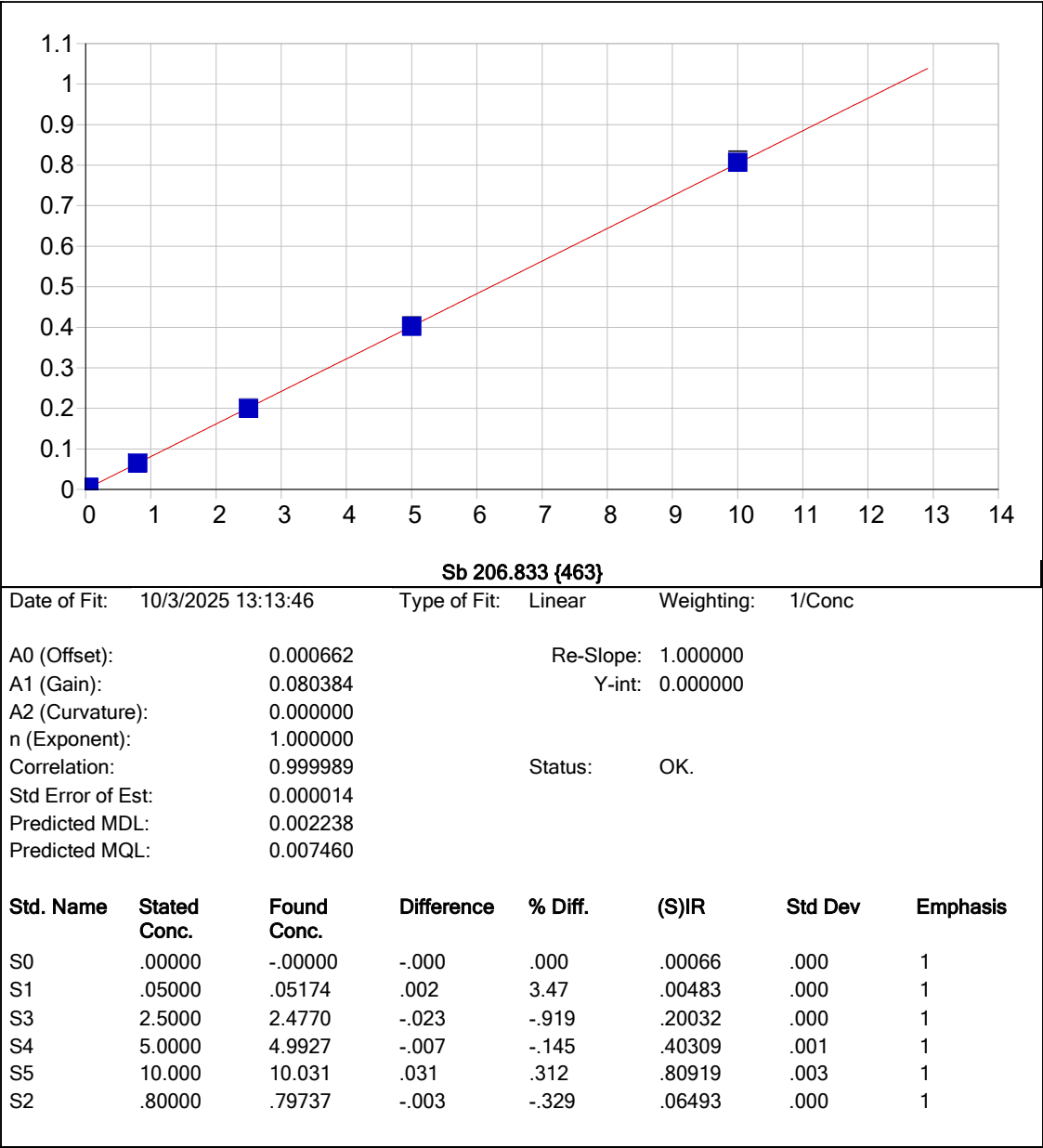
Pb 220.353 {453}

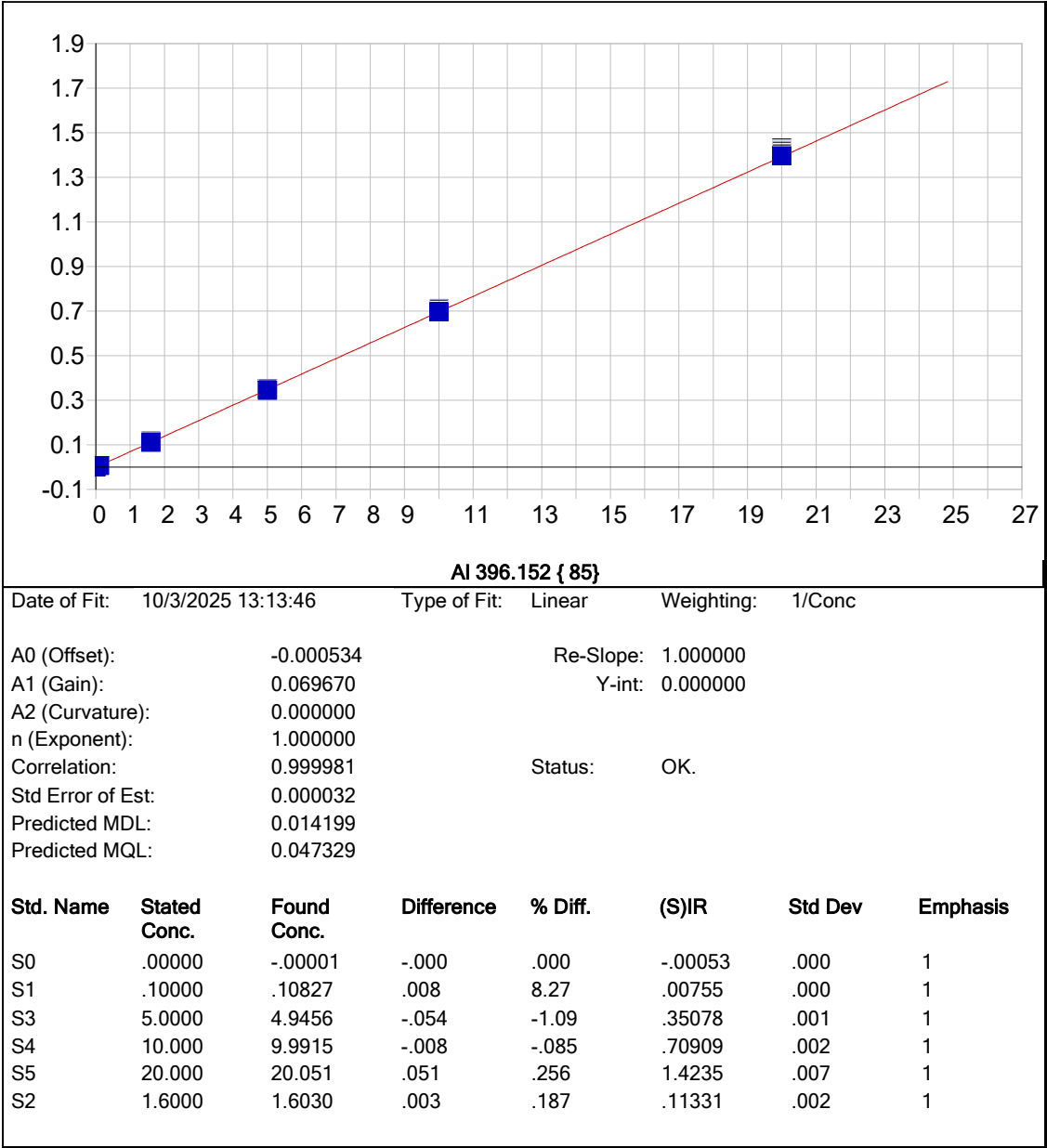
Date of Fit: 10/3/2025 13:13:46 Type of Fit: Linear Weighting: 1/Conc

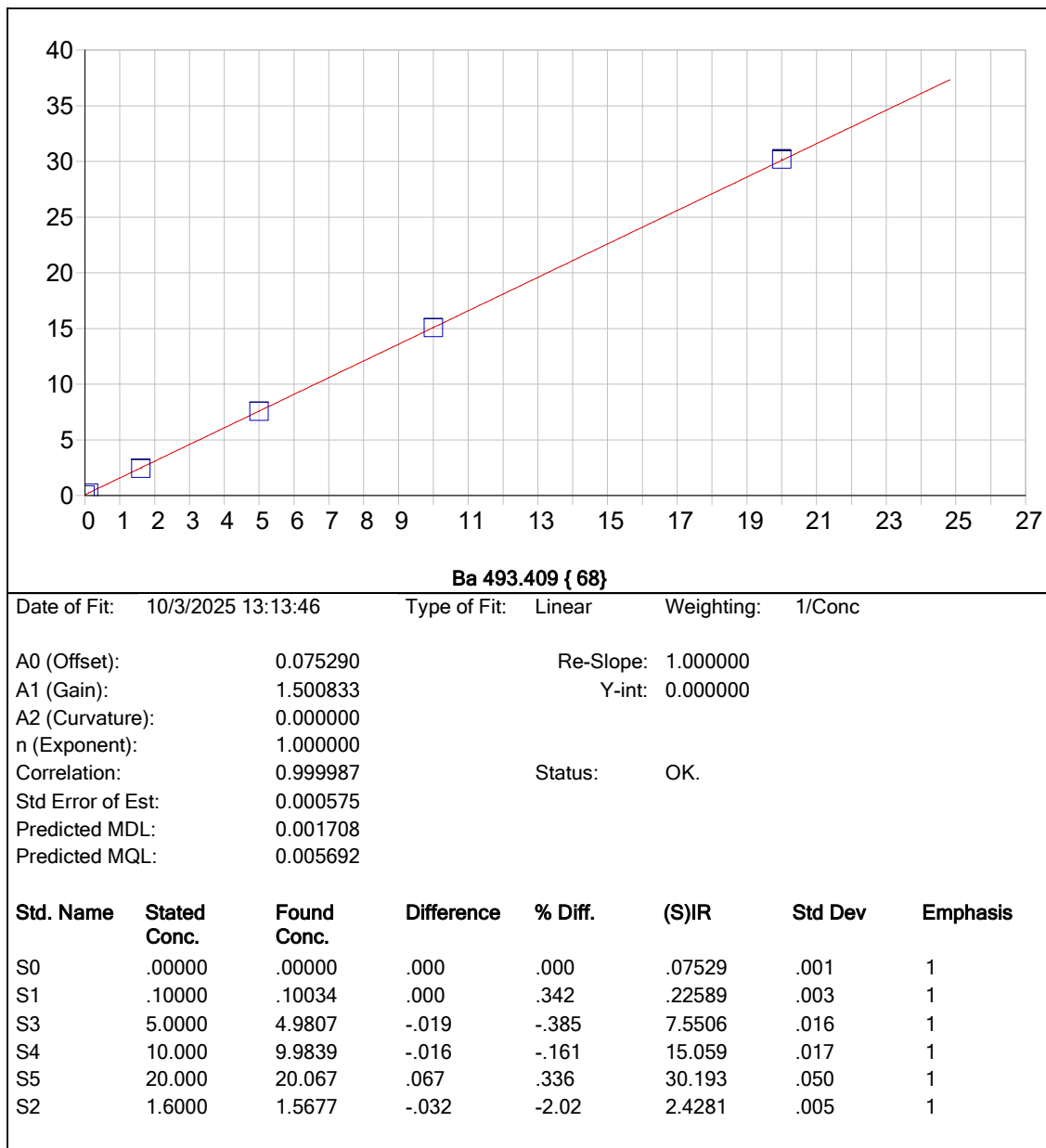
A0 (Offset): 0.000334 Re-Slope: 1.000000
A1 (Gain): 0.177798 Y-int: 0.000000
A2 (Curvature): 0.000000
n (Exponent): 1.000000
Correlation: 0.999908 Status: OK.
Std Error of Est: 0.000044
Predicted MDL: 0.001542
Predicted MQL: 0.005140

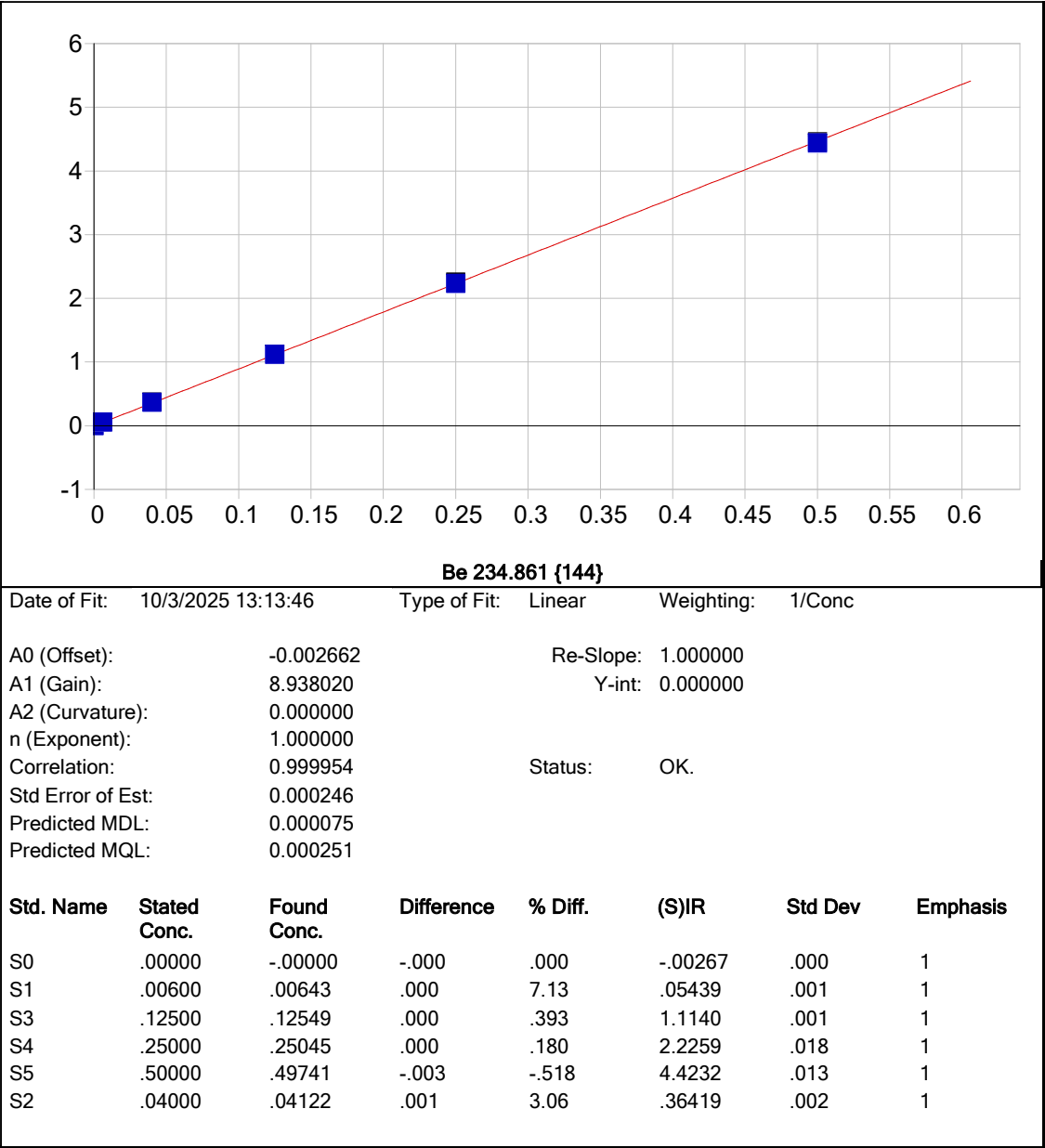
Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00000	.000	.000	.00033	.000	1
S1	.01200	.01132	-.001	-5.65	.00230	.000	1
S3	2.5000	2.4425	-.057	-2.30	.43412	.000	1
S4	5.0000	4.9569	-.043	-.862	.88068	.001	1
S5	10.000	10.116	.116	1.16	1.7970	.005	1
S2	.80000	.78497	-.015	-1.88	.13974	.000	1

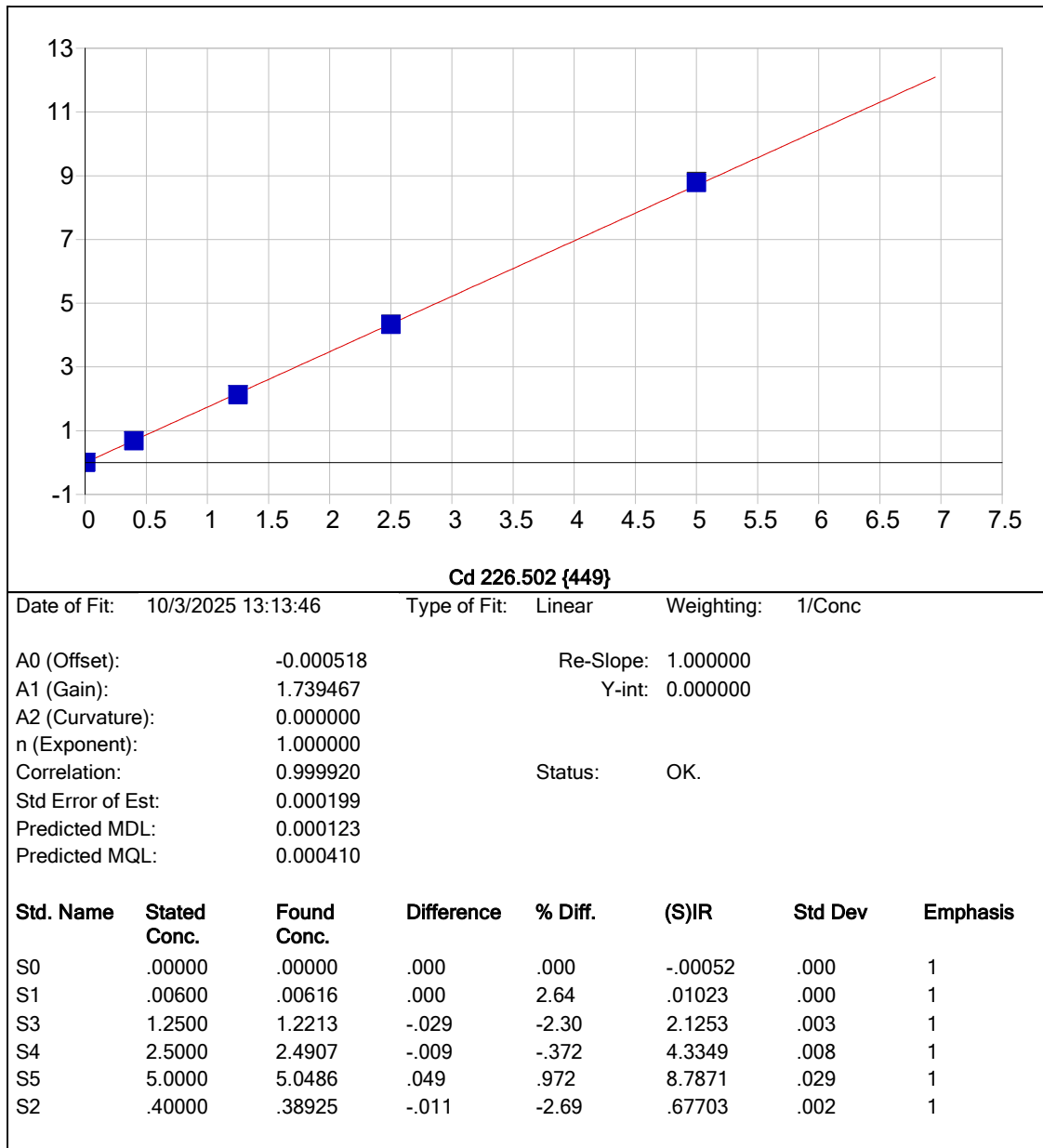


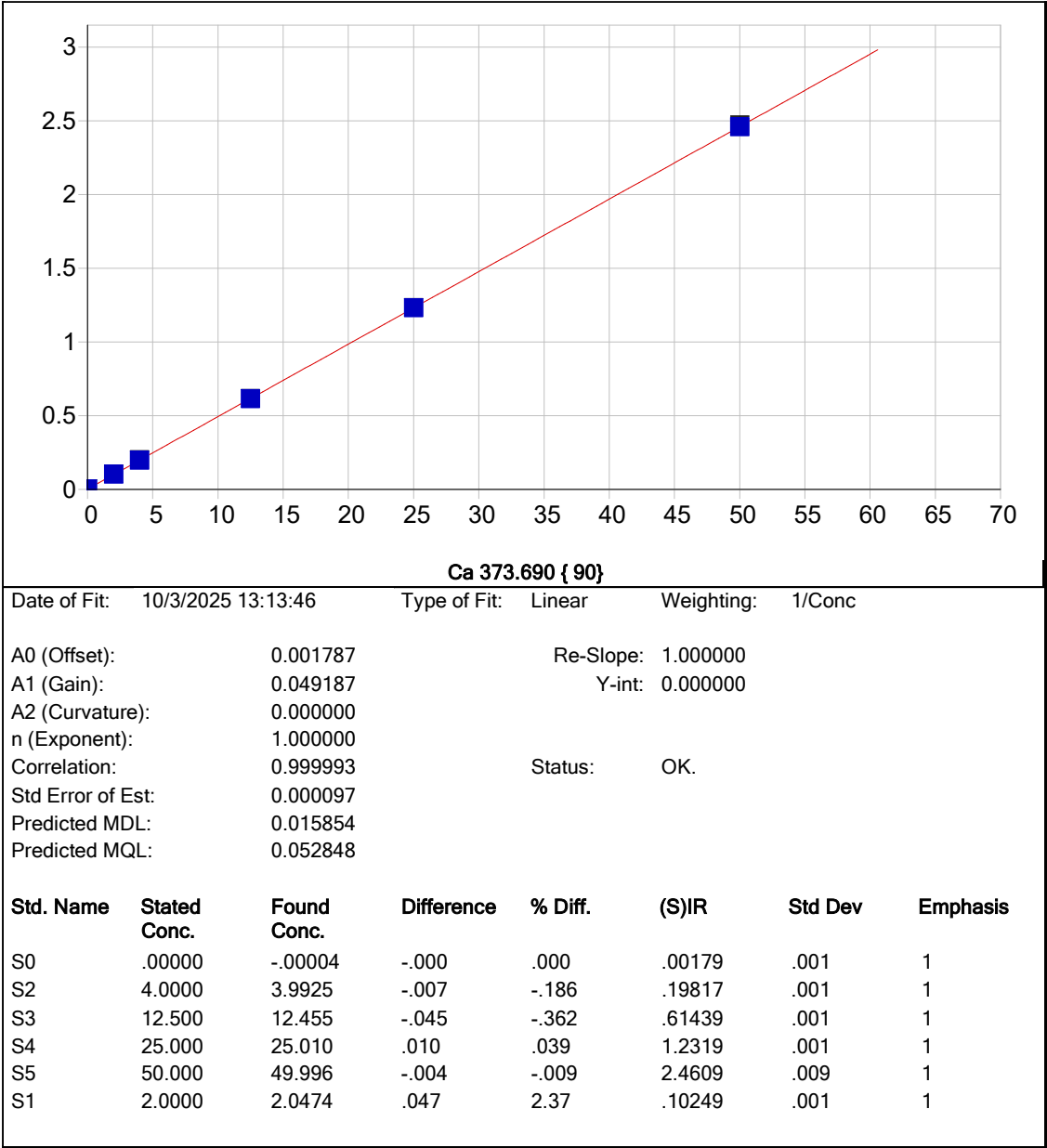


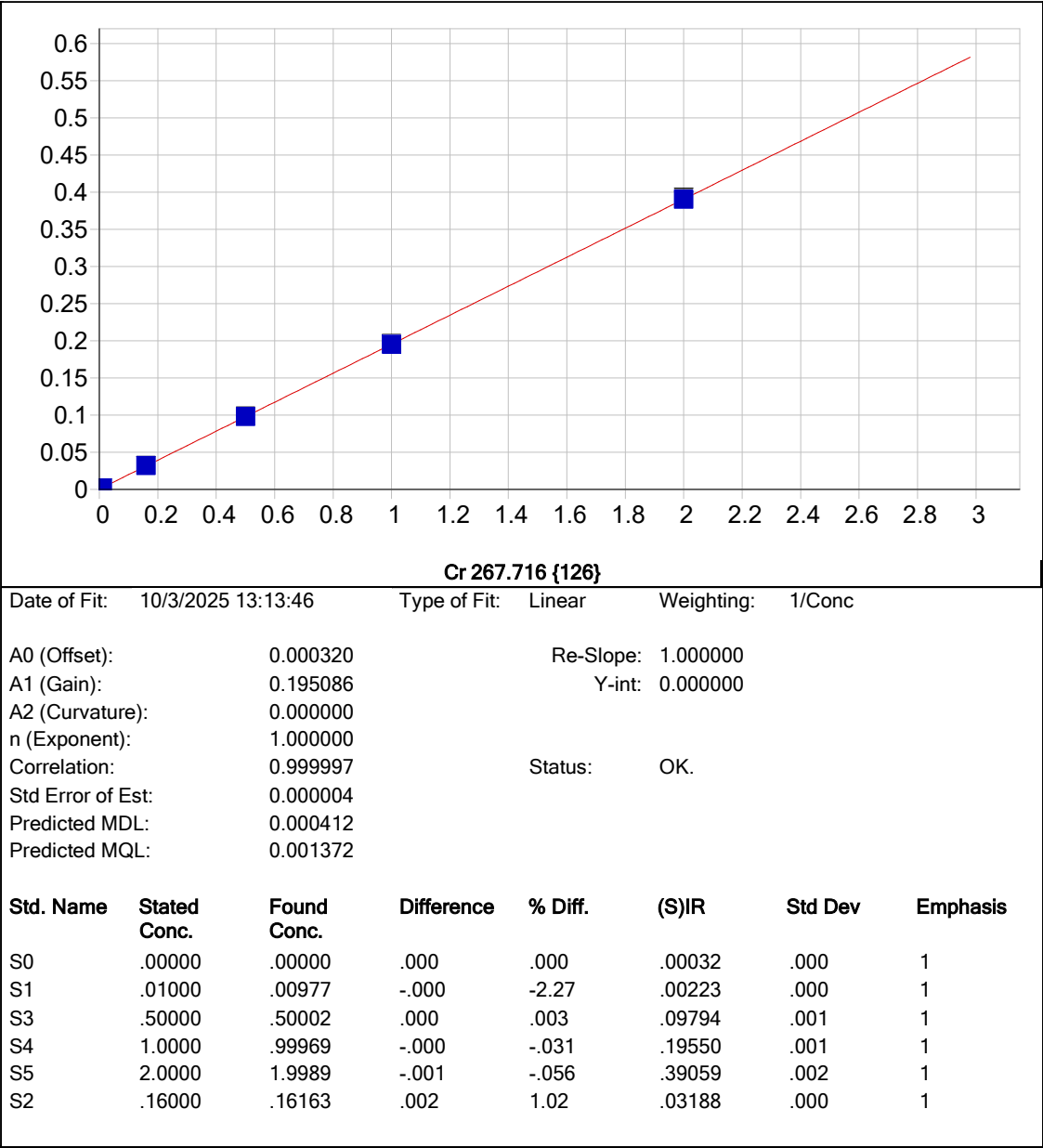


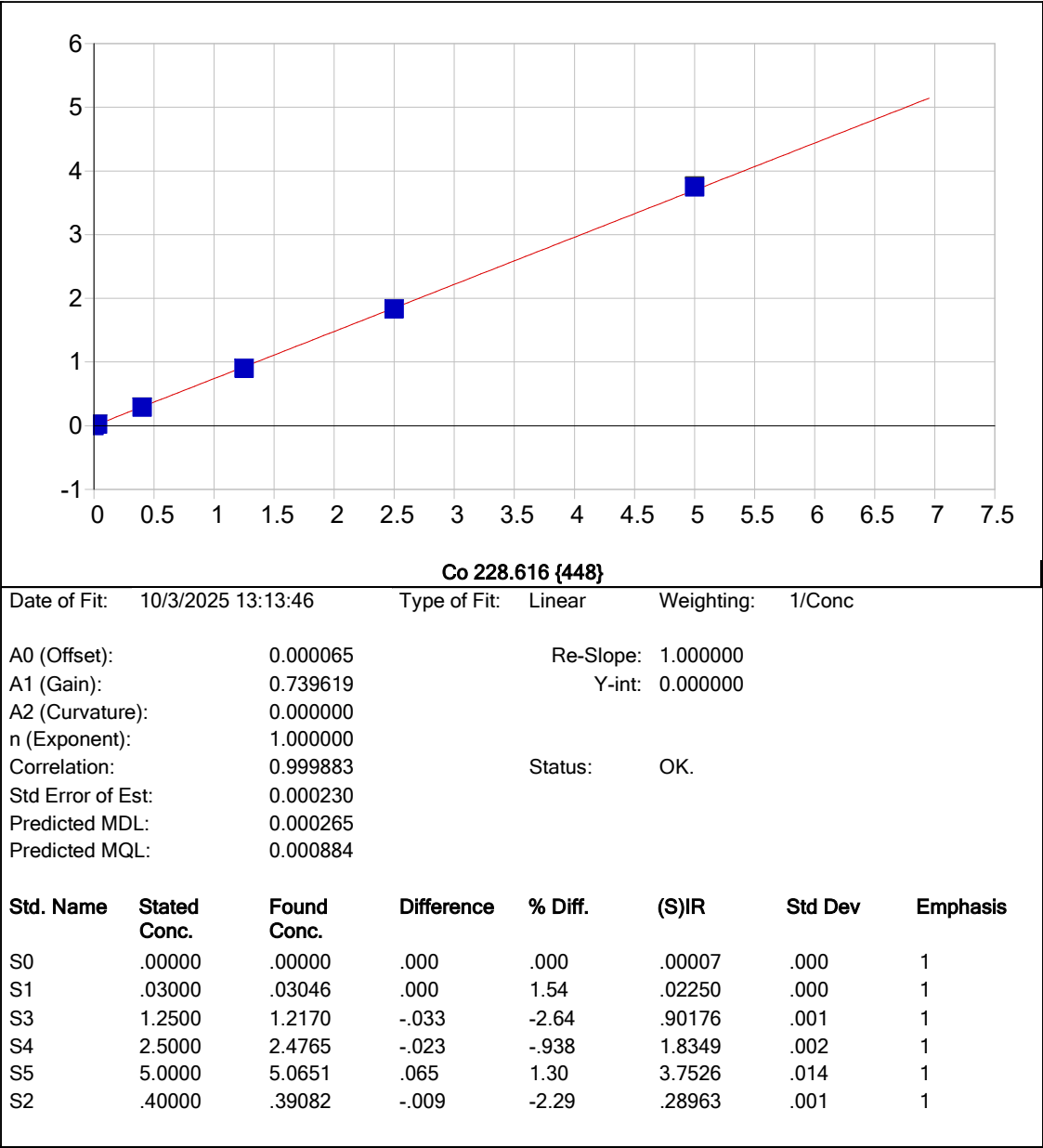


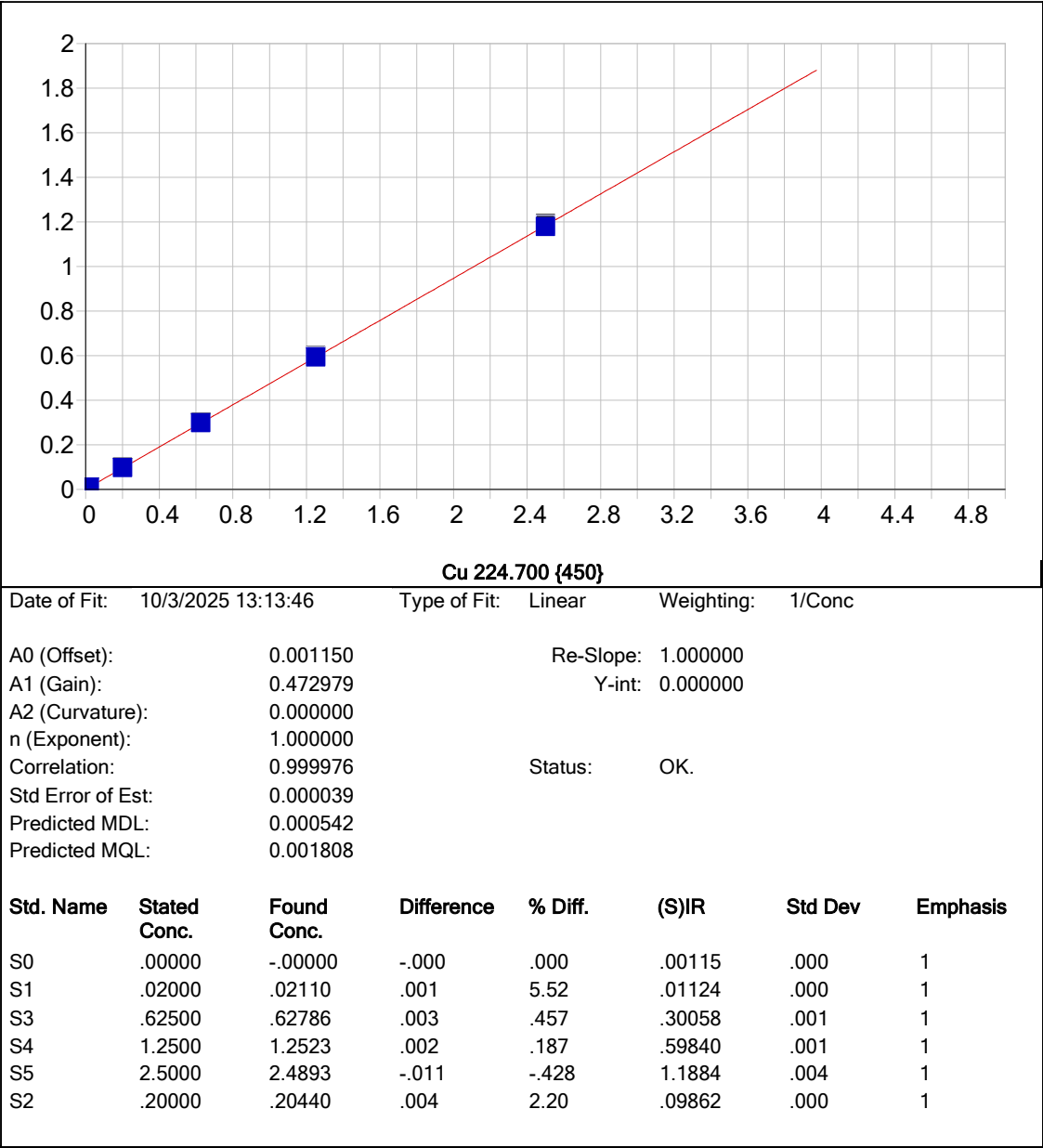


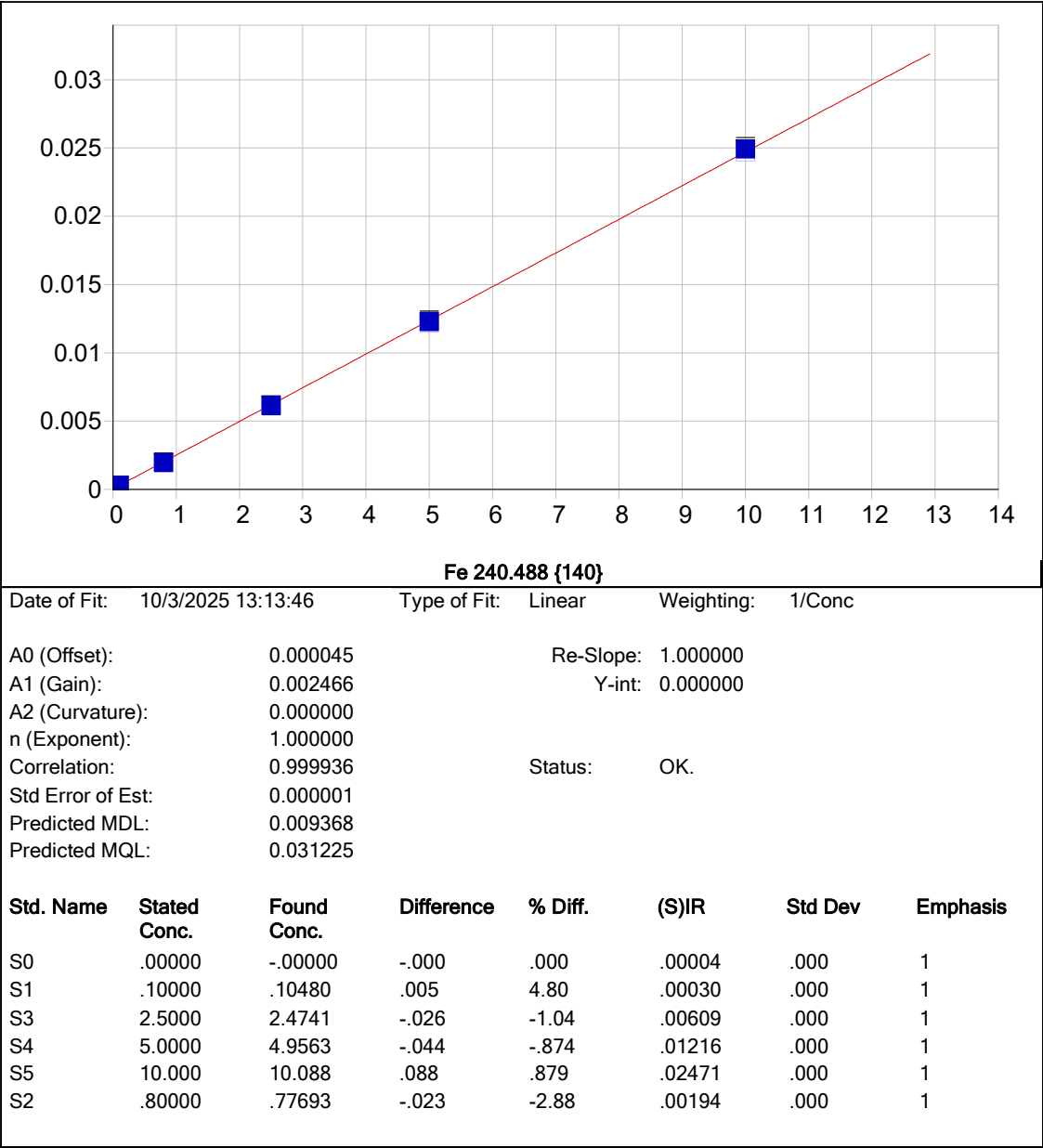


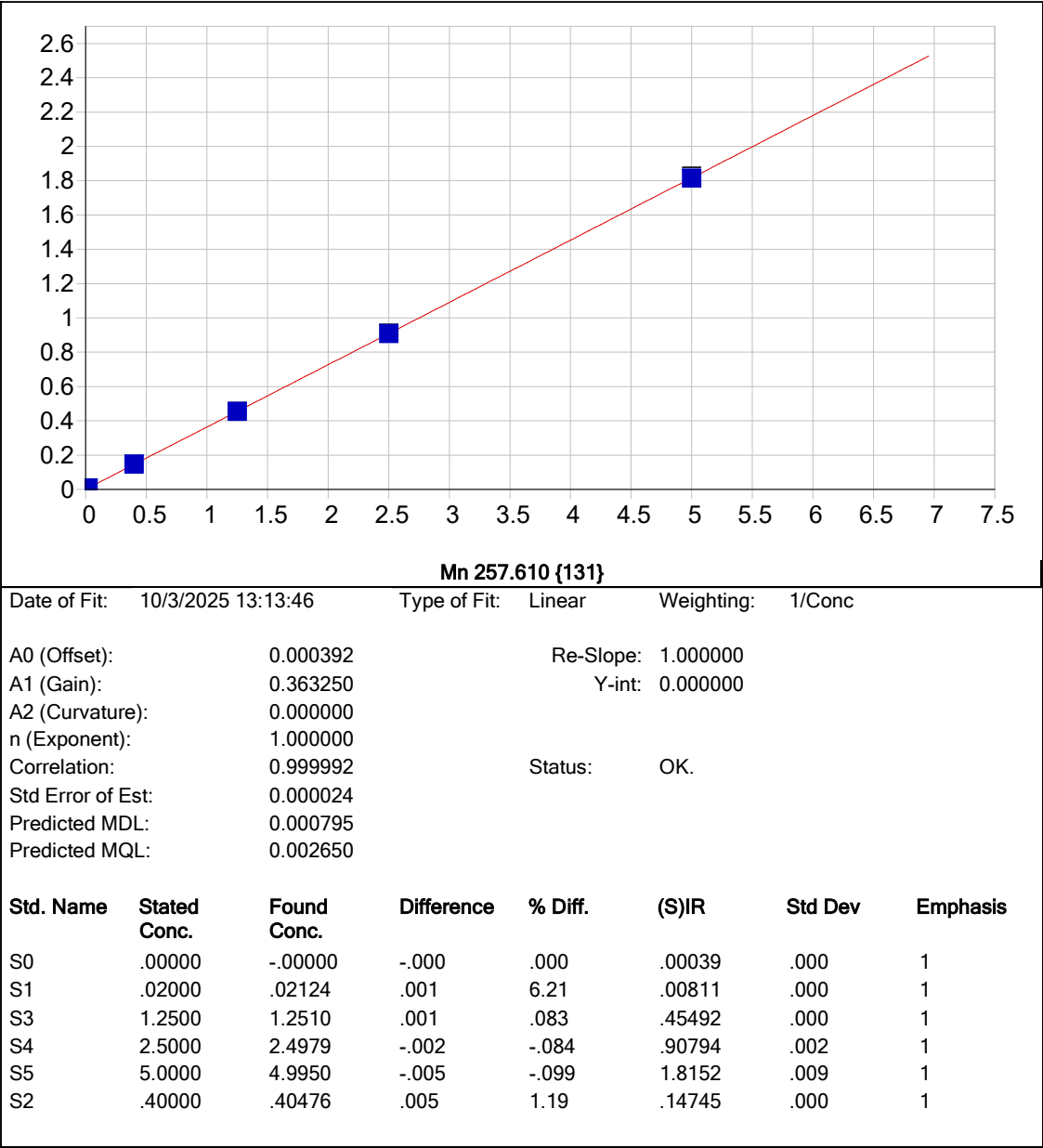






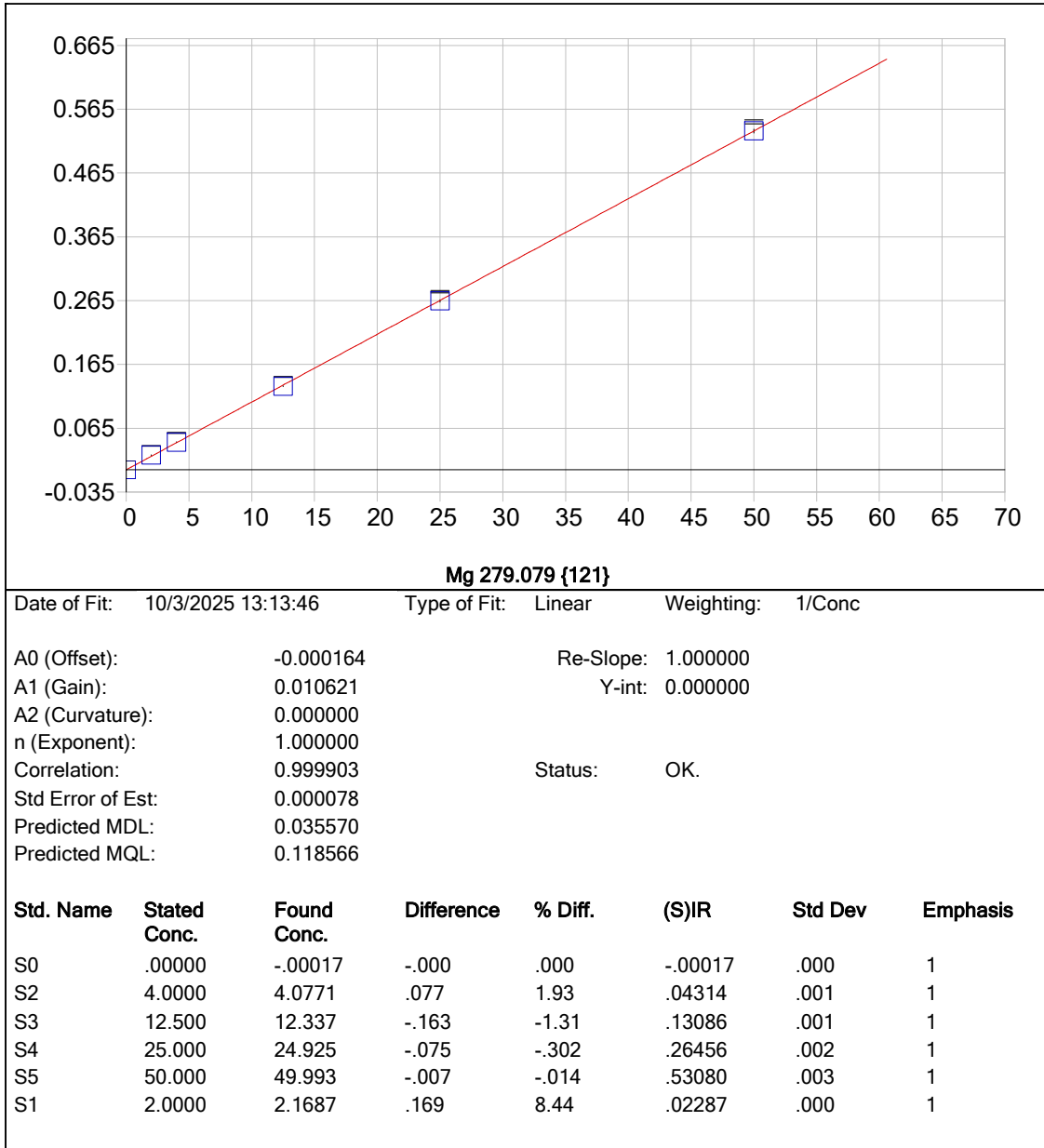


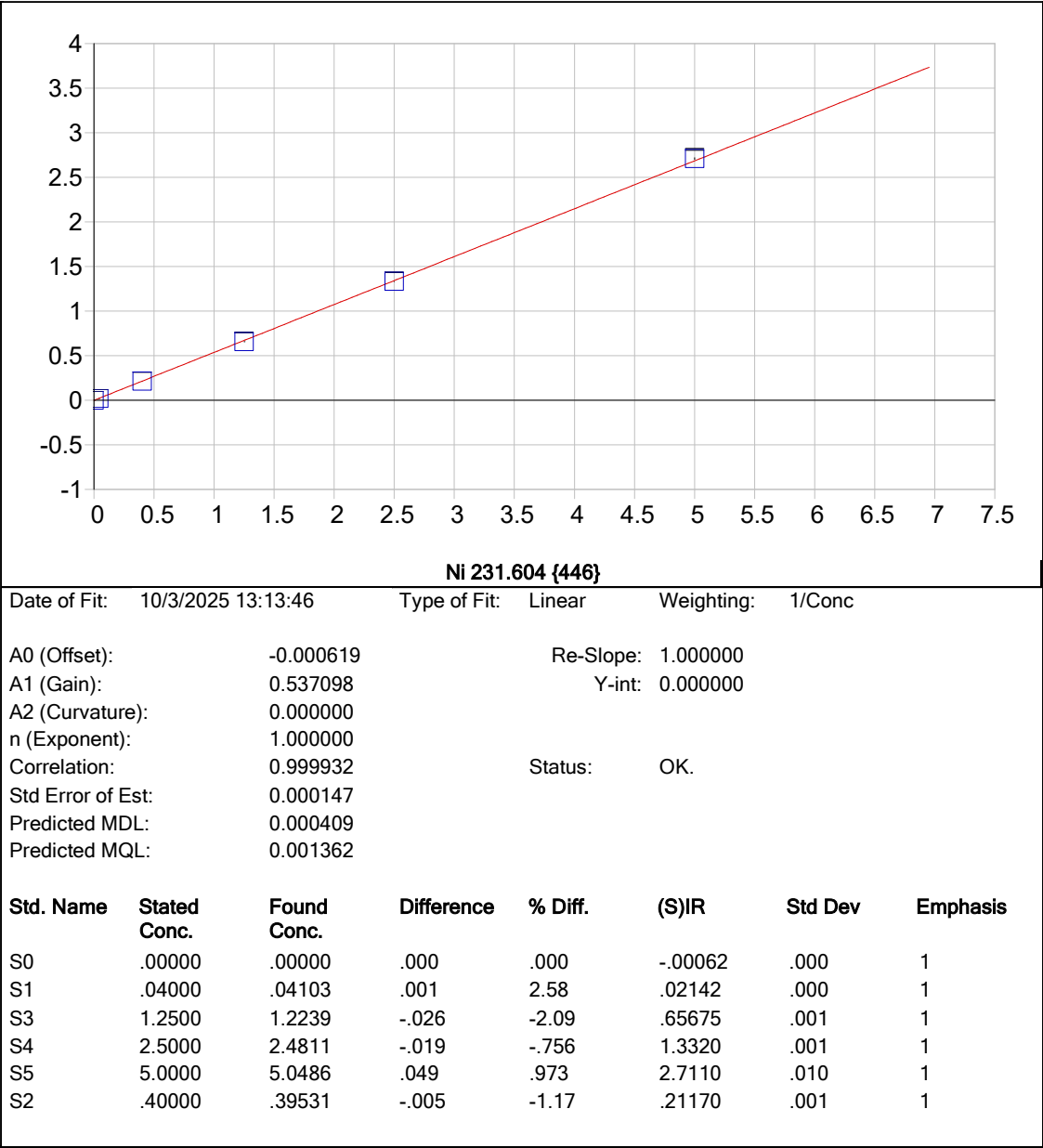


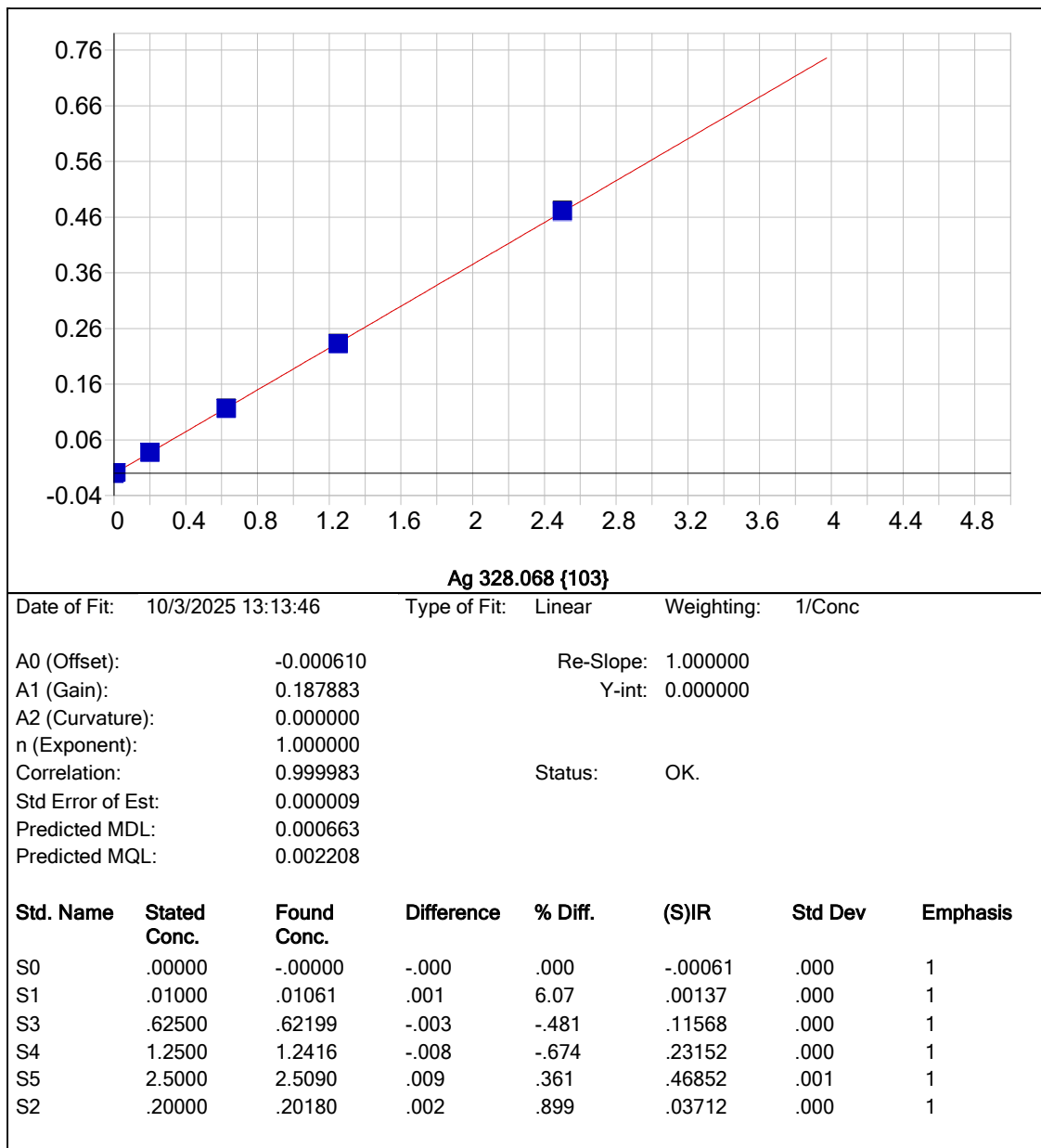


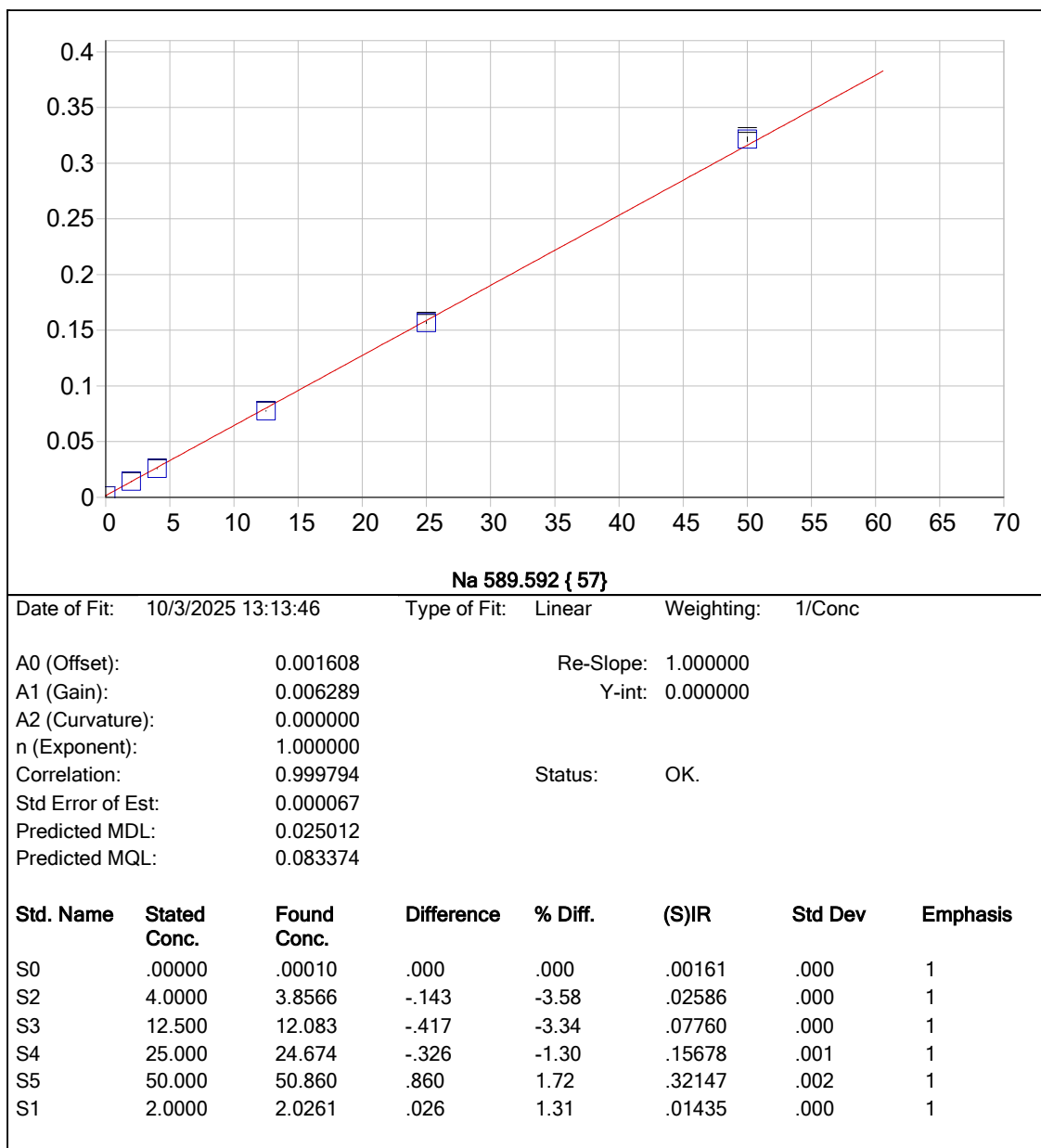
Date of Fit: 10/3/2025 13:13:46 Type of Fit: Linear Weighting: 1/Conc

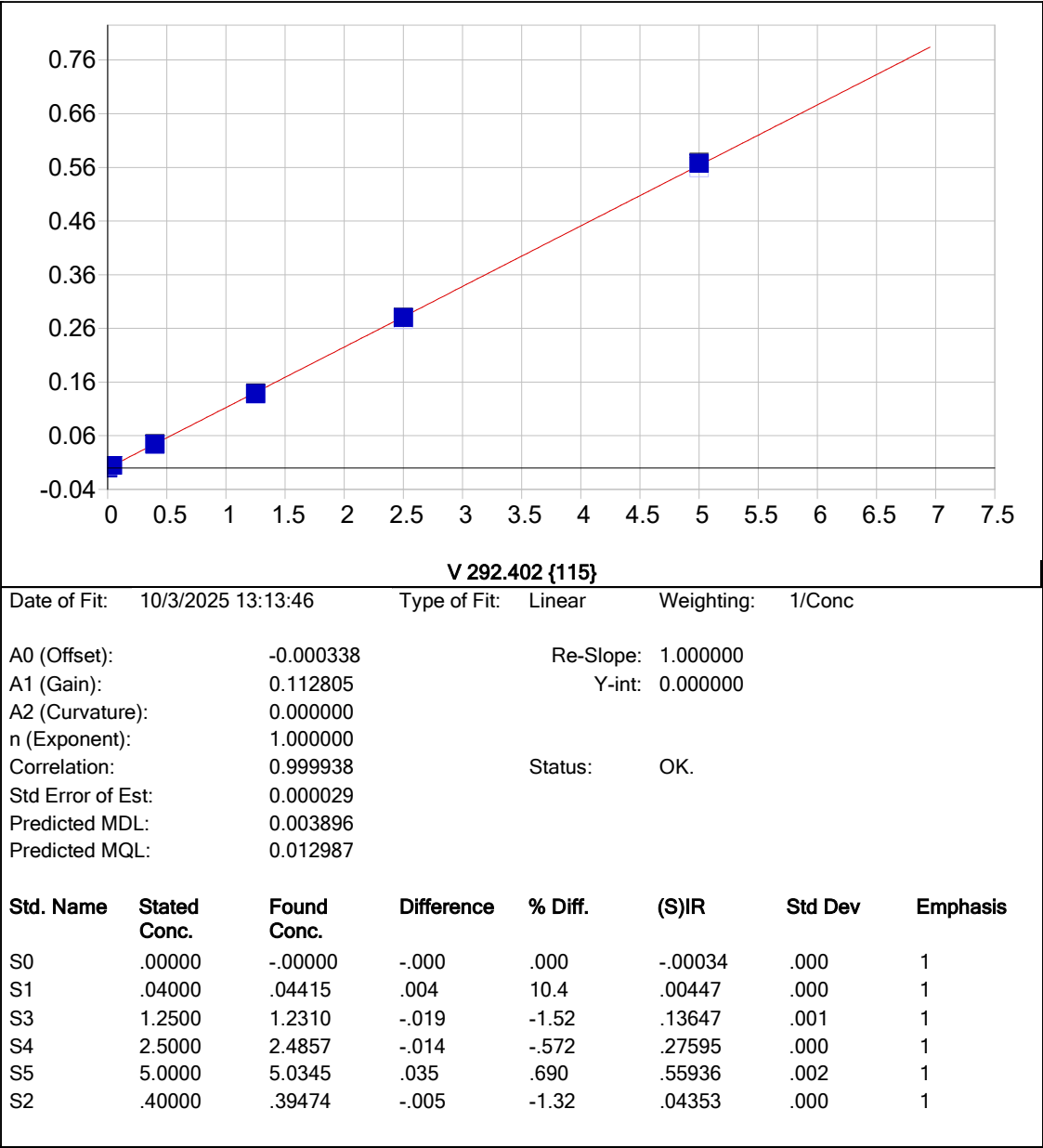
A0 (Offset): 0.000392 Re-Slope: 1.000000
A1 (Gain): 0.363250 Y-int: 0.000000
A2 (Curvature): 0.000000
n (Exponent): 1.000000
Correlation: 0.999992 Status: OK.
Std Error of Est: 0.000024
Predicted MDL: 0.000795
Predicted MQL: 0.002650

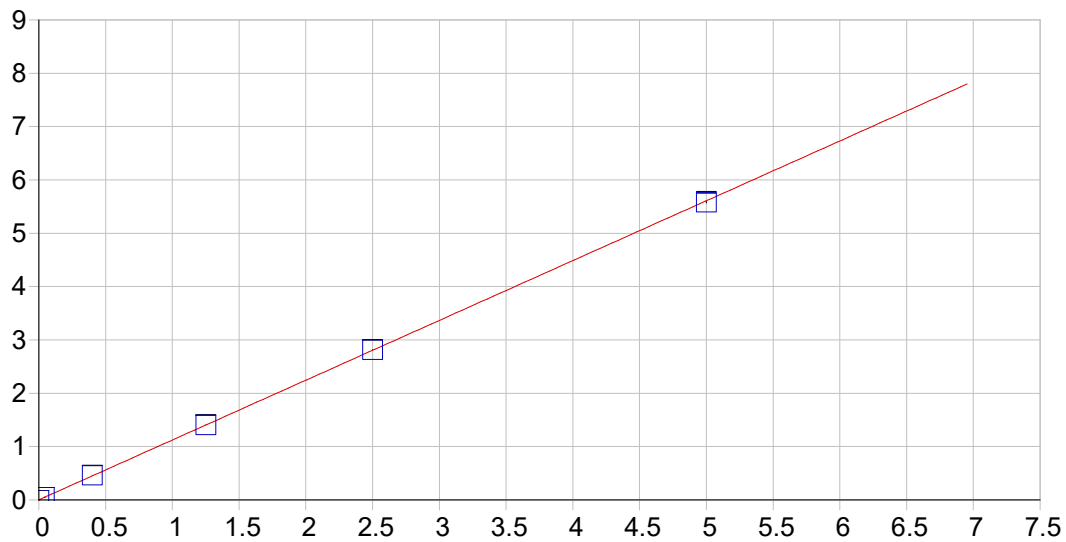










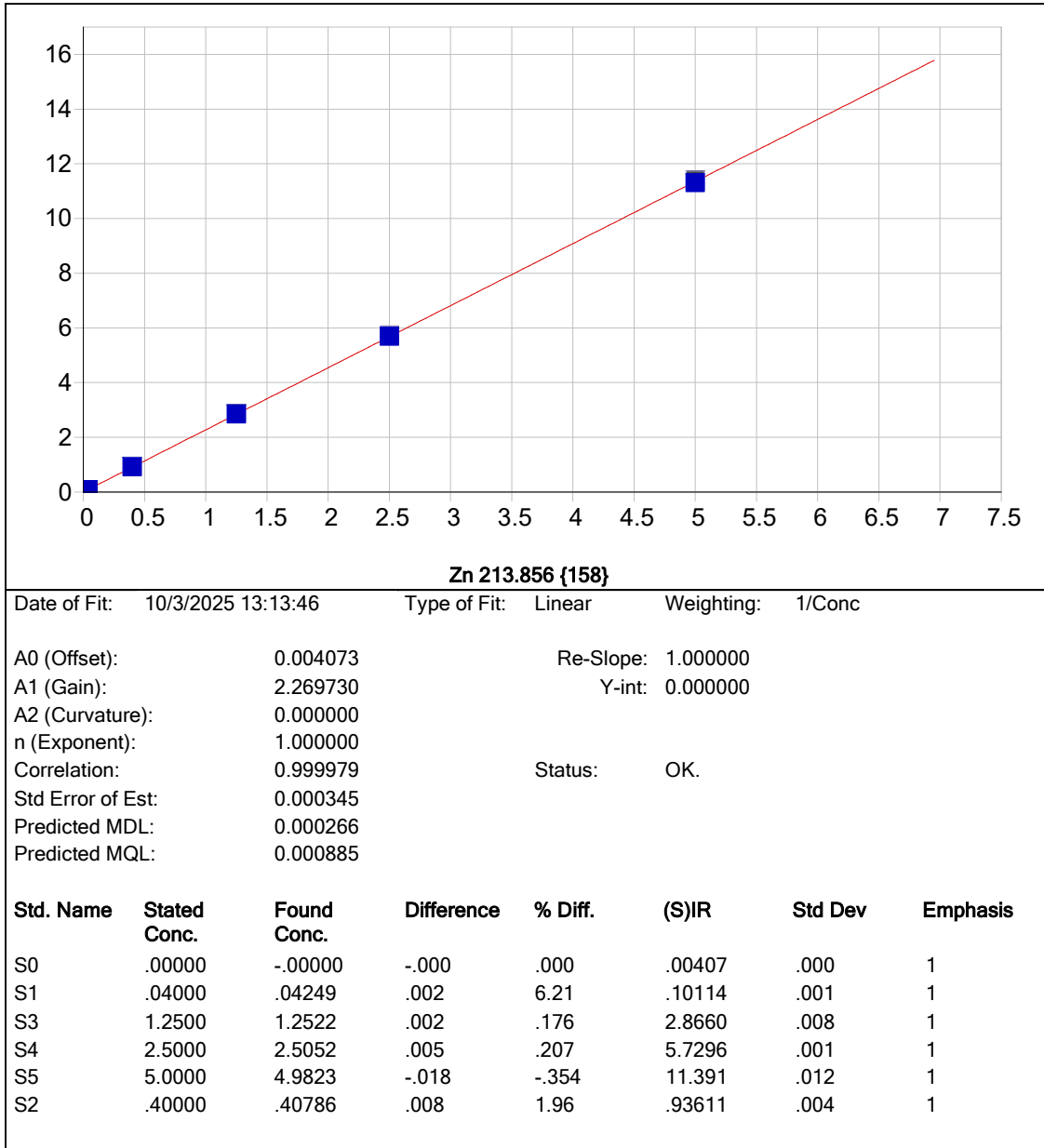


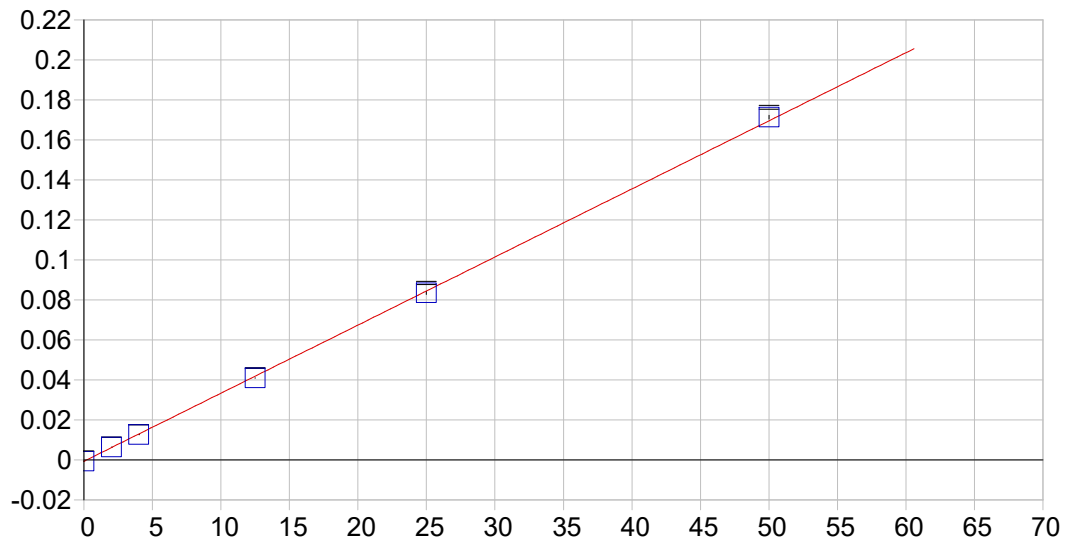
Zn 206.200 {464}

Date of Fit: 10/3/2025 13:13:46 Type of Fit: Linear Weighting: 1/Conc

A0 (Offset):	0.001513	Re-Slope:	1.000000
A1 (Gain):	1.121463	Y-int:	0.000000
A2 (Curvature):	0.000000		
n (Exponent):	1.000000		
Correlation:	0.999972	Status:	OK.
Std Error of Est:	0.000196		
Predicted MDL:	0.000147		
Predicted MQL:	0.000489		

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	-.00000	-.000	.000	.00151	.000	1
S1	.04000	.04267	.003	6.68	.04937	.000	1
S3	1.2500	1.2521	.002	.171	1.4057	.002	1
S4	2.5000	2.5102	.010	.407	2.8166	.004	1
S5	5.0000	4.9766	-.023	-.467	5.5826	.013	1
S2	.40000	.40839	.008	2.10	.45951	.001	1



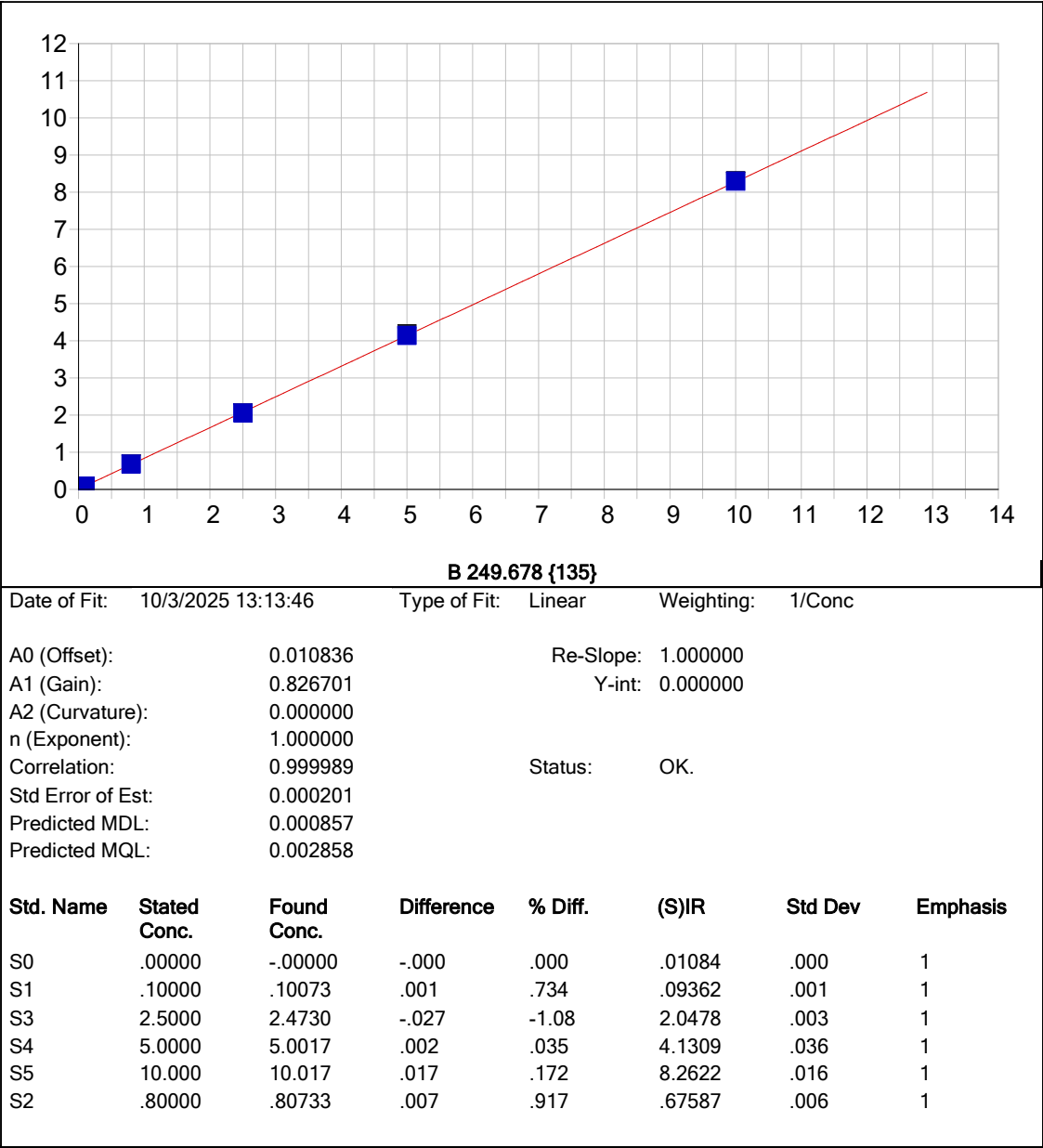


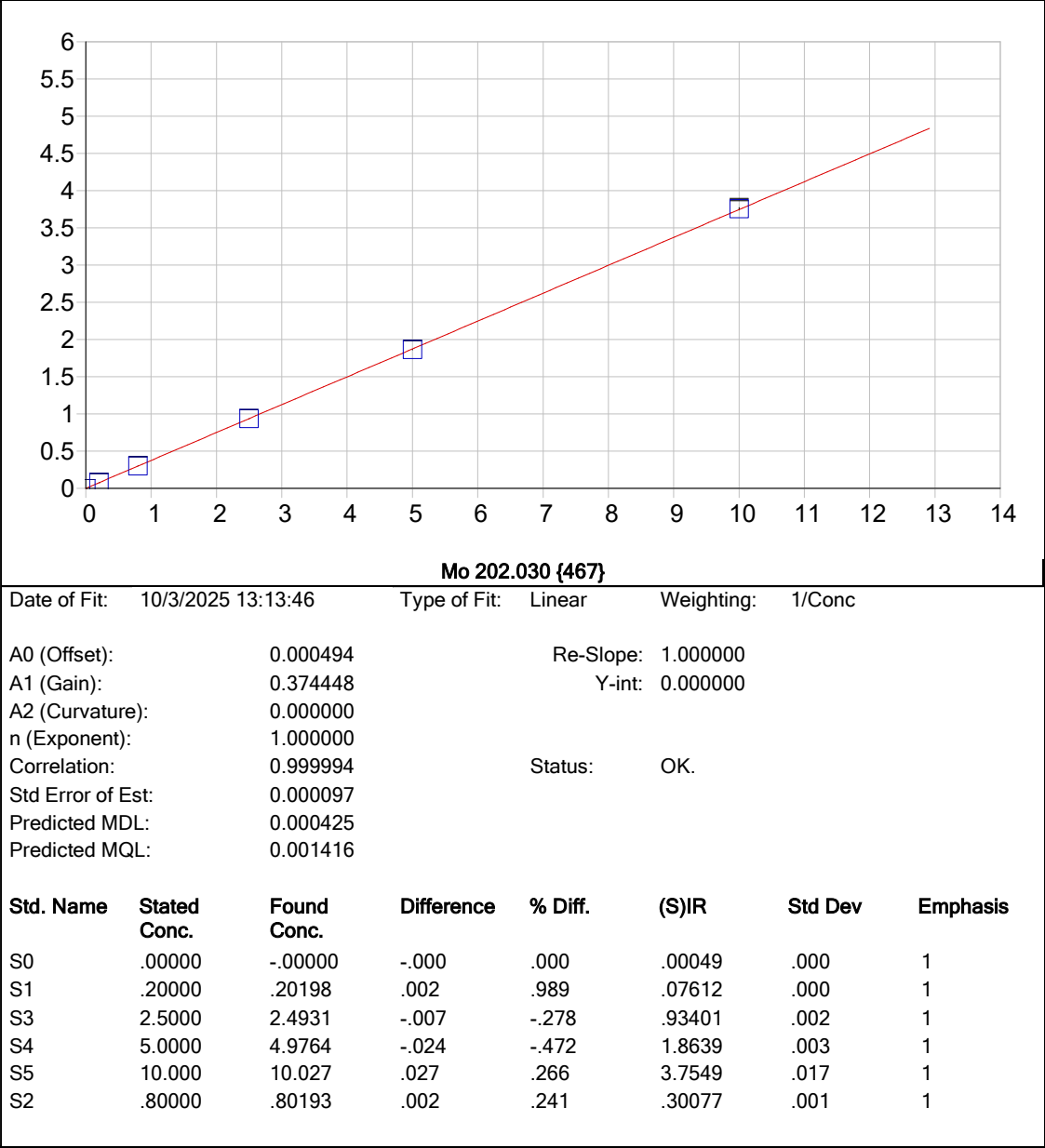
K 766.490 { 44}

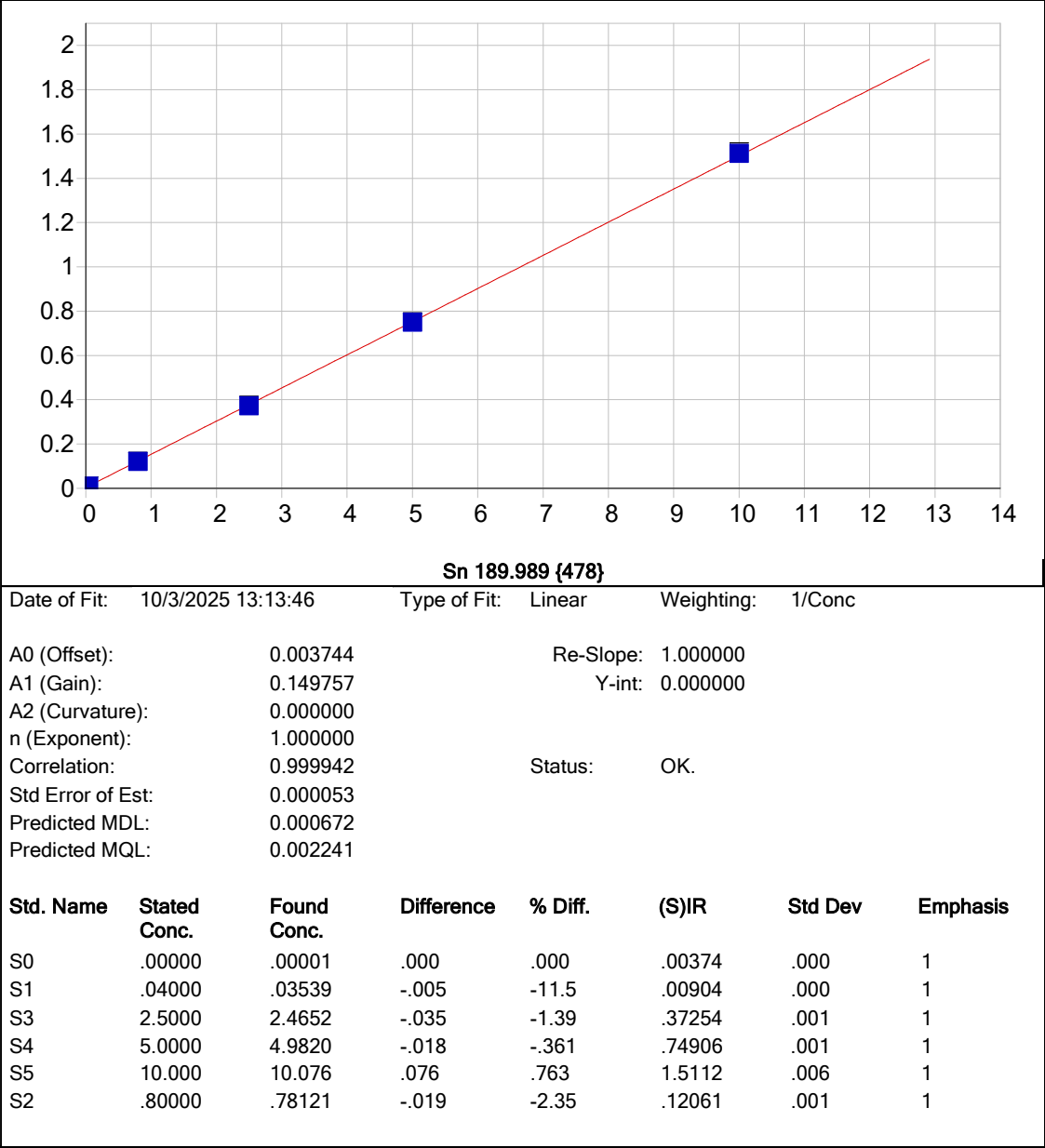
Date of Fit: 10/3/2025 13:13:46 Type of Fit: Linear Weighting: 1/Conc

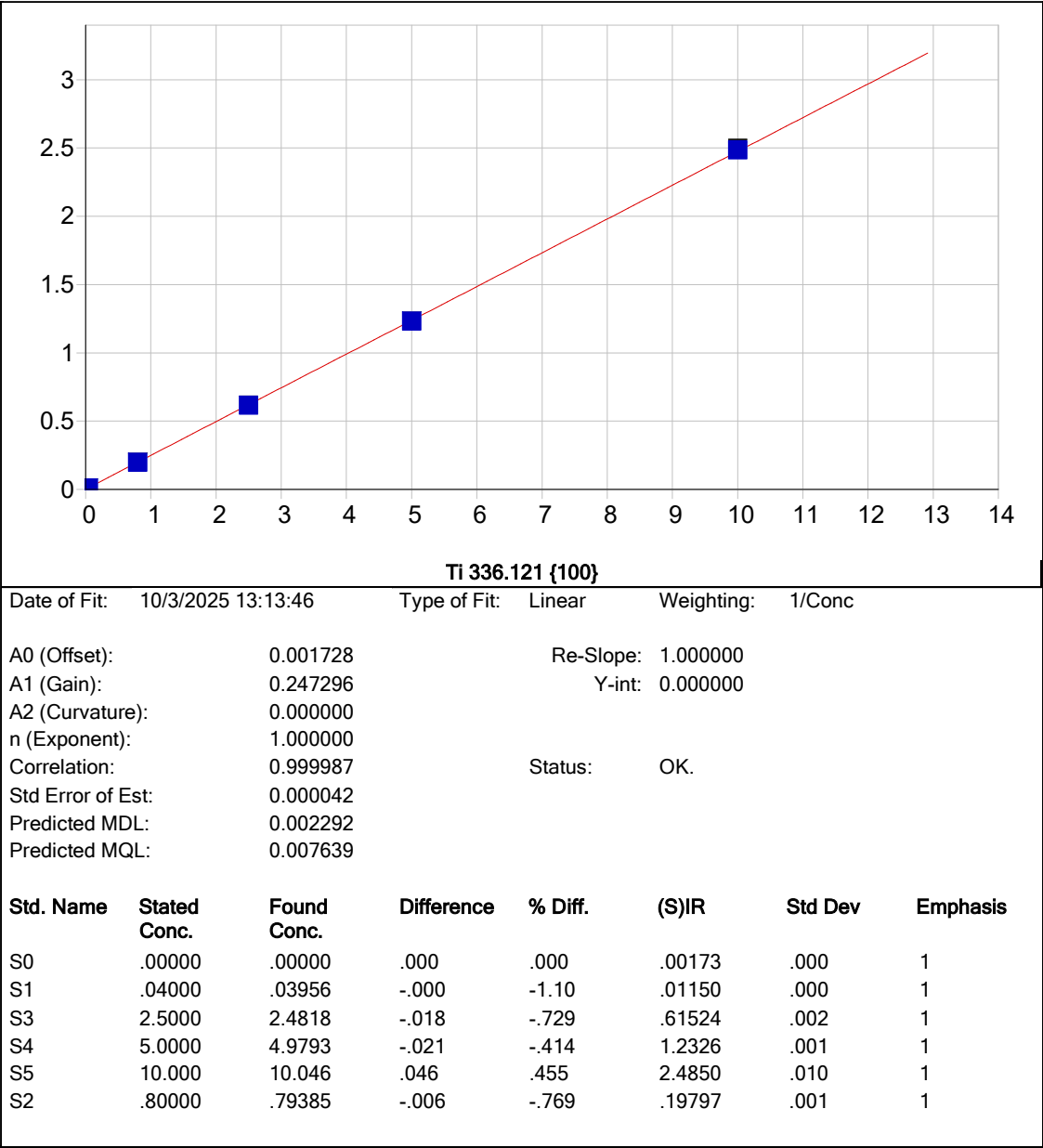
A0 (Offset): -0.000695 Re-Slope: 1.000000
A1 (Gain): 0.003405 Y-int: 0.000000
A2 (Curvature): 0.000000
n (Exponent): 1.000000
Correlation: 0.999896 Status: OK.
Std Error of Est: 0.000026
Predicted MDL: 0.055693
Predicted MQL: 0.185642

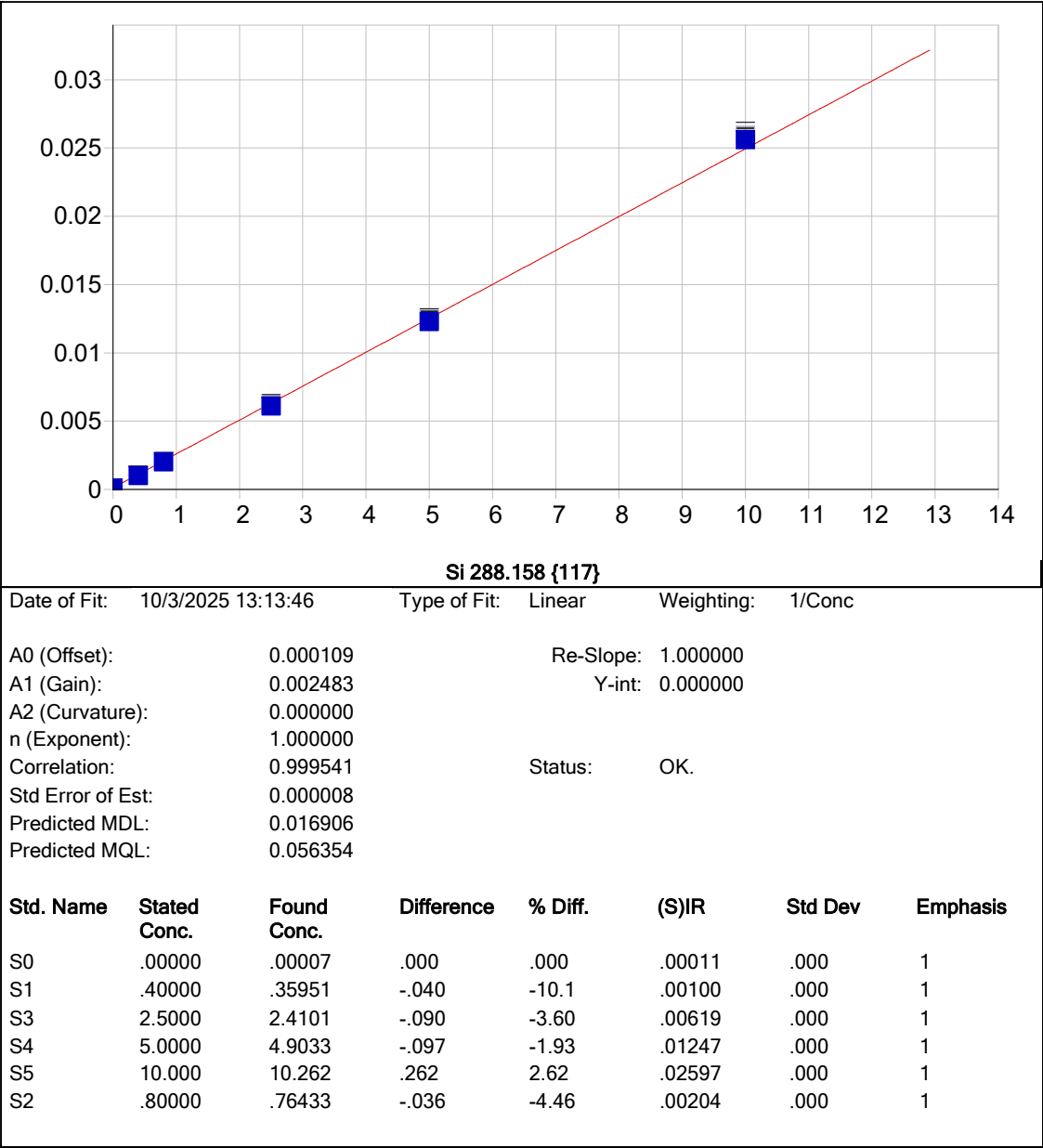
Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00001	.000	.000	-.00070	.000	1
S2	4.0000	3.8997	-.100	-2.51	.01258	.000	1
S3	12.500	12.248	-.252	-2.02	.04101	.000	1
S4	25.000	24.730	-.270	-1.08	.08351	.001	1
S5	50.000	50.546	.546	1.09	.17141	.001	1
S1	2.0000	2.0768	.077	3.84	.00638	.000	1

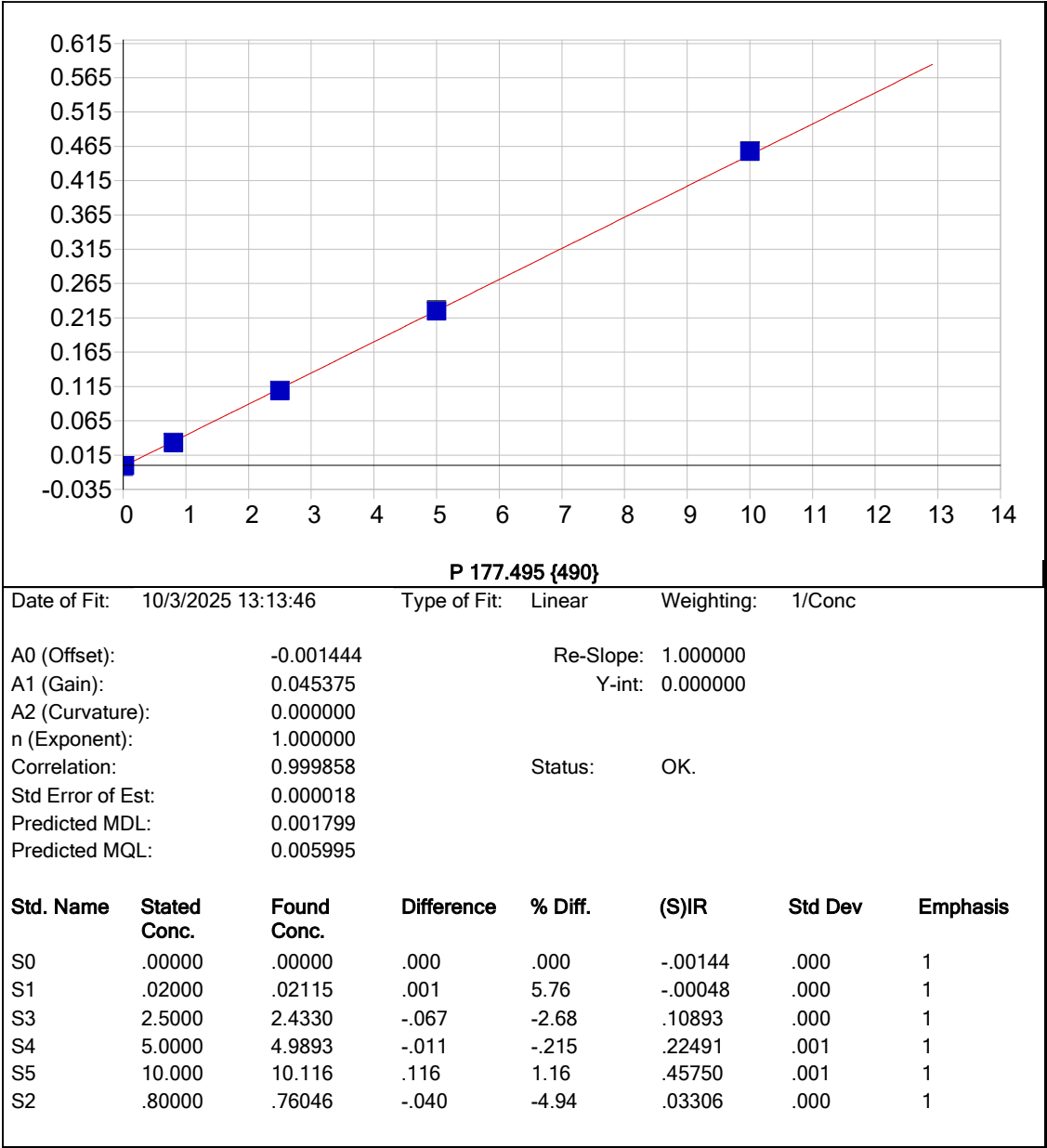


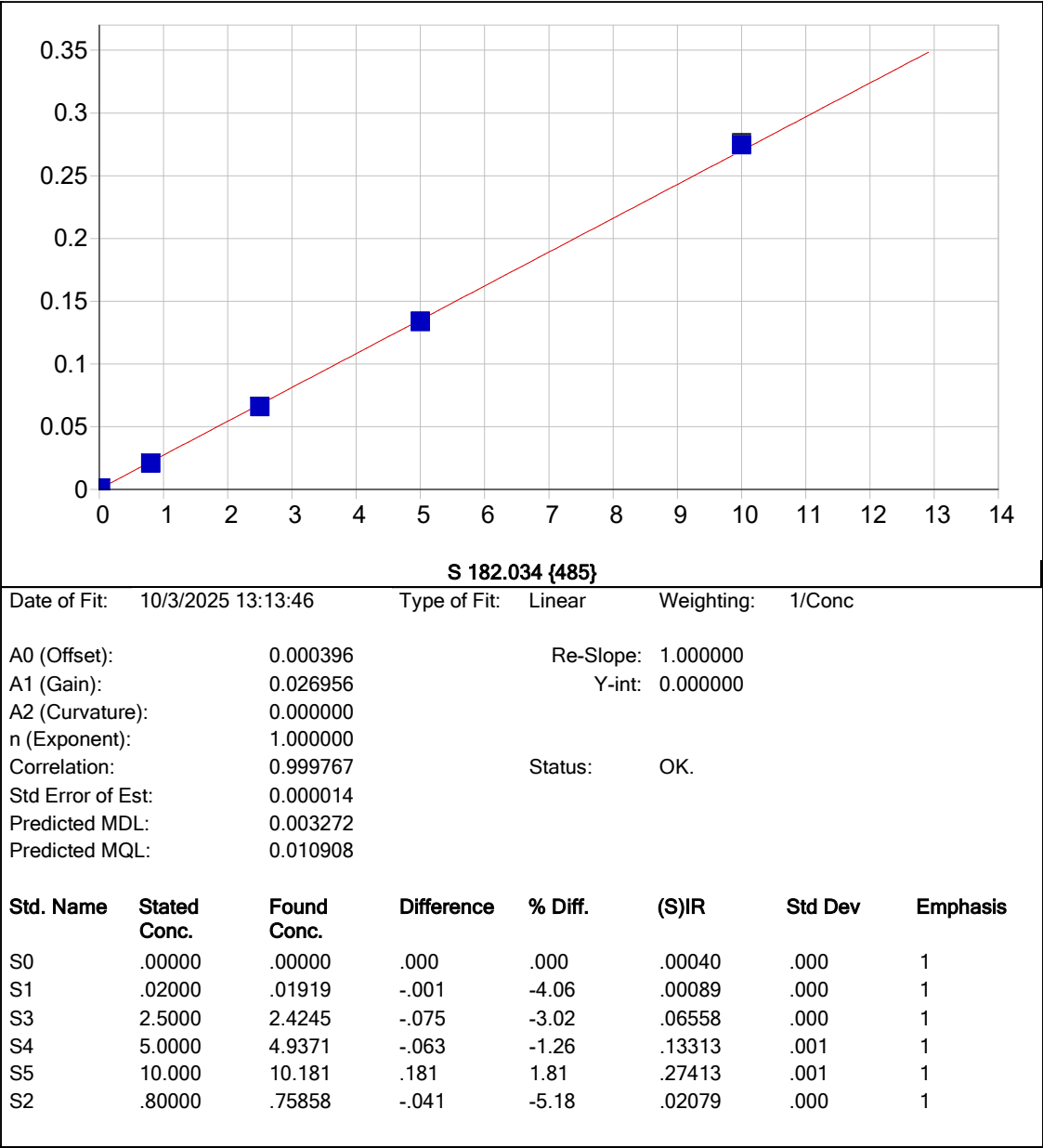


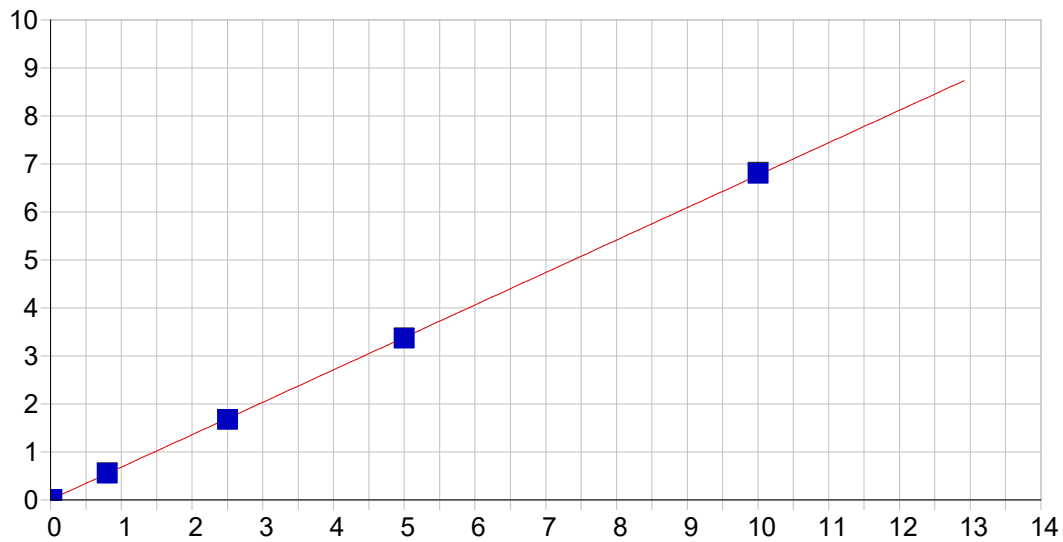










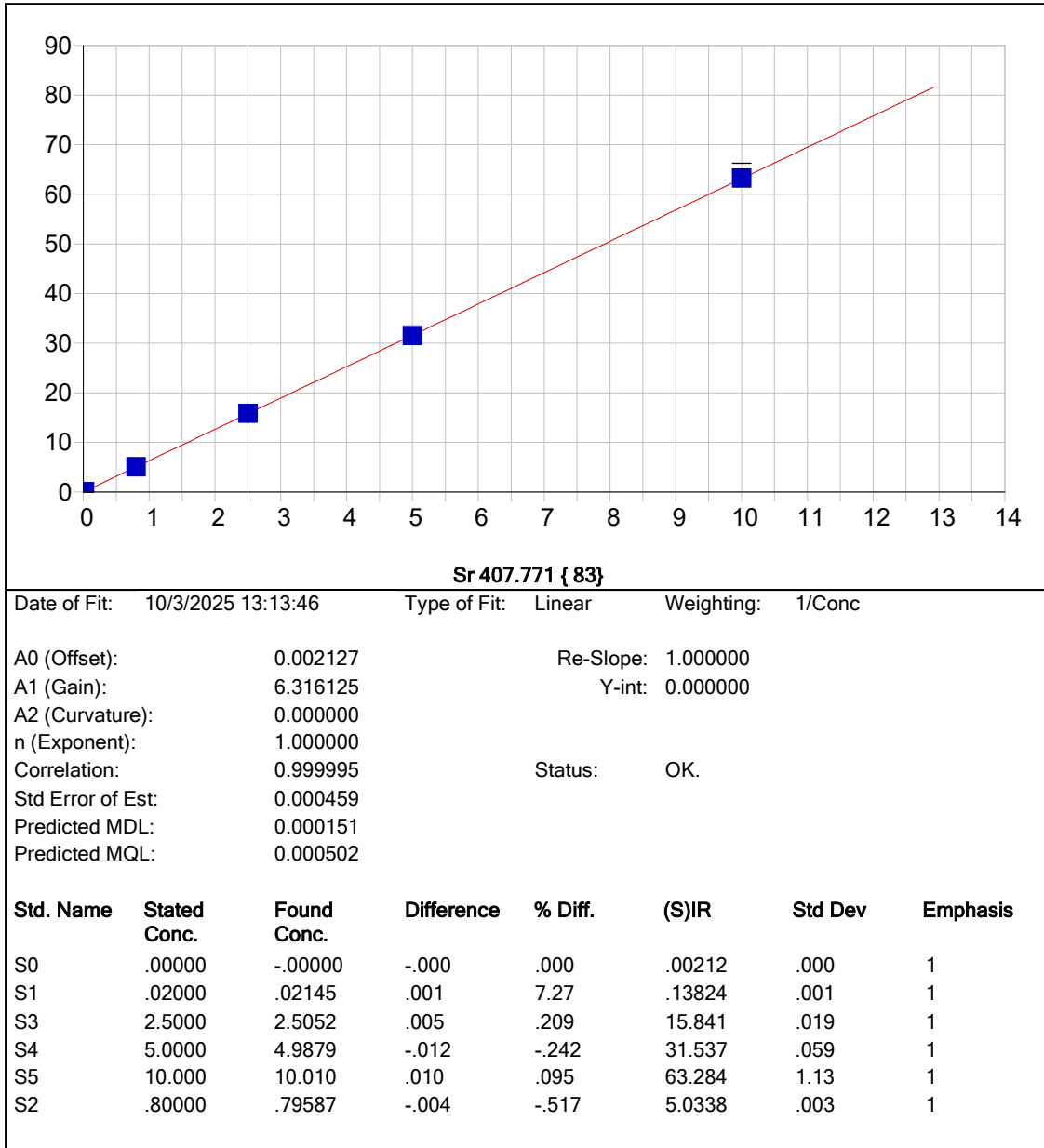


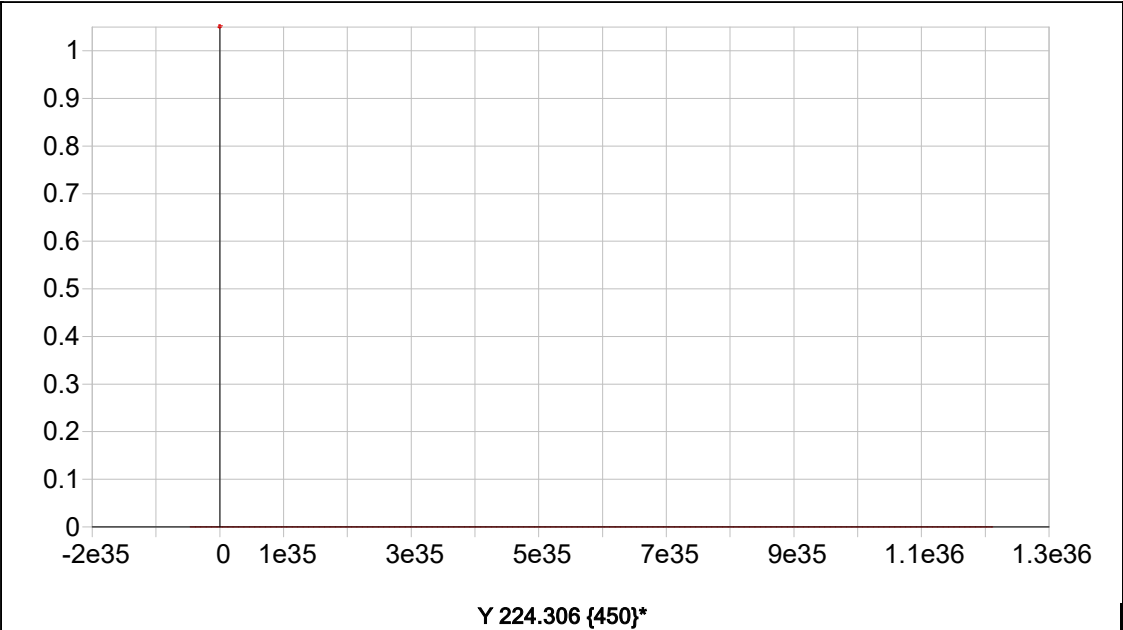
Li 670.784 { 50}

Date of Fit: 10/3/2025 13:13:46 Type of Fit: Linear Weighting: 1/Conc

A0 (Offset): 0.006366 Re-Slope: 1.000000
A1 (Gain): 0.675904 Y-int: 0.000000
A2 (Curvature): 0.000000
n (Exponent): 1.000000
Correlation: 0.999969 Status: OK.
Std Error of Est: 0.000126
Predicted MDL: 0.002641
Predicted MQL: 0.008805

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	-.00000	-.000	.000	.00637	.001	1
S5	10.000	10.051	.051	.507	6.8051	.023	1
S4	5.0000	4.9696	-.030	-.607	3.3681	.004	1
S3	2.5000	2.4657	-.034	-1.37	1.6743	.002	1
S1	.02000	.02047	.000	2.36	.02044	.002	1
S2	.80000	.81351	.014	1.69	.55666	.002	1

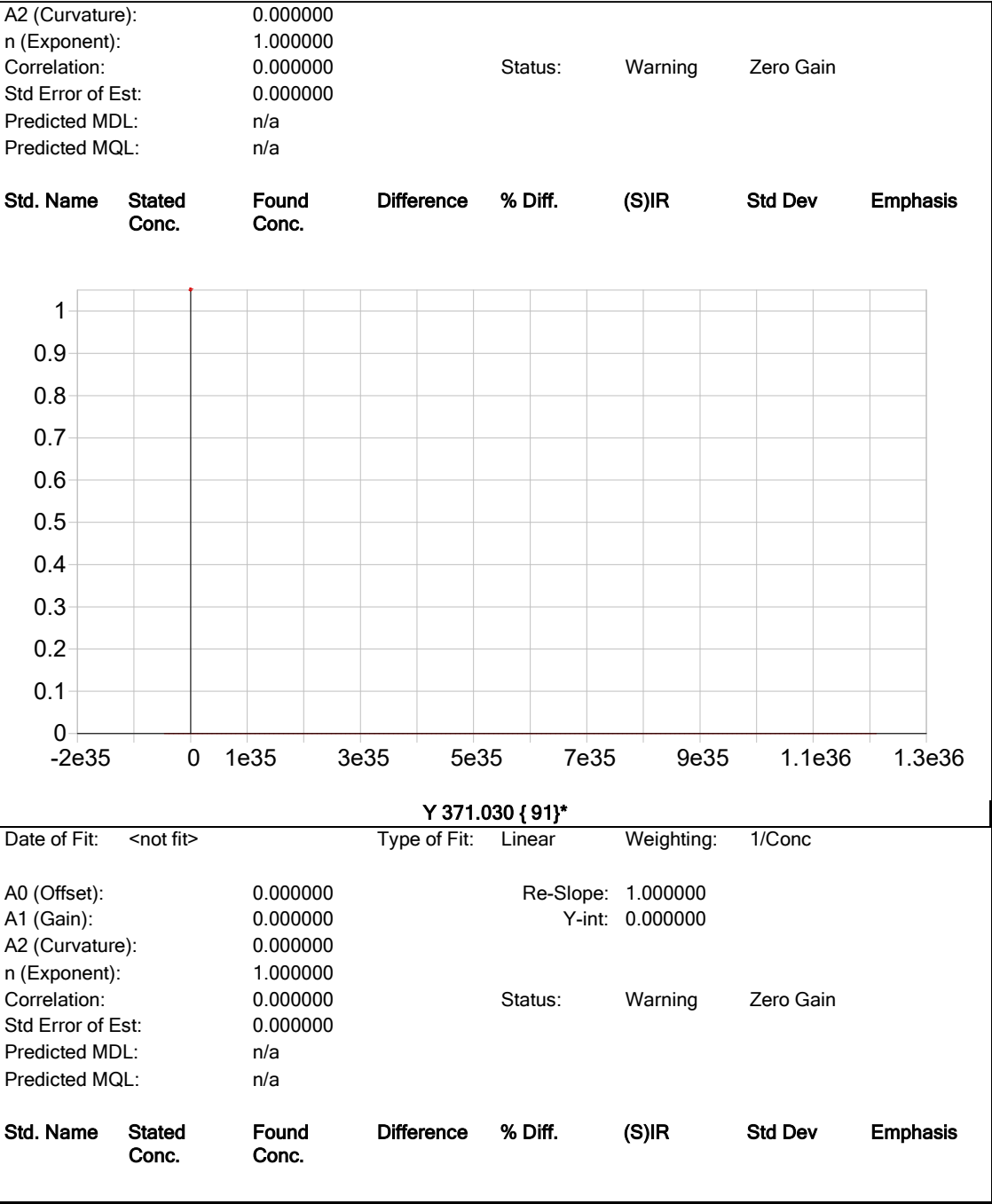




Date of Fit:	10/3/2025 13:13:46	Type of Fit:	Linear	Weighting:	1/Conc
A0 (Offset):	0.000000	Re-Slope:	1.000000		
A1 (Gain):	0.000000	Y-int:	0.000000		
A2 (Curvature):	0.000000				
n (Exponent):	1.000000				
Correlation:	0.000000	Status:	Warning	Zero Gain	
Std Error of Est:	0.000000				
Predicted MDL:	n/a				
Predicted MQL:	n/a				

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
							
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):	0.000000	Y-int:	0.000000		

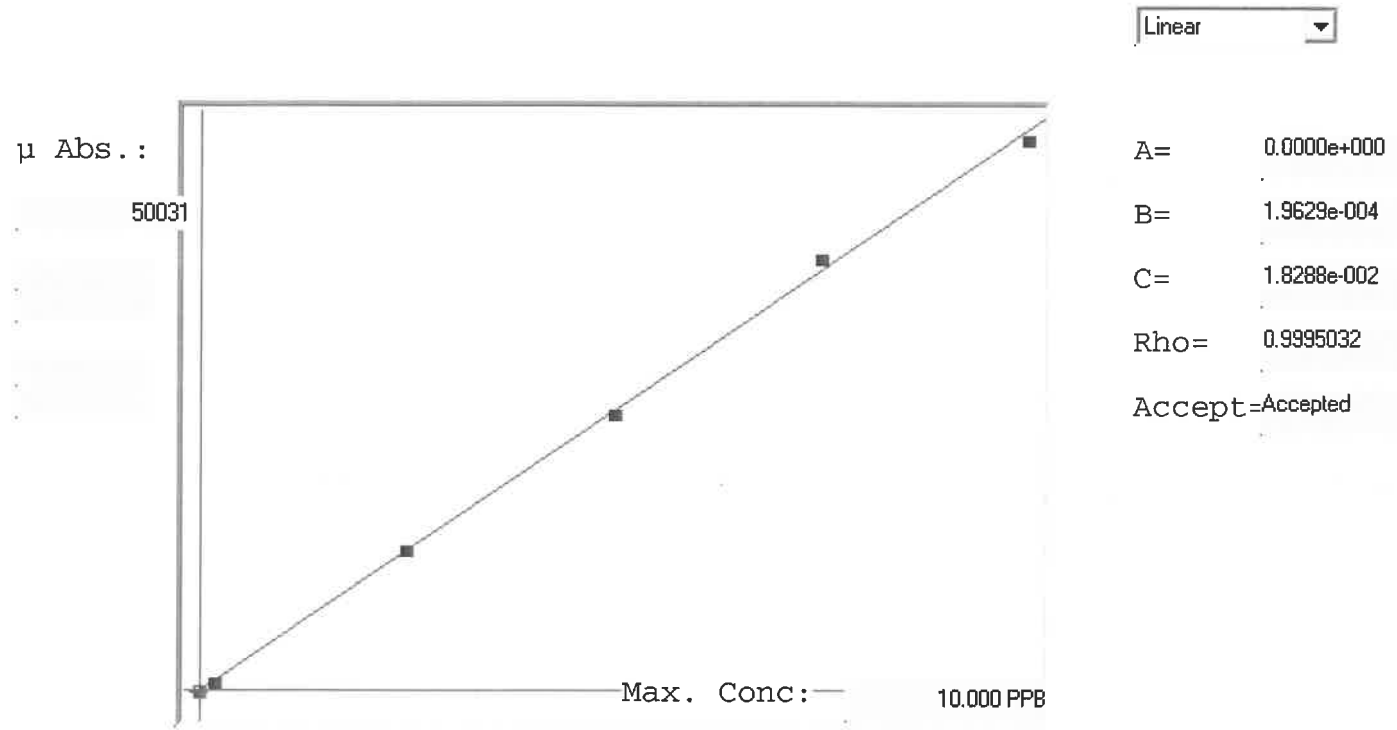


A2 (Curvature):		0.000000		Status:	Warning	Zero Gain	
n (Exponent):		1.000000					
Correlation:		0.000000					
Std Error of Est:		0.000000					
Predicted MDL:		n/a					
Predicted MQL:		n/a					
Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis

LB137429

7471B

INSTRUMENT ID: CV1



Std ID	Conc.	Calc.	Dev.	Mean	SD or %RSD	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0.0	0.000	-0.037	-0.037	-280	0.000	-280				
0.2	0.200	0.188	-0.012	867	0.0 %	867				
2.5	2.500	2.531	0.031	12801	0.0 %	12801				
5.0	5.000	4.953	-0.047	25140	0.0 %	25140				
7.5	7.500	7.725	0.225	39261	0.0 %	39261				
10.0	10.000	9.839	-0.161	50031	0.0 %	50031				

LB137429 INSTRUMENT ID : CV1

Method: 7471B Operator: Admin Date of Analysis: 06 Oct 2025 12:19:59

Type	Sample ID	Extended ID	Conc.	µ Abs.	Units	Type	Std Conc	Method	Date
S	0.0 - 1	50	-	-280	PPB	Std	0.0000	7471B	06 Oct 2025 14:39:49
S	0.2 - 1	50.2	-	867	PPB	Std	0.2000	7471B	06 Oct 2025 14:42:47
S	2.5 - 1	52.5	-	12801	PPB	Std	2.5000	7471B	06 Oct 2025 14:45:06
S	5.0 - 1	55	-	25140	PPB	Std	5.0000	7471B	06 Oct 2025 14:47:23
S	7.5 - 1	57.5	-	39261	PPB	Std	7.5000	7471B	06 Oct 2025 14:49:59
S	10.0 - 1	57.5	-	50031	PPB	Std	10.0000	7471B	06 Oct 2025 14:52:42
U	ICV59 - 1	ICV59	4.0696	20639	PPB	SMPL	-7471B		06 Oct 2025 14:56:06
U	ICB59 - 1	ICB59	-0.0494	-345	PPB	SMPL	-7471B		06 Oct 2025 14:58:33
U	CCV83 - 1	CCV83	4.8948	24843	PPB	SMPL	-7471B		06 Oct 2025 15:01:13
U	CCB83 - 1	CCB83	-0.0459	-327	PPB	SMPL	-7471B		06 Oct 2025 15:03:28
U	CRA - 1	CRA	0.1961	906	PPB	SMPL	-7471B		06 Oct 2025 15:06:09
U	HighStd - 1	HighStd	9.8012	49838	PPB	SMPL	-7471B		06 Oct 2025 15:08:24
U	ChkStd - 1	ChkStd	6.7849	34472	PPB	SMPL	-7471B		06 Oct 2025 15:10:39
U	PB169993BL - 1	PBS	-0.0473	-334	PPB	SMPL	-7471B		06 Oct 2025 15:13:31
U	PB169993BS - 1	LCSS	3.6421	18461	PPB	SMPL	-7471B		06 Oct 2025 15:16:19
U	Q3270-01 - 1	SG-1-TEST-PIT	0.3196	1535	PPB	SMPL	-7471B		06 Oct 2025 15:18:35
U	Q3271-01 - 1	72-11929	0.3561	1721	PPB	SMPL	-7471B		06 Oct 2025 15:21:15
U	Q3272-01 - 1	VNJ-235	6.9398	35261	PPB	SMPL	-7471B		06 Oct 2025 15:23:34
U	Q3272-03 - 1	R7	0.8629	4303	PPB	SMPL	-7471B		06 Oct 2025 15:25:52
U	Q3277-01 - 1	WC1	4.3063	21845	PPB	SMPL	-7471B		06 Oct 2025 15:28:36
U	CCV84 - 1	CCV84	4.8351	24539	PPB	SMPL	-7471B		06 Oct 2025 15:30:53
U	CCB84 - 1	CCB84	-0.0339	-266	PPB	SMPL	-7471B		06 Oct 2025 15:33:34
U	Q3288-01 - 1	TR-01-100325	0.3816	1851	PPB	SMPL	-7471B		06 Oct 2025 15:36:16
U	Q3289-01 - 1	VNJ-240	0.3567	1724	PPB	SMPL	-7471B		06 Oct 2025 15:38:31
U	Q3289-03 - 1	VNJ-261	0.5457	2687	PPB	SMPL	-7471B		06 Oct 2025 15:40:47
U	Q3289-05 - 1	72-11966	0.1123	479	PPB	SMPL	-7471B		06 Oct 2025 15:43:03
U	Q3290-01 - 1	CL-02-100325	0.2868	1368	PPB	SMPL	-7471B		06 Oct 2025 15:45:18
U	Q3290-01DUP - 1	CL-02-100325DUP	0.3180	1527	PPB	SMPL	-7471B		06 Oct 2025 15:47:35
U	Q3290-01MS - 1	CL-02-100325MS	3.9722	20143	PPB	SMPL	-7471B		06 Oct 2025 15:49:51
U	Q3290-01MSD - 1	CL-02-100325MSD	4.2590	21604	PPB	SMPL	-7471B		06 Oct 2025 15:52:08
U	Q3290-01LX5 - 1		0.0273	46	PPB	SMPL	-7471B		06 Oct 2025 15:54:48
U	Q3290-01A - 1		4.0403	20490	PPB	SMPL	-7471B		06 Oct 2025 15:57:27
U	CCV85 - 1	CCV85	4.8338	24532	PPB	SMPL	-7471B		06 Oct 2025 15:59:43
U	CCB85 - 1	CCB85	-0.0343	-268	PPB	SMPL	-7471B		06 Oct 2025 16:02:23

SOP ID : M3050B-Digestion-20

SDG No : N/A

Matrix : SOIL

Pipette ID: ICP A

Balance ID : M SC-2

Filter paper ID : N/A

pH Strip ID : N/A

Hood ID : #3

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

Start Digest Date: 10/03/2025 Time : 10:30 Temp : 96 °C

End Digest Date: 10/03/2025 Time : 12:35 Temp : 96 °C

Digestion tube ID: M6054

Block thermometer ID: MET-DIG. #2

Dig Technician Signature: *SKS*

Supervisor Signature: *[Signature]*

Temp : 1. 96°C 2. N/A

Standard Name	MLS USED	STD REF. # FROM LOG
LFS-1	1.00	M6180
LFS-2	1.00	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	5.00	M6158
1:1 HNO3	10.00	MP85156
30% H2O2	3.00	M6170
Conc. HCL	10.00	M6151
PTFE Boiling Stones	N/A	M5581
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

Extraction Conformance/Non-Conformance Comments:

HOT BLOCK#2 CELL#35 96C

Date / Time	Prepped Sample Relinquished By/Location	Received By/Location
10/3/2025 13:35	<i>SKS metals</i>	<i>SKS metals lab</i>
	Preparation Group	Analysis Group

Lab Sample ID	Client Sample ID	pH	Initial Weight (g)	Final Vol (ml)	Color Before	Color After	Texture	Artifact	Comment	Prep Pos
PB169979BL	PBS979	N/A	2.00	100	Colorless	Colorless	Fine	No	N/A	1
PB169979BS	LCS979	N/A	2.00	100	Colorless	Colorless	Fine	No	M6180,M6181	2
Q3270-01	SG-1-TEST-PIT	N/A	2.44	100	Brown	Yellow	Medium	No	N/A	3
Q3271-01	72-11929	N/A	2.36	100	Brown	Yellow	Medium	No	N/A	4
Q3271-01MS	72-11929MS	N/A	2.20	100	Brown	Yellow	Medium	No	M6180,M6181	6
Q3271-01MSD	72-11929MSD	N/A	2.24	100	Brown	Yellow	Medium	No	M6180,M6181	7
Q3271-01DUP	72-11929DUP	N/A	2.16	100	Brown	Yellow	Medium	No	N/A	5
Q3272-01	VNJ-235	N/A	2.34	100	Brown	Yellow	Medium	No	N/A	8
Q3272-03	R7	N/A	2.33	100	Brown	Yellow	Medium	No	N/A	9
Q3277-01	WC1	N/A	2.30	100	Brown	Yellow	Medium	No	N/A	10

WORKLIST(Hardcopy Internal Chain)

Worklist Name : PB169979

Worklist ID : 192275

Department : Digestion

Date : 10-03-2025 09:51:28

Sample	Customer Sample	Matrix	Test	Preservative	Customer	Raw Sample Storage Location	Collect Date	Method
Q3270-01	SG-1-TEST-PIT	Solid	Metals ICP-TAL	Cool 4 deg C	PSEG03	D31	10/02/2025	6010D
Q3271-01	72-11929	Solid	Metals ICP-TAL	Cool 4 deg C	PSEG03	D31	10/02/2025	6010D
Q3272-01	VNJ-235	Solid	Metals ICP-TAL	Cool 4 deg C	PSEG03	D31	10/02/2025	6010D
Q3272-03	R7	Solid	Metals ICP-TAL	Cool 4 deg C	PSEG03	D31	10/02/2025	6010D
Q3277-01	WC1	Solid	Metals ICP-TAL	Cool 4 deg C	GENV01	D31	09/30/2025	6010D

Date/Time 1010312025 10:10

Raw Sample Received by: SPH met d19

Raw Sample Relinquished by: CPCSH

Date/Time 1010312025 11:10

Raw Sample Received by: CPCSH

Raw Sample Relinquished by: SPH met d19

SOP ID : M7471B-Mercury-19

SDG No : NA

Start Digest Date: 10/06/2025 Time : 09:25 Temp : 94 °C

Matrix : SOIL

End Digest Date: 10/06/2025 Time : 09:55 Temp : 95 °C

Pipette ID: HG B

Digestion tube ID: M5595

Balance ID : M SC-3

Block thermometer ID: HG-DIG#3

Filter paper ID : NA

Dig Technician Signature: *MS*

pH Strip ID : NA

Supervisor Signature: *12*

Hood ID : #1

Temp : 1. 94°C 2. N/A

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

Standardized Name	MLS USED	STD REF. # FROM LOG
ICV	30mL	MP87449
CCV	30mL	MP87451
CRA	30mL	MP87453
Blank Spike	0.48mL	MP87441
Matrix Spike	0.48mL	MP87441

Chemical Used	ML/SAMPLE USED	Lot Number
AQUA REGIA	1.5ML	MP87455
KMnO4 (5%)	4.5mL	MP87072
Hydroxylamine HCL (12%)	2.0ML	MP87149
PTFE Boiling Stones	-----	M5582
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

LAB SAMPLE ID	CLIENT SAMPLE ID	Wt(g)/Vol(ml)	Comment
0.0 ppb	S0	30mL	MP87442
0.05 ppb	S0.05	N/A	N/A
0.2 ppb	S0.2	30mL	MP87443
2.5 ppb	S2.5	30mL	MP87444
5.0 ppb	S5.0	30mL	MP87445
7.5 ppb	S7.5	30mL	MP87447
10.0 ppb	S10.0	30mL	MP87448
ICV	ICV	30mL	MP87449
ICB	ICB	30mL	MP87450
CCV	CCV	30mL	MP87451
CCB	CCB	30mL	MP87452
CRI	CRI	30mL	MP87453
CHK STD	CHK STD	30mL	MP87454

Extraction Conformance/Non-Conformance Comments:

N/A		
Date / Time	Prepped Sample Relinquished By/Location	Received By/Location
10/06/2025 10:35	<i>MS, N/A, LMS</i>	<i>MS, sample LMS</i>
	Preparation Group	Analysis Group

Lab Sample ID	Client Sample ID	Initial Weight (g)	Final Vol (ml)	pH	Comment	Prep Pos
PB169993BL	PBS993	0.54	35	NA	N/A	3-1
PB169993BS	LCS993	0.52	35	NA	MP87441	2
Q3270-01	SG-1-TEST-PIT	0.51	35	NA	N/A	3
Q3271-01	72-11929	0.59	35	NA	N/A	4
Q3272-01	VNJ-235	0.58	35	NA	N/A	5
Q3272-03	R7	0.55	35	NA	N/A	6
Q3277-01	WC1	0.58	35	NA	N/A	7
Q3288-01	TR-01-100325	0.58	35	NA	N/A	8
Q3289-01	VNJ-240	0.57	35	NA	N/A	9
Q3289-03	VNJ-261	0.51	35	NA	N/A	10
Q3289-05	72-11966	0.59	35	NA	N/A	11
Q3290-01	CL-02-100325	0.58	35	NA	N/A	12
Q3290-01DUP	CL-02-100325DUP	0.58	35	NA	N/A	13
Q3290-01MS	CL-02-100325MS	0.59	35	NA	MP87441	14
Q3290-01MSD	CL-02-100325MSD	0.58	35	NA	MP87441	15

WORKLIST(Hardcopy Internal Chain)

WorkList Name : 100625_7471

WorkList ID : 192295

Department : Digestion

Date : 10-06-2025 09:09:42

Sample	Customer Sample	Matrix	Test	Preservative	Customer	Raw Sample Storage Location	Collect Date	Method
Q3270-01	SG-1-TEST-PIT	Solid	Mercury	Cool 4 deg C	PSEG03	D31	10/02/2025	7471B
Q3271-01	72-11929	Solid	Mercury	Cool 4 deg C	PSEG03	D31	10/02/2025	7471B
Q3272-01	VNJ-235	Solid	Mercury	Cool 4 deg C	PSEG03	D31	10/02/2025	7471B
Q3272-03	R7	Solid	Mercury	Cool 4 deg C	PSEG03	D31	10/02/2025	7471B
Q3277-01	WC1	Solid	Mercury	Cool 4 deg C	GENV01	D31	09/30/2025	7471B
Q3288-01	TR-01-100325	Solid	Mercury	Cool 4 deg C	PSEG05	D31	10/03/2025	7471B
Q3289-01	VNJ-240	Solid	Mercury	Cool 4 deg C	PSEG03	D31	10/03/2025	7471B
Q3289-03	VNJ-261	Solid	Mercury	Cool 4 deg C	PSEG03	D31	10/03/2025	7471B
Q3289-05	72-11966	Solid	Mercury	Cool 4 deg C	PSEG03	D31	10/03/2025	7471B
Q3290-01	CL-02-100325	Solid	Mercury	Cool 4 deg C	PSEG05	D31	10/03/2025	7471B

Date/Time 10/6/25 @ 9:00
 Raw Sample Received by: AS - Dig. Lab
 Raw Sample Relinquished by: AS - Dig. Lab

Date/Time 10/6/25 @ 9:45
 Raw Sample Received by: AS - Dig. Lab
 Raw Sample Relinquished by: AS - Dig. Lab

PERCENT SOLID

Supervisor: Iwona
Analyst: jignesh
Date: 10/3/2025

OVENTEMP IN Celsius(°C): 107
Time IN: 17:30
In Date: 10/02/2025
Weight Check 1.0g: 1.00
Weight Check 10g: 10.00
OvenID: M OVEN#1

OVENTEMP OUT Celsius(°C): 104
Time OUT: 08:40
Out Date: 10/03/2025
Weight Check 1.0g: 1.00
Weight Check 10g: 10.00
BalanceID: M SC-4
Thermometer ID: % solids-oven

QC:LB137394

Lab ID	Client SampleID	Dish #	Dish Wt(g) (A)	Sample Wt(g)	Dish + Sample Wt(g) (B)	Dish+Dry Sample Wt(g) (C)	% Solid	Comments
Q2409-05	COP-SOIL-PILE	12	1.18	10.58	11.76	11.38	96.4	
Q3249-03	S-3 (4-4.5)	1	1.11	10.45	11.56	9.51	80.4	
Q3249-08	S-8 (4.5-5)	2	1.19	10.75	11.94	10.38	85.5	
Q3249-16	S-14 (4-4.5)	3	1.13	10.32	11.45	9.34	79.6	
Q3249-19	S-18 (4.5-5)	4	1.18	10.64	11.82	10.8	90.4	
Q3249-22	S-20 (4-4.5)	5	1.18	10.47	11.65	10.64	90.4	
Q3249-24	S-22 (4.5-5)	6	1.19	10.11	11.3	10.33	90.4	
Q3249-27	S-24 (4.5-5)	7	1.15	11.05	12.2	9.82	78.5	
Q3269-01	EG1-TP1	8	1.18	10.78	11.96	10.97	90.8	
Q3269-02	EG1-TP1-E2	9	1.13	10.63	11.76	10.8	91.0	
Q3269-04	EG1-TP2	10	1.13	10.85	11.98	10.97	90.7	
Q3269-05	EG1-TP2-E2	11	1.11	10.77	11.88	11.13	93.0	
Q3270-01	SG-1-TEST-PIT	16	1.18	10.73	11.91	10.77	89.4	
Q3270-02	SG-1-TEST-PIT	17	1.19	10.32	11.51	10.79	93.0	
Q3271-01	72-11929	18	1.13	9.61	10.74	9.79	90.1	
Q3271-02	72-11929-E2	19	1.19	10.47	11.66	10.57	89.6	
Q3272-01	VNJ-235	20	1.19	10.68	11.87	10.15	83.9	
Q3272-02	VNJ-235-E2	21	1.13	10.47	11.6	10.15	86.2	
Q3272-03	R7	22	1.12	10.85	11.97	7.78	61.4	
Q3272-04	R7-E2	23	1.18	10.67	11.85	8.98	73.1	
Q3272-06	RT5417-CONCRETE	24	1.00	1.00	2.00	2.00	100.0	Concreate sample
Q3276-01	SB2	13	1.14	10.92	12.06	10.6	86.6	
Q3276-02	SB2A	14	1.15	10.38	11.53	10.6	91.0	
Q3277-01	WC1	15	1.18	10.41	11.59	11.34	97.6	

$$\% \text{ Solid} = \frac{(C-A) * 100}{(B-A)}$$

WORKLIST(Hardcopy Internal Chain)

137394

WorkList Name : %1-100225 WorkList ID : 192236 Department : Wet-Chemistry Date : 10-02-2025 09:10:00

Sample	Customer Sample	Matrix	Test	Preservative	Customer	Raw Sample Storage Location	Collect Date	Method
Q2409-05	COP-SOIL-PILE	Solid	Percent Solids	Cool 4 deg C	COPP02	D51	06/24/2025	Chemtech -SO
Q3249-03	S-3(4-4.5)	Solid	Percent Solids	Cool 4 deg C	PSEG03	D31	09/29/2025	Chemtech -SO
Q3249-08	S-8(4.5-5)	Solid	Percent Solids	Cool 4 deg C	PSEG03	D31	09/29/2025	Chemtech -SO
Q3249-16	S-14(4-4.5)	Solid	Percent Solids	Cool 4 deg C	PSEG03	D31	09/29/2025	Chemtech -SO
Q3249-19	S-18(4.5-5)	Solid	Percent Solids	Cool 4 deg C	PSEG03	D31	09/29/2025	Chemtech -SO
Q3249-22	S-20(4-4.5)	Solid	Percent Solids	Cool 4 deg C	PSEG03	D31	09/29/2025	Chemtech -SO
Q3249-24	S-22(4.5-5)	Solid	Percent Solids	Cool 4 deg C	PSEG03	D31	09/29/2025	Chemtech -SO
Q3249-27	S-24(4.5-5)	Solid	Percent Solids	Cool 4 deg C	PSEG03	D31	09/29/2025	Chemtech -SO
Q3269-01	EG1-TP1	Solid	Percent Solids	Cool 4 deg C	PSEG03	D31	09/29/2025	Chemtech -SO
Q3269-02	EG1-TP1-E2	Solid	Percent Solids	Cool 4 deg C	PSEG03	D31	10/02/2025	Chemtech -SO
Q3269-04	EG1-TP2	Solid	Percent Solids	Cool 4 deg C	PSEG03	D31	10/02/2025	Chemtech -SO
Q3269-05	EG1-TP2-E2	Solid	Percent Solids	Cool 4 deg C	PSEG03	D31	10/02/2025	Chemtech -SO
Q3270-01	SG-1-TEST-PIT	Solid	Percent Solids	Cool 4 deg C	PSEG03	D31	10/02/2025	Chemtech -SO
Q3270-02	SG-1-TEST-PIT	Solid	Percent Solids	Cool 4 deg C	PSEG03	D31	10/02/2025	Chemtech -SO
Q3271-01	72-11929	Solid	Percent Solids	Cool 4 deg C	PSEG03	D31	10/02/2025	Chemtech -SO
Q3271-02	72-11929-E2	Solid	Percent Solids	Cool 4 deg C	PSEG03	D31	10/02/2025	Chemtech -SO
Q3272-01	VNJ-235	Solid	Percent Solids	Cool 4 deg C	PSEG03	D31	10/02/2025	Chemtech -SO
Q3272-02	VNJ-235-E2	Solid	Percent Solids	Cool 4 deg C	PSEG03	D31	10/02/2025	Chemtech -SO
Q3272-03	R7	Solid	Percent Solids	Cool 4 deg C	PSEG03	D31	10/02/2025	Chemtech -SO
Q3272-04	R7-E2	Solid	Percent Solids	Cool 4 deg C	PSEG03	D31	10/02/2025	Chemtech -SO
Q3272-06	RT5417-CONCRETE	Solid	Percent Solids	Cool 4 deg C	PSEG03	D31	10/02/2025	Chemtech -SO

Date/Time 10/02/25 16:00
 Raw Sample Received by: SO WCI
 Raw Sample Relinquished by: CP
 Date/Time 10/02/25 17:40
 Raw Sample Received by: CP
 Raw Sample Relinquished by: SO WCI

WORKLIST(Hardcopy Internal Chain)

8137394

WorkList Name : %1-100225

WorkList ID : 192236

Department : Wet-Chemistry

Date : 10-02-2025 09:10:00

Sample	Customer Sample	Matrix	Test	Preservative	Customer	Raw Sample Storage Location	Collect Date	Method
Q3276-01	SB2	Solid	Percent Solids	Cool 4 deg C	GENV01	D31	10/01/2025	Chemtech -SO
Q3276-02	SB2A	Solid	Percent Solids	Cool 4 deg C	GENV01	D31	10/01/2025	Chemtech -SO
Q3277-01	WC1	Solid	Percent Solids	Cool 4 deg C	GENV01	D31	09/30/2025	Chemtech -SO

Date/Time 10/02/25 16:00
 Raw Sample Received by: SP
 Raw Sample Relinquished by: CP

Date/Time 10/02/25 17:40
 Raw Sample Received by: CP
 Raw Sample Relinquished by: SP

Instrument ID: CV1

Daily Analysis Runlog For Sequence/QC Batch ID # LB137429

Review By	mohan	Review On	10/7/2025 4:12:40 PM
Supervise By	janvi	Supervise On	10/7/2025 11:28:39 PM

STD. NAME	STD REF.#
ICAL Standard	MP87442,MP874423,MP87444,MP87445,MP87447,MP87448
ICV Standard	MP87449
CCV Standard	MP87451
ICSA Standard	
CRI Standard	MP87453
LCS Standard	
Chk Standard	MP87450,MP87452,MP87454,MP87456

Sr#	SampleId	ClientID	QcType	Date	Comment	Operator	Status
1	S0	S0	CAL1	10/06/25 14:39		mohan	OK
2	S0.2	S0.2	CAL2	10/06/25 14:42		mohan	OK
3	S2.5	S2.5	CAL3	10/06/25 14:45		mohan	OK
4	S5	S5	CAL4	10/06/25 14:47		mohan	OK
5	S7.5	S7.5	CAL5	10/06/25 14:49		mohan	OK
6	S10	S10	CAL6	10/06/25 14:52		mohan	OK
7	ICV59	ICV59	ICV	10/06/25 14:56		mohan	OK
8	ICB59	ICB59	ICB	10/06/25 14:58		mohan	OK
9	CCV83	CCV83	CCV	10/06/25 15:01		mohan	OK
10	CCB83	CCB83	CCB	10/06/25 15:03		mohan	OK
11	CRA	CRA	CRDL	10/06/25 15:06		mohan	OK
12	HighStd	HighStd	HIGH STD	10/06/25 15:08		mohan	OK
13	ChkStd	ChkStd	SAM	10/06/25 15:10		mohan	OK
14	PB169993BL	PB169993BL	MB	10/06/25 15:13		mohan	OK
15	PB169993BS	PB169993BS	LCS	10/06/25 15:16		mohan	OK
16	Q3270-01	SG-1-TEST-PIT	SAM	10/06/25 15:18		mohan	OK
17	Q3271-01	72-11929	SAM	10/06/25 15:21		mohan	OK
18	Q3272-01	VNJ-235	SAM	10/06/25 15:23		mohan	OK

Instrument ID: CV1

Daily Analysis Runlog For Sequence/QC Batch ID # LB137429

Review By	mohan	Review On	10/7/2025 4:12:40 PM
Supervise By	janvi	Supervise On	10/7/2025 11:28:39 PM
STD. NAME	STD REF.#		
ICAL Standard	MP87442,MP874423,MP87444,MP87445,MP87447,MP87448		
ICV Standard	MP87449		
CCV Standard	MP87451		
ICSA Standard			
CRI Standard	MP87453		
LCS Standard			
Chk Standard	MP87450,MP87452,MP87454,MP87456		

19	Q3272-03	R7	SAM	10/06/25 15:25		mohan	OK
20	Q3277-01	WC1	SAM	10/06/25 15:28		mohan	OK
21	CCV84	CCV84	CCV	10/06/25 15:30		mohan	OK
22	CCB84	CCB84	CCB	10/06/25 15:33		mohan	OK
23	Q3288-01	TR-01-100325	SAM	10/06/25 15:36		mohan	OK
24	Q3289-01	VNJ-240	SAM	10/06/25 15:38		mohan	OK
25	Q3289-03	VNJ-261	SAM	10/06/25 15:40		mohan	OK
26	Q3289-05	72-11966	SAM	10/06/25 15:43		mohan	OK
27	Q3290-01	CL-02-100325	SAM	10/06/25 15:45		mohan	OK
28	Q3290-01DUP	CL-02-100325DUP	DUP	10/06/25 15:47		mohan	OK
29	Q3290-01MS	CL-02-100325MS	MS	10/06/25 15:49		mohan	OK
30	Q3290-01MSD	CL-02-100325MSD	MSD	10/06/25 15:52		mohan	OK
31	Q3290-01L	CL-02-100325L	SD	10/06/25 15:54		mohan	OK
32	Q3290-01A	CL-02-100325A	PS	10/06/25 15:57		mohan	OK
33	CCV85	CCV85	CCV	10/06/25 15:59		mohan	OK
34	CCB85	CCB85	CCB	10/06/25 16:02		mohan	OK

Instrument ID: P4

Daily Analysis Runlog For Sequence/QC Batch ID # LB137447

Review By	Janvi	Review On	10/8/2025 2:41:18 PM
Supervise By	jaswal	Supervise On	10/8/2025 11:43:16 PM
STD. NAME	STD REF.#		
ICAL Standard	MP87074,MP87083,MP87082,MP87080,MP87079,MP87078,MP87077,MP87076,MP87075		
ICV Standard	MP87085,MP87082		
CCV Standard	MP87086		
ICSA Standard	MP87087,MP87088		
CRI Standard	MP87082		
LCS Standard			
Chk Standard	MP87091,MP87092		

Sr#	SampleId	ClientID	QcType	Date	Comment	Operator	Status
1	S0	S0	CAL1	10/07/25 10:29		Jaswal	OK
2	S1	S1	CAL2	10/07/25 10:34		Jaswal	OK
3	S2	S2	CAL3	10/07/25 10:38		Jaswal	OK
4	S3	S3	CAL4	10/07/25 10:42		Jaswal	OK
5	S4	S4	CAL5	10/07/25 10:46		Jaswal	OK
6	S5	S5	CAL6	10/07/25 10:50		Jaswal	OK
7	ICV01	ICV01	ICV	10/07/25 10:54		Jaswal	OK
8	LLICV01	LLICV01	LLICV	10/07/25 12:01		Jaswal	OK
9	ICB01	ICB01	ICB	10/07/25 12:06		Jaswal	OK
10	CRI01	CRI01	CRDL	10/07/25 12:10		Jaswal	OK
11	ICSA01	ICSA01	ICSA	10/07/25 12:14		Jaswal	OK
12	ICSAB01	ICSAB01	ICSAB	10/07/25 12:37		Jaswal	OK
13	ICSADL	ICSADL	ICSA	10/07/25 12:41		Jaswal	OK
14	ICSABDL	ICSABDL	ICSAB	10/07/25 12:45		Jaswal	OK
15	CCV01	CCV01	CCV	10/07/25 12:50		Jaswal	OK
16	CCB01	CCB01	CCB	10/07/25 12:58		Jaswal	OK
17	Q3283-01	001-WILLETS-PT-BL	SAM	10/07/25 13:21		Jaswal	OK
18	Q3283-02	002-35TH-AVE(SEP)	SAM	10/07/25 13:25		Jaswal	OK

Instrument ID: P4

Daily Analysis Runlog For Sequence/QC Batch ID # LB137447

Review By	Janvi	Review On	10/8/2025 2:41:18 PM
Supervise By	jaswal	Supervise On	10/8/2025 11:43:16 PM
STD. NAME	STD REF.#		
ICAL Standard	MP87074,MP87083,MP87082,MP87080,MP87079,MP87078,MP87077,MP87076,MP87075		
ICV Standard	MP87085,MP87082		
CCV Standard	MP87086		
ICSA Standard	MP87087,MP87088		
CRI Standard	MP87082		
LCS Standard			
Chk Standard	MP87091,MP87092		

19	Q3283-02DUP	002-35TH-AVE(SEP)DUP		10/07/25 13:29		Jaswal	OK
20	Q3283-02L	002-35TH-AVE(SEP)LS		10/07/25 13:33		Jaswal	OK
21	Q3283-02MS	002-35TH-AVE(SEP)MS		10/07/25 13:38		Jaswal	OK
22	Q3283-02MSD	002-35TH-AVE(SEP)MSD		10/07/25 13:42		Jaswal	OK
23	Q3283-02A	002-35TH-AVE(SEP)PS		10/07/25 13:46		Jaswal	OK
24	LR-1	LR-1	HIGH STD	10/07/25 13:50		Jaswal	OK
25	LR-3	LR-3	HIGH STD	10/07/25 13:59		Jaswal	OK
26	LR-2	LR-2	HIGH STD	10/07/25 14:10		Jaswal	OK
27	CCV02	CCV02	CCV	10/07/25 14:19		Jaswal	OK
28	CCB02	CCB02	CCB	10/07/25 14:24		Jaswal	OK
29	Q3270-01	SG-1-TEST-PIT	SAM	10/07/25 14:28		Jaswal	OK
30	Q3271-01	72-11929	SAM	10/07/25 14:32		Jaswal	OK
31	Q3271-01L	72-11929L	SD	10/07/25 14:40		Jaswal	OK
32	Q3271-01MS	72-11929MS	MS	10/07/25 14:44		Jaswal	OK
33	Q3271-01MSD	72-11929MSD	MSD	10/07/25 14:48		Jaswal	OK
34	Q3271-01A	72-11929A	PS	10/07/25 14:52		Jaswal	OK
35	Q3272-01	VNJ-235	SAM	10/07/25 14:56		Jaswal	OK
36	Q3272-03	R7	SAM	10/07/25 15:00	Ca is high, need dilution	Jaswal	Dilution
37	Q3277-01	WC1	SAM	10/07/25 15:04		Jaswal	OK
38	CCV03	CCV03	CCV	10/07/25 15:08		Jaswal	OK

Instrument ID: P4

Daily Analysis Runlog For Sequence/QC Batch ID # LB137447

Review By	Janvi	Review On	10/8/2025 2:41:18 PM
Supervise By	jaswal	Supervise On	10/8/2025 11:43:16 PM
STD. NAME	STD REF.#		
ICAL Standard	MP87074,MP87083,MP87082,MP87080,MP87079,MP87078,MP87077,MP87076,MP87075		
ICV Standard	MP87085,MP87082		
CCV Standard	MP87086		
ICSA Standard	MP87087,MP87088		
CRI Standard	MP87082		
LCS Standard			
Chk Standard	MP87091,MP87092		

39	CCB03	CCB03	CCB	10/07/25 15:12		Jaswal	OK
40	Q3269-03	EG1-TP1	SAM	10/07/25 15:17		Jaswal	OK
41	Q3269-06	EG1-TP2	SAM	10/07/25 15:21		Jaswal	OK
42	Q3281-01	001-WILLETS-PT-BL	SAM	10/07/25 15:26		Jaswal	OK
43	Q3281-02	002-35TH-AVE(OCT)	SAM	10/07/25 15:30		Jaswal	OK
44	Q3272-03DL	R7DL	SAM	10/07/25 15:34	25X for Ca	Jaswal	Confirms
45	Q3271-01DUP	72-11929DUP	DUP	10/07/25 15:38		Jaswal	OK
46	PB169982BL	PB169982BL	MB	10/07/25 15:43		Jaswal	OK
47	PB169982BS	PB169982BS	LCS	10/07/25 15:48		Jaswal	OK
48	PB169979BL	PB169979BL	MB	10/07/25 15:52		Jaswal	OK
49	PB169979BS	PB169979BS	LCS	10/07/25 15:56		Jaswal	OK
50	CCV04	CCV04	CCV	10/07/25 16:00		Jaswal	OK
51	CCB04	CCB04	CCB	10/07/25 16:04		Jaswal	OK
52	PB169996BS	PB169996BS	LCS	10/07/25 16:08		Jaswal	OK
53	Q3266-02	ENV-4-6FT	SAM	10/07/25 16:13		Jaswal	OK
54	Q3266-02DUP	ENV-4-6FTDUP	DUP	10/07/25 16:17		Jaswal	OK
55	Q3266-02L	ENV-4-6FTL	SD	10/07/25 16:20		Jaswal	OK
56	Q3266-02MS	ENV-4-6FTMS	MS	10/07/25 16:25		Jaswal	OK
57	Q3266-02MSD	ENV-4-6FTMSD	MSD	10/07/25 16:29		Jaswal	OK
58	Q3266-02A	ENV-4-6FTA	PS	10/07/25 16:33		Jaswal	OK

Instrument ID: P4

Daily Analysis Runlog For Sequence/QC Batch ID # LB137447

Review By	Janvi	Review On	10/8/2025 2:41:18 PM
Supervise By	jaswal	Supervise On	10/8/2025 11:43:16 PM
STD. NAME	STD REF.#		
ICAL Standard	MP87074,MP87083,MP87082,MP87080,MP87079,MP87078,MP87077,MP87076,MP87075		
ICV Standard	MP87085,MP87082		
CCV Standard	MP87086		
ICSA Standard	MP87087,MP87088		
CRI Standard	MP87082		
LCS Standard			
Chk Standard	MP87091,MP87092		

59	Q3258-06DL	COMPOSITEDL	SAM	10/07/25 16:37	Not use	Jaswal	Not Ok
60	PB169971TB	PB169971TB	MB	10/07/25 16:41		Jaswal	OK
61	Q3262-03	MOO-25-0280	SAM	10/07/25 16:45		Jaswal	OK
62	CCV05	CCV05	CCV	10/07/25 16:50		Jaswal	OK
63	CCB05	CCB05	CCB	10/07/25 17:01		Jaswal	OK
64	Q3262-06	MOO-25-0281-82	SAM	10/07/25 17:05		Jaswal	OK
65	Q3262-09	279887	SAM	10/07/25 17:10		Jaswal	OK
66	Q3277-02	WC1	SAM	10/07/25 17:14		Jaswal	OK
67	Q3289-02	VNJ-240	SAM	10/07/25 17:19		Jaswal	OK
68	Q3289-04	VNJ-261	SAM	10/07/25 17:23		Jaswal	OK
69	Q3289-06	72-11966	SAM	10/07/25 17:27		Jaswal	OK
70	Q3289-06DUP	72-11966DUP	DUP	10/07/25 17:32		Jaswal	OK
71	Q3289-06L	72-11966L	SD	10/07/25 17:36		Jaswal	OK
72	Q3289-06MS	72-11966MS	MS	10/07/25 17:40		Jaswal	OK
73	Q3289-06MSD	72-11966MSD	MSD	10/07/25 17:44		Jaswal	OK
74	CCV06	CCV06	CCV	10/07/25 17:49		Jaswal	OK
75	CCB06	CCB06	CCB	10/07/25 17:59		Jaswal	OK
76	Q3289-06A	72-11966A	PS	10/07/25 18:03		Jaswal	OK
77	Q3287-02	TSS-25-0001-0002	SAM	10/07/25 18:07		Jaswal	OK
78	PB169996BL	PB169996BL	MB	10/07/25 18:11		Jaswal	OK

Instrument ID: P4

Daily Analysis Runlog For Sequence/QC Batch ID # LB137447

Review By	Janvi	Review On	10/8/2025 2:41:18 PM
Supervise By	jaswal	Supervise On	10/8/2025 11:43:16 PM
STD. NAME	STD REF.#		
ICAL Standard	MP87074,MP87083,MP87082,MP87080,MP87079,MP87078,MP87077,MP87076,MP87075		
ICV Standard	MP87085,MP87082		
CCV Standard	MP87086		
ICSA Standard	MP87087,MP87088		
CRI Standard	MP87082		
LCS Standard			
Chk Standard	MP87091,MP87092		

79	PB169983BL	PB169983BL	MB	10/07/25 18:15		Jaswal	OK
80	PB169983BS	PB169983BS	LCS	10/07/25 18:20		Jaswal	OK
81	Q3288-01	TR-01-100325	SAM	10/07/25 18:24		Jaswal	OK
82	Q3289-01	VNJ-240	SAM	10/07/25 18:28		Jaswal	OK
83	Q3289-03	VNJ-261	SAM	10/07/25 18:32		Jaswal	OK
84	Q3289-05	72-11966	SAM	10/07/25 18:36		Jaswal	OK
85	Q3290-01	CL-02-100325	SAM	10/07/25 18:40		Jaswal	OK
86	CCV07	CCV07	CCV	10/07/25 18:44		Jaswal	OK
87	CCB07	CCB07	CCB	10/07/25 18:48		Jaswal	OK
88	Q3290-01DUP	CL-02-100325DUP	DUP	10/07/25 18:52		Jaswal	OK
89	Q3290-01L	CL-02-100325L	SD	10/07/25 18:56		Jaswal	OK
90	Q3290-01MS	CL-02-100325MS	MS	10/07/25 19:00		Jaswal	OK
91	Q3290-01MSD	CL-02-100325MSD	MSD	10/07/25 19:04		Jaswal	OK
92	Q3290-01A	CL-02-100325A	PS	10/07/25 19:08		Jaswal	OK
93	Q3257-01DL	ENV1-6FTDL	SAM	10/07/25 19:12	5X for Ag	Jaswal	Confirms
94	Q3257-02DL	ENV2-6FTDL	SAM	10/07/25 19:16	5X for Ag	Jaswal	Confirms
95	CCV08	CCV08	CCV	10/07/25 19:20		Jaswal	OK
96	CCB08	CCB08	CCB	10/07/25 19:24		Jaswal	OK

Prep Standard - Chemical Standard Summary

Order ID : Q3277

Test : Mercury, Metals ICP-TAL

Prepbatch ID : PB169979, PB169993,

Sequence ID/Qc Batch ID: LB137429, LB137447,

Standard ID :

MP85156, MP87072, MP87074, MP87075, MP87076, MP87077, MP87078, MP87079, MP87080, MP87081, MP87082, MP87083, MP87085, MP87086, MP87087, MP87088, MP87090, MP87091, MP87092, MP87149, MP87441, MP87442, MP874423, MP87444, MP87445, MP87447, MP87448, MP87449, MP87450, MP87451, MP87452, MP87453, MP87454, MP87455, MP87456,

Chemical ID :

M4916, M5062, M5245, M5581, M5582, M5658, M5697, M5739, M5798, M5799, M5800, M5801, M5815, M5817, M5882, M5884, M5962, M5979, M5981, M6021, M6023, M6025, M6026, M6027, M6028, M6030, M6032, M6055, M6079, M6086, M6128, M6137, M6140, M6142, M6145, M6146, M6151, M6153, M6158, M6159, M6161, M6163, M6164, M6165, M6170, M6171, M6172, M6175, M6176, M6178, M6180, M6181, M6185, M6187, M6196, M6200, W3112,

Metals STANDARD PREPARATION LOG

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
170	1:1HCL	MP85156	04/07/2025	10/08/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								04/07/2025

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

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
65	POTASSIUM PERMANGANATE SOLUTION 5 %	MP87072	09/04/2025	03/04/2026	Mohan Bera	METALS_SCALE_3 (M SC-3)	None	Sarabjit Jaswal
								09/04/2025

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



<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1122	ICPMS CALIB BLANK(S0/ICB/CCB)	MP87074	09/03/2025	10/07/2025	Janvi Patel	None	METALS_PIPETTE_1 (ICP)	Sarabjit Jaswal 09/09/2025
FROM 25.00000ml of M6151 + 4925.00000ml of W3112 + 50.00000ml of M6187 = Final Quantity: 5000.000 ml								

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
2902	S8 ICPMS	MP87075	09/03/2025	10/07/2025	Janvi Patel	None	METALS_PIPETTE_1 (ICP A)	Sarabjit Jaswal 09/09/2025
<u>FROM</u>	1.00000ml of M6159 + 2.50000ml of M6140 + 2.50000ml of M6142 + 5.00000ml of M6086 + 5.00000ml of M6171 + 5.00000ml of M6172 + 79.00000ml of MP87074 = Final Quantity: 100.000 ml							



<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
3947	S7(SFAM,6020,200.8)	MP87076	09/03/2025	10/07/2025	Janvi Patel	None	METALS_PIPETTE_1 (ICP A)	Sarabjit Jaswal 09/09/2025
FROM 0.10000ml of M6153 + 0.40000ml of M6026 + 0.50000ml of M6151 + 1.00000ml of M5799 + 1.00000ml of M5981 + 1.00000ml of M6079 + 1.00000ml of M6137 + 1.00000ml of M6187 + 1.90000ml of M6159 + 10.00000ml of M5979 + 10.00000ml of M6178 + 2.00000ml of M5815 + 2.00000ml of M5817 + 4.00000ml of M6032 + 4.90000ml of M6140 + 4.90000ml of M6142 + 48.50000ml of W3112 + 50.00000ml of M6175 + 9.00000ml of M5697 + 9.00000ml of M6128 + 9.00000ml of M6145 + 9.90000ml of M6086 + 9.90000ml of M6171 + 9.90000ml of M6172 = Final Quantity: 100.000 ml								

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
3948	S6(SFAM,6020,200.8)	MP87077	09/03/2025	10/07/2025	Janvi Patel	None	METALS_PIPETTE_1 (ICP A)	Sarabjit Jaswal 09/09/2025
<u>FROM</u>	0.50000ml of M6151 + 1.00000ml of M6187 + 48.50000ml of W3112 + 50.00000ml of MP87076 = Final Quantity: 100.000 ml							



<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
3949	S5(SFAM,6020,200.8)	MP87078	09/03/2025	10/07/2025	Janvi Patel	None	METALS_PIPETTE_1 (ICP A)	Sarabjit Jaswal 09/09/2025
<u>FROM</u>	0.50000ml of M6151 + 1.00000ml of M6187 + 73.50000ml of W3112 + 25.00000ml of MP87076 = Final Quantity: 100.000 ml							

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
3954	S4(SFAM,6020,200.8)	MP87079	09/03/2025	10/07/2025	Janvi Patel	None	METALS_PIPETTE_1 (ICP A)	Sarabjit Jaswal 09/09/2025
<u>FROM</u>	0.50000ml of M6151 + 1.00000ml of M6187 + 86.00000ml of W3112 + 12.50000ml of MP87076 = Final Quantity: 100.000 ml							



<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
3951	S3(SFAM, 6020,200.8)	MP87080	09/03/2025	10/07/2025	Janvi Patel	None	METALS_PIPETTE_1 (ICP A)	Sarabjit Jaswal 09/09/2025
<u>FROM</u>	0.50000ml of M6151 + 1.00000ml of M6187 + 88.50000ml of W3112 + 10.00000ml of MP87077 = Final Quantity: 100.000 ml							

[illegible]



<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
3956	S2(SFAM,6020,200.8)	MP87082	09/03/2025	10/07/2025	Janvi Patel	None	METALS_PIPETTE_1 (ICP)	Sarabjit Jaswal
A) FROM 0.50000ml of M6151 + 1.00000ml of M6187 + 98.00000ml of W3112 + 0.50000ml of MP87081 = Final Quantity: 100.000 ml								

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
3957	S1(SFAM,6020,200.8)	MP87083	09/03/2025	10/07/2025	Janvi Patel	None	METALS_PIPETTE_1 (ICP A)	Sarabjit Jaswal 09/09/2025
<u>FROM</u>	0.50000ml of M6151 + 1.00000ml of M6187 + 88.50000ml of W3112 + 10.00000ml of MP87082 = Final Quantity: 100.000 ml							



<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
4213	NEW ICV-6020B	MP87085	09/03/2025	10/07/2025	Janvi Patel	None	METALS_PIPETTE_1 (ICP)	Sarabjit Jaswal
A) FROM 0.00800ml of M6164 + 0.00800ml of M6165 + 0.01600ml of M6163 + 49.96800ml of MP87074 = Final Quantity: 50.000 ml								

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
3961	CCV	MP87086	09/03/2025	10/07/2025	Janvi Patel	None	METALS_PIPETTE_1 (ICP)	Sarabjit Jaswal
FROM 0.20000ml of M6026 + 0.50000ml of M5799 + 0.50000ml of M5981 + 0.50000ml of M6079 + 0.50000ml of M6137 + 0.50000ml of M6176 + 1.00000ml of M5815 + 1.00000ml of M5817 + 10.00000ml of M6187 + 12.45000ml of M6140 + 12.45000ml of M6142 + 2.00000ml of M6032 + 24.95000ml of M6086 + 24.95000ml of M6171 + 24.95000ml of M6172 + 25.00000ml of M6175 + 4.50000ml of M5697 + 4.50000ml of M6128 + 4.50000ml of M6145 + 4.95000ml of M6159 + 5.00000ml of M6151 + 5.50000ml of M5979 + 5.50000ml of M6178 + 824.10000ml of W3112 = Final Quantity: 1000.000 ml								



<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1142	ICSA ICPMS	MP87087	09/03/2025	10/07/2025	Janvi Patel	None	METALS_PIPETTE_1 (ICP)	Sarabjit Jaswal
FROM 10.00000ml of M6185 + 90.00000ml of MP87074 = Final Quantity: 100.000 ml								

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1143	ICSAB ICPMS	MP87088	09/03/2025	10/07/2025	Janvi Patel	None	METALS_PIPETTE_1 (ICP)	Sarabjit Jaswal
FROM 10.00000ml of M5245 + 10.00000ml of M6185 + 80.00000ml of MP87074 = Final Quantity: 100.000 ml								

Metals STANDARD PREPARATION LOG

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
3962	MG 10PPM FOR TUNE	MP87090	09/03/2025	10/07/2025	Janvi Patel	None	METALS_PIPETTE_1 (ICP)	Sarabjit Jaswal
FROM 0.01000ml of M6171 + 9.99000ml of MP87074 = Final Quantity: 100.000 ml								

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
3894	TUNE 200PPB	MP87091	09/03/2025	10/07/2025	Janvi Patel	None	METALS_PIPETTE_1 (ICP)	Sarabjit Jaswal
A) FROM 2.00000ml of M6055 + 2.00000ml of MP87090 + 96.00000ml of MP87074 = Final Quantity: 100.000 ml								



<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
3903	ISS 3PPM	MP87092	09/03/2025	10/07/2025	Janvi Patel	None	METALS_PIPETTE_1 (ICP)	Sarabjit Jaswal
FROM 5.00000ml of M6187 + 75.00000ml of M5739 + 170.00000ml of MP87074 = Final Quantity: 250.000 ml								

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
67	SODIUM CHLORIDE - HYDROXYL- CHLORIDE SOLUTION	MP87149	09/09/2025	02/03/2026	Mohan Bera	METALS_SCALE_2 (M SC-2)	None	Sarabjit Jaswal
FROM 2000.00000ml of W3112 + 240.00000gram of M5884 + 240.00000ml of M6196 = Final Quantity: 2000.000 ml								



<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
871	MERCURY INTERMEDIATE B 250PPB WORKING STD.	MP87441	10/06/2025	10/07/2025	Mohan Bera	None	METALS_PIPETTE_6 (HGB)	Sarabjit Jaswal 10/06/2025
<u>FROM</u> 1.00000ml of M6187 + 2.50000ml of M5062 + 96.50000ml of W3112 = Final Quantity: 100.000 ml								

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1340	Hg 0.00 PPB STD	MP87442	10/06/2025	10/07/2025	Mohan Bera	None	METALS_PIPETTE_6 (HGB)	Sarabjit Jaswal 10/06/2025
<u>FROM</u> 2.50000ml of M6187 + 247.50000ml of W3112 = Final Quantity: 250.000 ml								



<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1342	Hg 2.5 PPB STD	MP87444	10/06/2025	10/07/2025	Mohan Bera	None	METALS_PIPETTE_6 (HG)	Sarabjit Jaswal 10/06/2025
FROM 2.50000ml of M6187 + 245.00000ml of W3112 + 2.50000ml of MP87441 = Final Quantity: 250.000 ml 								

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<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1344	Hg 7.5 PPB STD	MP87447	10/06/2025	10/07/2025	Mohan Bera	None	METALS_PIPETTE_6 (HG	Sarabjit Jaswal 10/06/2025
FROM 2.50000ml of M6187 + 240.00000ml of W3112 + 7.50000ml of MP87441 = Final Quantity: 250.000 ml 								

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1345	Hg 10.0 PPB STD	MP87448	10/06/2025	10/07/2025	Mohan Bera	None	METALS_PIPETTE_6 (HG B)	Sarabjit Jaswal 10/06/2025
<u>FROM</u>	2.50000ml of M6187 + 237.50000ml of W3112 + 10.00000ml of MP87441 = Final Quantity: 250.000 ml							



<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1346	Hg ICV SOLUTION	MP87449	10/06/2025	10/07/2025	Mohan Bera	None	METALS_PIPETTE_6 (HGB)	Sarabjit Jaswal 10/06/2025
<u>FROM</u> 2.50000ml of M6161 + 2.50000ml of M6187 + 245.00000ml of W3112 = Final Quantity: 250.000 ml								

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1351	ICB (Hg 0.00 PPB SOLUTION)	MP87450	10/06/2025	10/07/2025	Mohan Bera	None	METALS_PIPETTE_6 (HGB)	Sarabjit Jaswal 10/06/2025
<u>FROM</u> 2.50000ml of M6187 + 247.50000ml of W3112 = Final Quantity: 250.000 ml								



<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1358	CCV (Hg 5.0 PPB SOLUTION)	MP87451	10/06/2025	10/07/2025	Mohan Bera	None	METALS_PIPETTE_6 (HG)	Sarabjit Jaswal 10/06/2025
FROM 485.00000ml of W3112 + 5.00000ml of M6187 + 10.00000ml of MP87441 = Final Quantity: 500.000 ml 								

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1352	CCB (Hg 0.00 PPB SOLUTION)	MP87452	10/06/2025	10/07/2025	Mohan Bera	None	METALS_PIPETTE_6 (HGB)	Sarabjit Jaswal 10/06/2025
<u>FROM</u> 495.00000ml of W3112 + 5.00000ml of M6187 = Final Quantity: 500.000 ml								



<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1349	CRA/CRI (Hg 0.2 PPB SOLUTION)	MP87453	10/06/2025	10/07/2025	Mohan Bera	None	METALS_PIPETTE_6 (HGB)	Sarabjit Jaswal 10/06/2025
<u>FROM</u> 2.50000ml of M6187 + 247.30000ml of W3112 + 0.20000ml of MP87441 = Final Quantity: 250.000 ml								

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1350	CHK STD (Hg 7.0 PPB SOLUTION)	MP87454	10/06/2025	10/07/2025	Mohan Bera	None	METALS_PIPETTE_6 (HGB)	Sarabjit Jaswal 10/06/2025
<u>FROM</u> 2.50000ml of M6187 + 240.50000ml of W3112 + 7.00000ml of MP87441 = Final Quantity: 250.000 ml								

Metals STANDARD PREPARATION LOG

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
887	AQUA REGIA FOR HG ON 7471A	MP87455	10/06/2025	10/07/2025	Mohan Bera	None	None	Sarabjit Jaswal
								10/06/2025

FROM 150.00000ml of M6200 + 50.00000ml of M6187 = Final Quantity: 200.000 ml

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
68	STANNOUS CHLORIDE SOLUTION	MP87456	10/06/2025	10/07/2025	Mohan Bera	METALS_SCALE_3 (M SC-3)	None	Sarabjit Jaswal
								10/06/2025

FROM 450.00000ml of W3112 + 50.00000gram of M5882 + 50.00000ml of M6200 = Final Quantity: 500.000 ml

CHEMICAL RECEIPT LOG BOOK

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 / Received By	Chemtech Lot #
Inorganic Ventures	MSHG-10PPM / MERCURY HCl 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 #
EPA	PART B / ICSB (ICPMS) STOCK SOLUTION	CP-MS ICSB-0803	07/01/2026	07/02/2025 / jaswal	02/20/2020 / jaswal	M5245

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
PCI Scientific Supply, Inc.	26397-103 / PTFE BOILING STONES	W126678	03/20/2026	03/20/2025 /	06/12/2023 / jaswal	M5581

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
PCI Scientific Supply, Inc.	26397-103 / PTFE BOILING STONES	W126678	12/31/2025	06/17/2023 / Al-Terek	06/12/2023 / jaswal	M5582

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58024 / Chromium, Cr, 500 ml, 1000 PPM	060523	06/05/2026	08/28/2023 / jaswal	08/25/2023 / jaswal	M5658

CHEMICAL RECEIPT LOG BOOK

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	102523	10/25/2026	04/03/2024 / jaswal	10/27/2023 / jaswal	M5697

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	6020ISS / 6020ISS, 10 ug/ml, Bi, Ho, In, 6Li, Rh, Sc, TB, Y	T2-MEB709511	09/03/2026	08/07/2024 / jaswal	04/11/2022 / jaswal	M5739

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 / Received By	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

CHEMICAL RECEIPT LOG BOOK

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57115 / P, 10000 PPM, 125 ml	041723	04/17/2026	05/21/2024 / Jaswal	02/09/2024 / jaswal	M5815

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57116 / S, 10000 PPM, 125 ml	071123	07/11/2026	03/01/2024 / jaswal	02/09/2024 / jaswal	M5817

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 (cs/4x2.5kg)	0000281938	07/06/2026	04/30/2024 / mohan	04/25/2024 / mohan	M5884

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57034 / Se, 1000 PPM, 125 ml	060624	06/06/2027	07/02/2024 / Jaswal	06/14/2024 / Jaswal	M5962

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

CHEMICAL RECEIPT LOG BOOK

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57092 / U, 1000 PPM, 125 ml	060724	06/07/2027	07/29/2024 / Jaswal	06/11/2024 / Jaswal	M5981

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57023 / V, 1000 PPM, 125 ml	062424	06/24/2027	09/28/2024 / jaswal	08/05/2024 / Jaswal	M6021

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57081 / TI, 1000 PPM, 125 ml	0624724	06/27/2027	08/05/2024 / kareem	08/05/2024 / Jaswal	M6023

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57082 / Pb, 1000 PPM, 125 ml	061224	11/09/2026	08/05/2024 / Jaswal	08/05/2024 / Jaswal	M6025

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

CHEMICAL RECEIPT LOG BOOK

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

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57056 / Ba, 1000 PPM, 125 ml	010924	01/09/2027	01/14/2025 / Jaswal	08/05/2024 / Jaswal	M6032

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	IV-STOCK-12 / ICP-MS TUNING SOLUTION, 125mL	U2-MEB734294	06/21/2028	08/21/2024 / Jaswal	08/19/2024 / Jaswal	M6055

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57040 / Zr, 1000 PPM, 125 ml	071423	07/14/2026	01/15/2025 / Jaswal	09/30/2024 / Jaswal	M6079

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58120 / Calcium, 500 ml, 10000 PPM	082324	08/23/2027	03/06/2025 / JANVI	10/14/2024 / jaswal	M6086

CHEMICAL RECEIPT LOG BOOK

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	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 / Received By	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 / Received By	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 / Received By	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.	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 #
Absolute Standards, Inc.	57051 / Sb, 1000 PPM, 125 ml	071724	07/17/2027	01/31/2025 / kareem	10/18/2024 / kareem	M6146

CHEMICAL RECEIPT LOG BOOK

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 #
Inorganic Ventures	CGSR10 / Strontium (SR), 125mL 10,000ppm	V2-SR754329	02/28/2026	02/28/2025 / JANVI	01/07/2025 / JANVI	M6153

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

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58113 / Al, 10000 PPM, 500 ml	011325	03/18/2026	03/18/2025 / kareem	02/09/2025 / kareem	M6159

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 #
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

CHEMICAL RECEIPT LOG BOOK

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

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	BA-2186-03 / Hydrogen Peroxide (cs/4x4L)	24D1961001	10/16/2025	06/25/2025 /	05/20/2025 / Sagar	M6170

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58112 / Mg, 10000 PPM, 500 ml	011525	01/15/2028	07/15/2025 /	02/13/2025 / Janvi	M6171

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CGNA10-5 / Sodium, 500 ml, 10000 PPM	V2-NA740547	07/29/2026	07/29/2025 / Janvi	01/25/2025 / Janvi	M6172

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	6020CAL-1 / Calibration Standard Method 6020	V2-MEB742014	07/17/2026	07/17/2025 / Janvi	01/27/2025 / Janvi	M6175

CHEMICAL RECEIPT LOG BOOK

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 / 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 / Received By	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 (ICPMS) STOCK SOLN	MS ICSA-0803	07/01/2026	07/02/2025 / Janvi	07/14/2022 / Janvi	M6185

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

CHEMICAL RECEIPT LOG BOOK

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
PCI Scientific Supply, Inc.	H330-500 / HYDROXYLAMINE HYDROCHLORIDE ACS 500G	243373	02/03/2026	09/04/2025 / mohan	08/04/2025 / mohan	M6196

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)	24D1562005	02/10/2026	09/11/2025 / Sagar	08/25/2025 / Sagar	M6200

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	DIW / DI Water	Daily Lab-Certified	07/03/2029	07/03/2024 / lwona	07/03/2024 / lwona	W3112

M5882
 M3

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 – 0120633

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 starting raw material ingredients, or used in processing, including lubricants, processing aids, or any other material that might migrate to the finished product.		

N/A			
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

Note: The data listed is valid for all package sizes of this lot of this product, expressed as an extension of this catalog number listed above.

If there are any questions with this certificate, please call at (800) 227-6701.

*Based on suggested storage condition.

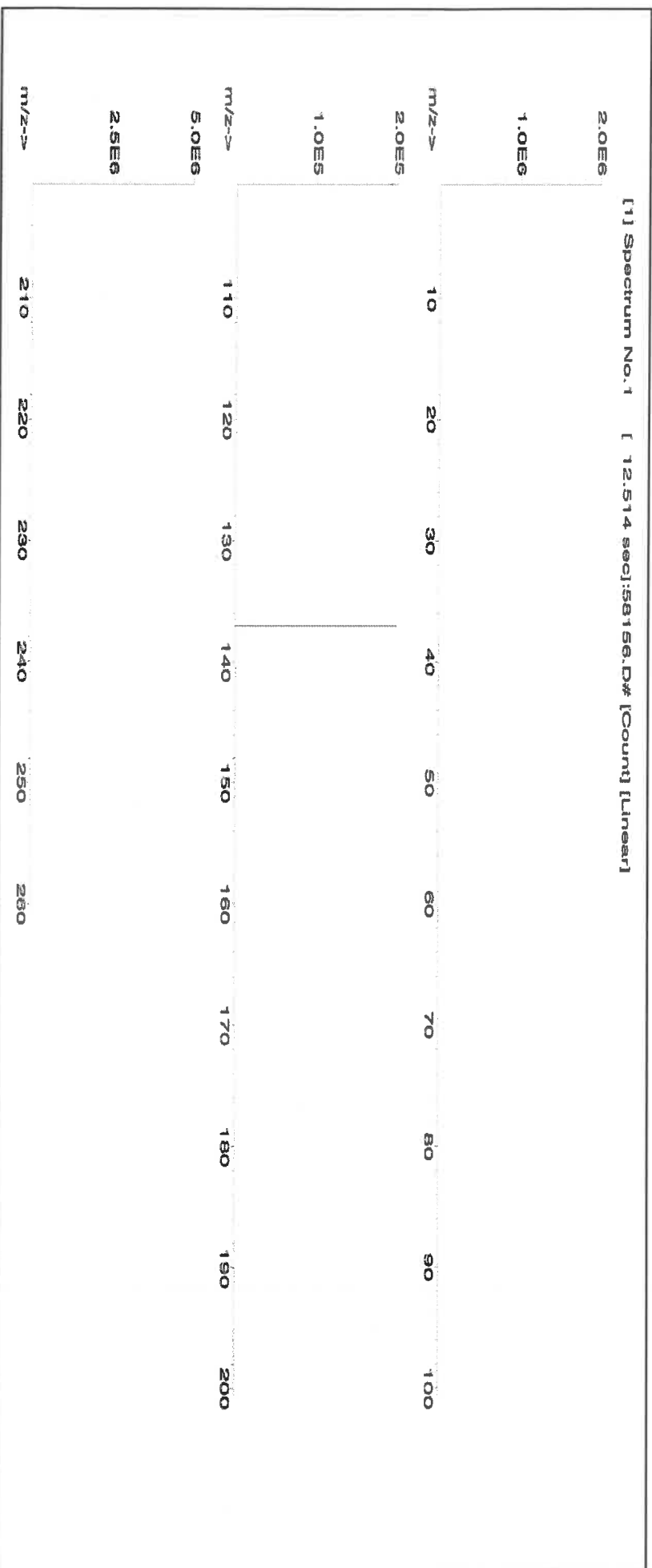
**CERTIFIED WEIGHT REPORT:**

Formulated By:	Giovanni Esposito	010924
Reviewed By:	Pedro L. Rentas	010924

SDS information

Compound	Lot	Nominal	Purity	Uncertainty	Assay	Target	Actual	Uncertainty	(Solvent Safety Info. On Attached pg.)	INST		
		Conc. (µg/mL)	(%)	Purity (%)	(%)	Weight (g)	Weight (g)	Conc. (µg/mL)			+/- (µg/mL)	
	RM#	Number	Conc. (µg/mL) <td>(%)<td>Purity (%)<td>(%)<td>Weight (g)<td>Conc. (µg/mL)<td>CAS#</td><td>OSHA PEL (TWA)</td><td>LD50</td><td>SRM</td></td></td></td></td></td>	(%) <td>Purity (%)<td>(%)<td>Weight (g)<td>Conc. (µg/mL)<td>CAS#</td><td>OSHA PEL (TWA)</td><td>LD50</td><td>SRM</td></td></td></td></td>	Purity (%) <td>(%)<td>Weight (g)<td>Conc. (µg/mL)<td>CAS#</td><td>OSHA PEL (TWA)</td><td>LD50</td><td>SRM</td></td></td></td>	(%) <td>Weight (g)<td>Conc. (µg/mL)<td>CAS#</td><td>OSHA PEL (TWA)</td><td>LD50</td><td>SRM</td></td></td>	Weight (g) <td>Conc. (µg/mL)<td>CAS#</td><td>OSHA PEL (TWA)</td><td>LD50</td><td>SRM</td></td>	Conc. (µg/mL) <td>CAS#</td> <td>OSHA PEL (TWA)</td> <td>LD50</td> <td>SRM</td>	CAS#	OSHA PEL (TWA)	LD50	SRM

1. Barium nitrate (Ba)	IN023	BA002019A1	1000	99.999	0.10	52.3	3.82417	3.82441	1000.1	2.0	10022-31-8	0.5 mg/m3	orl-rat 355 mg/kg	3104a
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Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pr	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	T	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<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.
- * 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 certified (+/-) 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 WEIGHT REPORT:

Part Number: **58120**
Lot Number: **082324**
Description: **Calcium (Ca)**

Solvent: **24002546 Nitric Acid**

Lot # **MC055 / MB086 / MB087**

Expiration Date: **082327**

Recommended Storage: **Ambient (20 °C)**

Nominal Concentration (µg/mL): **10000**

NIST Test Number: **6UTB**

5E-05 Balance Uncertainty

Weight shown below was diluted to (mL): **4000.1** 0.15 Flask Uncertainty

<i>Giovanni Esposito</i>	
Formulated By:	Giovanni Esposito
Reviewed By:	<i>Pedro L. Rentas</i>
	Pedro L. Rentas
	082324

SDS Information									
Compound	RM#	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty Purity (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)
1. Calcium carbonate (Ca)	IN014	CAD03202383	10000	99.999	0.10	39.9	100.2537	100.2656	10001.2
							20.0	471.34-1	5 mg/m3
								ort-rat >2000mg/kg	3109a

[1] Spectrum No. 1 [12.514 sec]: 58120.D* [Count] [Linear]





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

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	T	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Tm	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	30	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Sn	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Su	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<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.
- * 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 certified (+/-) 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 WEIGHT REPORT:

Part Number:
Lot Number:
Description:

57048
070124
Cadmium (Cd)

Solvent: 24002546 Nitric Acid

Lot #

R: 815/24

2% 40.0 Nitric Acid (mL)

Expiration Date: 070127

Recommended Storage: Ambient (20 °C)

Nominal Concentration (µg/mL): 1000

NIST Test Number: 6UTB

SE-05 Balance Uncertainty

Weight shown below was diluted to (mL): 2000.07 0.100 Flask Uncertainty

<i>Aleah O'Brady</i>	
Formulated By:	Aleah O'Brady
	070124
<i>Pedro L. Rentas</i>	
Reviewed By:	Pedro L. Rentas
	070124

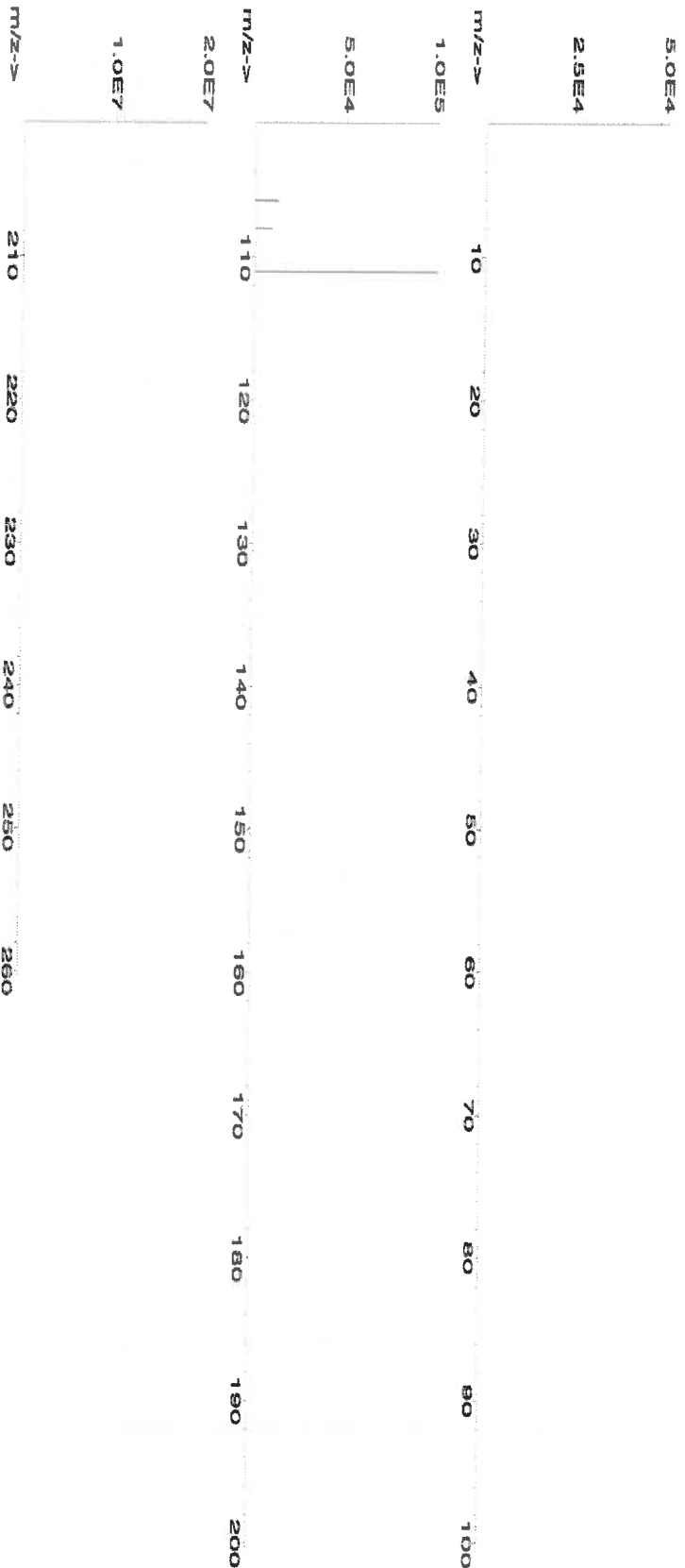
SDS Information

Compound

Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
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1. Cadmium nitrate tetrahydrate (Cd)	INO24 CDM09221A1	1000	99.999	0.10	36.5	5.4797	5.4804	1000.1	2.0	10022-68-1	0.01 mg/m3	or-rat 60.2mg/kg	3108
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[1] Spectrum No.1 [12.514 sec]:\$8148.D# [Count] [Linear]





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

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.2	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Ba	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Cd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pr	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<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.
- * 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 certified (+/-) 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).



Instructions for QATS Reference Material: **ICP-MS ICS**

**QATS LABORATORY INORGANIC REFERENCE MATERIAL
INTERFERENCE CHECK SAMPLE SET FOR ICP-MS (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

(A) SAMPLE DESCRIPTION

Enclosed is a set of one (1) or more bottles of an 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-0803" and for the ICSAB mixture use "ICSA-0803+ICSB-0803".**

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

This interference check sample set is to be used to verify elemental isobaric correction factors of inductively coupled plasma-mass spectrometers (ICP-MS). This reference material set consists of two (2) concentrated solutions. The ICSA solution contains several interferent elements and species; for a complete listing refer to the CLP SOW. The ICSB solution contains the analytes: Ag, As, Sb, Ba, Be, Cd, Co, Cr, Cu, Mn, Ni, Pb, Tl, Se, V, and Zn. This instruction sheet provides the nominal values for the ICP-MS ICS 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-0803, Interferents: Pipet 10 mL of the ICSA solution into a 100 mL volumetric flask and dilute to volume with 1% v/v HNO₃. Analyze this solution by ICP-MS.

ICSB-0803, Analytes, mixed with ICSA-0803, 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 1% v/v HNO₃. Analyze this ICSAB solution by ICP-MS.

(D) "CERTIFIED VALUE" CONCENTRATIONS OF QATS ICP-MS 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-MS ICSA-0803, AND ICSA-0803 MIXED WITH ICSB-0803							
Element	CRQL	Part A (µg/L)	Lower Limit (µg/L)	Upper Limit (µg/L)	Part A +Part B (µg/L)	Lower Limit (µg/L)	Upper Limit (µg/L)
Al	20	[100000]			[100000]		
Sb	2.0	(1.5)	-2.5	5.5	(22.0)	18.0	26.0
As	1.0	(0.10)	-1.9	2.1	19.0	16.2	21.9
Ba	10	(1.2)	-18.8	21.2	(22.0)	2.0	42.0
Be	1.0	(0.0)	-2.0	2.0	19.0	16.2	21.9
Cd	1.0	(0.70)	-1.3	2.7	20.0	17.0	23.0
Ca	500	[100000]			[100000]		
C		[200000]			[200000]		
Cl		[1000000]			[1000000]		
Cr	2.0	(21.0)	17.0	25.0	40.0	34.0	46.0
Co	1.0	(1.0)	-1.0	3.0	20.0	17.0	23.0
Cu	2.0	(8.0)	4.0	12.0	(25.0)	21.0	29.0
Fe	200	[100000]			[100000]		
Pb	1.0	(4.0)	2.0	6.0	25.0	21.3	28.8
Mg	500	[100000]			[100000]		
Mn	1.0	(7.0)	5.0	9.0	27.0	23.0	31.1
Mo		[2000]			[2000]		
Ni	1.0	(6.0)	4.0	8.0	24.0	20.4	27.6
P		[100000]			[100000]		
K	500	[100000]			[100000]		
Se	5.0	(0.30)	-9.7	10.0	(19.0)	9.0	29.0
Ag	1.0	(0.0)	-2.0	2.0	18.0	15.3	20.7
Na	500	[100000]			[100000]		
S		[100000]			[100000]		
Tl	1.0	(0.0)	-2.0	2.0	21.0	17.9	24.2
Ti		[2000]			[2000]		
V	5.0	(0.50)	-9.5	10.5	(19.0)	9.0	29.0
Zn	5.0	(11.0)	1.0	21.0	(29.0)	19.0	39.0

[] Indicates analytes that do not require ICP-MS determination in the ICS.

The acceptance ranges for all analytes in parentheses in the above table were determined using the listed certified value ± 2 times the associated CLP SOW CRQL. The acceptance ranges for all other analytes were determined using the certified value ± 15 percent of the listed certified value.

ICSA:
M5244

ICSB:
M5245



R: 815/24



CERTIFIED WEIGHT REPORT:

Part Number: **57182**
Lot Number: **110923**
Description: **Lead (Pb)**

Solvent: **24002546 Nitric Acid**

Expiration Date: **110926**
Recommended Storage: **Ambient (20 °C)**
Nominal Concentration (µg/mL): **10000**
NIST Test Number: **6UTB**

2% **40.0** **Nitric Acid**
(mL)

Weight shown below was diluted to (mL): **2000.02** **5E-05** Balance Uncertainty
0.058 Flask Uncertainty

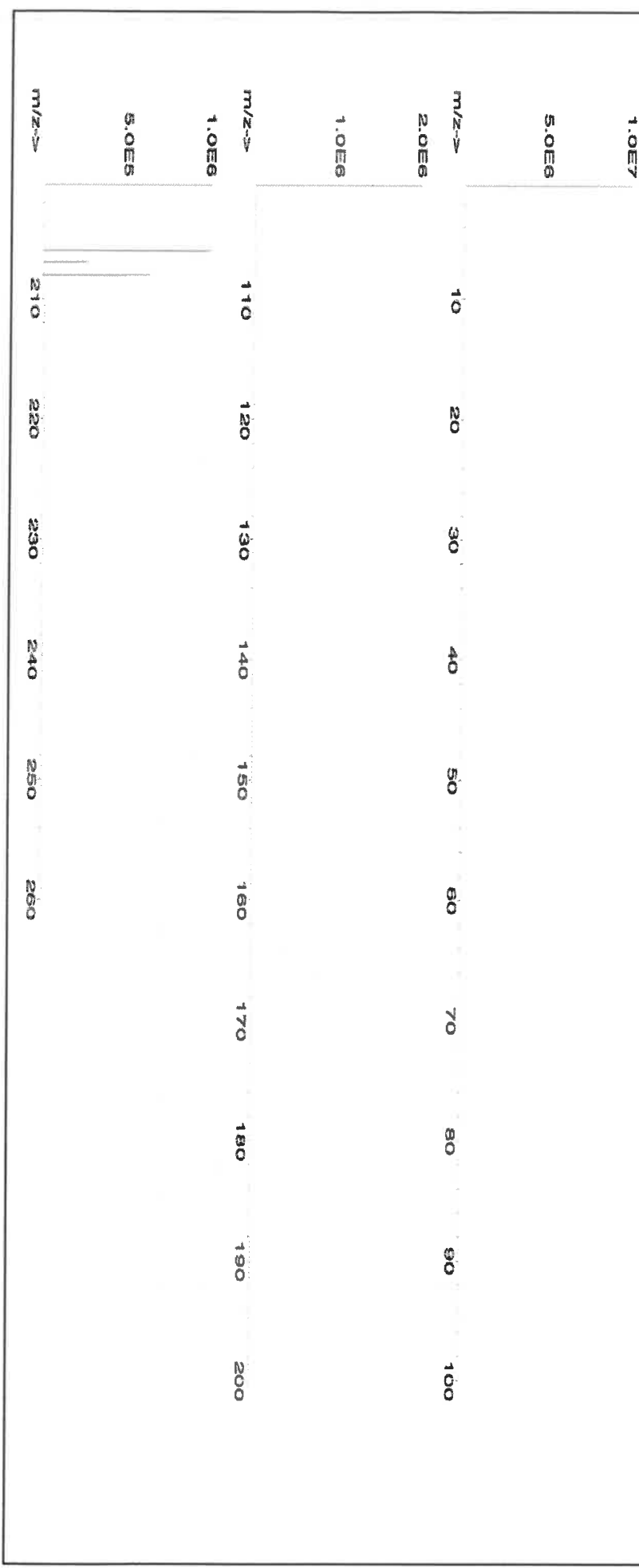
Formulated By:	Lawrence Barry
Reviewed By:	Pedro L. Rentas
110923	

Compound	RM#	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty Purity (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded		CAS#	OSHA PEL (TWA)	LD50	NIST SRM
										Uncertainty	(µg/mL)				

SDS Information

1. Lead(II) nitrate (Pb)	IN029	PED12016A1	10000	99.999	0.10	62.5	32.0006	32.0040	10001.1	20.0	10099-74-8	0.05 mg/m3	inhalation 83 mg/kg	3128
--------------------------	-------	------------	-------	--------	------	------	---------	---------	---------	------	------------	------------	---------------------	------

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





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

Trace Metals Verification by ICP-MS ($\mu\text{g/mL}$)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	T	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<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.
- * 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 certified (+/-) 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).



MC026



CERTIFIED WEIGHT REPORT:

Part Number: 57182
Lot Number: 110923
Description: Lead (Pb)
Solvent: 24002546 Nitric Acid
Lot #

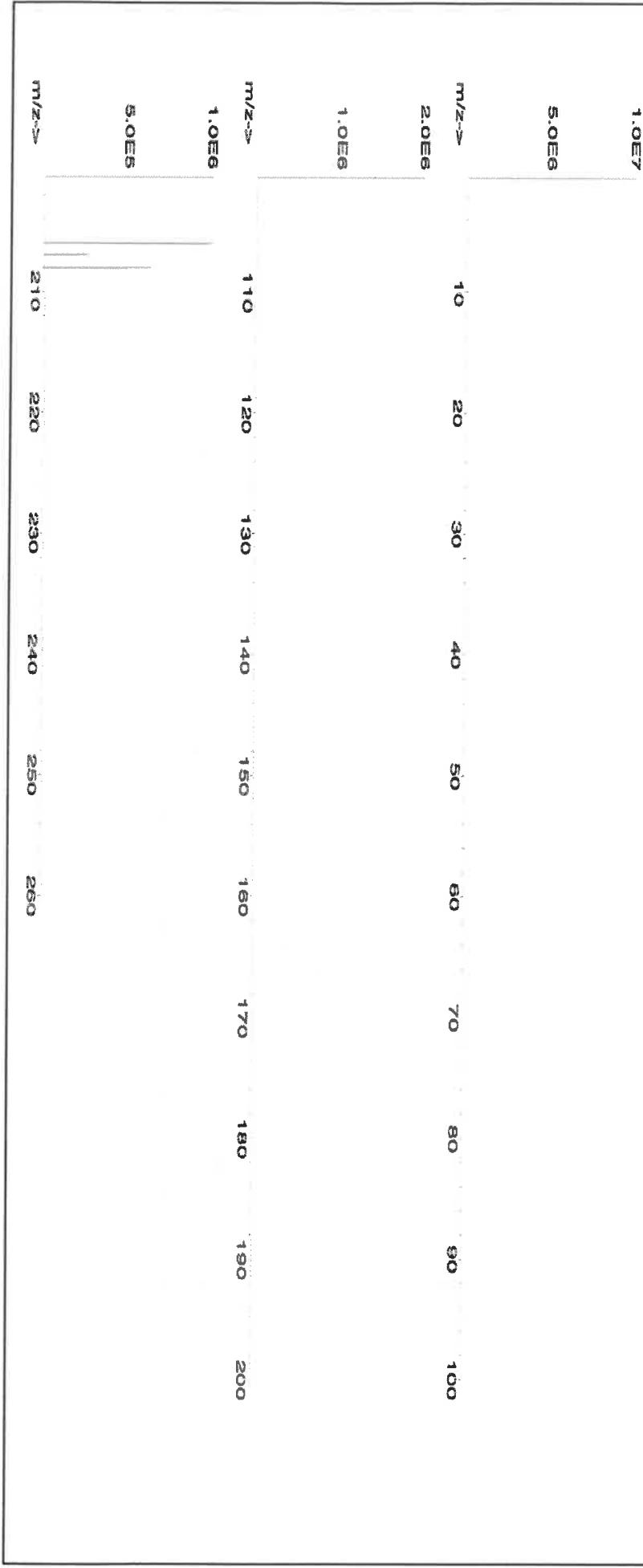
Expiration Date: 110926
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 10000
NIST Test Number: 6UTB
Weight shown below was diluted to (mL): 2000.02
5E-05 Balance Uncertainty
0.058 Flask Uncertainty

Formulated By:	Lawrence Barry
110923	
Reviewed By:	Pedro L. Rentas
110923	

Compound	SDS Information									
	RM#	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty Purity (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)

1. Lead(II) nitrate (Pb) IN029 PED12016A1 10000 99.999 0.10 62.5 32.0006 32.0040 10001.1 20.0 10099-74-8 0.05 mg/m3 Inverse rat 83 mg/kg 3128

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





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

Trace Metals Verification by ICP-MS ($\mu\text{g/mL}$)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	T	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<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 certified (+/-) 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).

M4913-16

MS

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

Note: The data listed is valid for all package sizes of this lot of this product, expressed as an extension of this catalog number listed above.
 If there are any questions with this certificate, please call at (800) 227-6701.

*Based on suggested storage condition.

300 Technology Drive
 Christiansburg, VA 24073 USA
 inorganicventures.com

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

MS062
 MS063
 MB

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) HCl
 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 ± 0.053 µg/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
Hg	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, $X_{CRM/RM}$, where two or more methods of characterization are used is the weighted mean of the results:

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

X_i = mean of Assay Method i with standard uncertainty $u_{char i}$
 w_i = the weighting factors for each method calculated using the inverse square of the variance.
 $w_i = (1/u_{char i}^2) / (\sum (1/u_{char i}^2))$

$$CRM/RM \text{ Expanded Uncertainty } (z) = U_{CRM/RM} = k (u_{char}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = 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:

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

X_a = mean of Assay Method A with

$u_{char a}$ = the standard uncertainty of characterization Method A

$$CRM/RM \text{ Expanded Uncertainty } (z) = U_{CRM/RM} = k (u_{char a}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

$u_{char a}$ = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = 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
O	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	<	0.000201		
M	Au	<	0.003631	M	Gd	<	0.000201	M	Ni	<	0.000402	M	Sn	<	0.001007		
M	B	<	0.001208	M	Ge	<	0.000201	M	Os	<	0.000605	M	Sr	<	0.000201		
M	Ba	<	0.000201	M	Hf	<	0.000201	O	P	<	0.032370	M	Ta	<	0.000201		
M	Be	<	0.000201	s	Hg	<		M	Pb	<	0.000201	M	Tb	<	0.000201		
M	Bi	<	0.000201	M	Ho	<	0.000201	M	Pd	<	0.000403	M	Te	<	0.002216		
O	Ca	0.000007	M	In	<	0.000201	M	Pr	<	0.000201	M	Th	<	0.000201			
M	Cd	<	0.000201	M	Ir	<	0.000201	M	Pt	<	0.000402	M	Ti	<	0.000402		
M	Ce	<	0.000201	O	K	0.000020	M	Rb	<	0.000201	O	Tl	<	0.016508			
M	Co	<	0.000201	M	La	<	0.000201	M	Re	<	0.000201	M	Tm	<	0.000201		
O	Cr	<	0.003021	O	Li	<	0.000107	M	Rh	<	0.000201	M	U	<	0.008058		
M	Cs	<	0.001208	M	Lu	<	0.000201	M	Ru	<	0.000201	M	V	<	0.000201		
M	Cu	<	0.000402	O	Mg	0.000001	O	S	<	0.053950	M	W	<	0.000604			
M	Dy	<	0.000201	M	Mn	<	0.000604	M	Sb	<	0.001208	M	Y	<	0.000201		
M	Er	<	0.000201	M	Mo	0.000009	M	Sc	<	0.000201	M	Yb	<	0.000201			

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° - 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 - 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



Certificate Approved By:

Michael Booth
Director, Quality Control



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director





MATERIAL CERTIFICATE OF COMPLIANCE

DATE: JUNE 12, 2023

CUSTOMER: PCI SCIENTIFIC SUPPLY, INC

PURCHASE ORDER NO. 6054931

CATALOG NO. BOI5021-450L

PRODUCT DESCRIPTION: BOILING STONES, TFE, 454GMS

QUANTITY: 10 EACH

LOT NO. W126678

SPECIFICATION (S): Made from Virgin PTFE Resin

We certify that we have complied with the terms and conditions of the above Purchase Order and the Part Specifications in the manufacturing of the above product.



Laura Valencia
Quality Assurance Inspector

F:\J:\A\CF\PCISCI\COC-55118-BOI5021-061223



MATERIAL CERTIFICATE OF COMPLIANCE

DATE: JUNE 12, 2023

CUSTOMER: PCI SCIENTIFIC SUPPLY, INC

PURCHASE ORDER NO. 6054931

CATALOG NO. BOI5021-450L

PRODUCT DESCRIPTION: BOILING STONES, TFE, 454GMS

QUANTITY: 10 EACH

LOT NO. W126678

SPECIFICATION (S): Made from Virgin PTFE Resin

We certify that we have complied with the terms and conditions of the above Purchase Order and the Part Specifications in the manufacturing of the above product.



Laura Valencia
Quality Assurance Inspector

F:\J:\A\CF\PCISCI\COC-55118-BOI5021-061223



CERTIFIED WEIGHT REPORT:

Part Number: 58024
Lot Number: 060523
Description: Chromium (Cr)

Lot #
21110221
Solvent: Nitric Acid

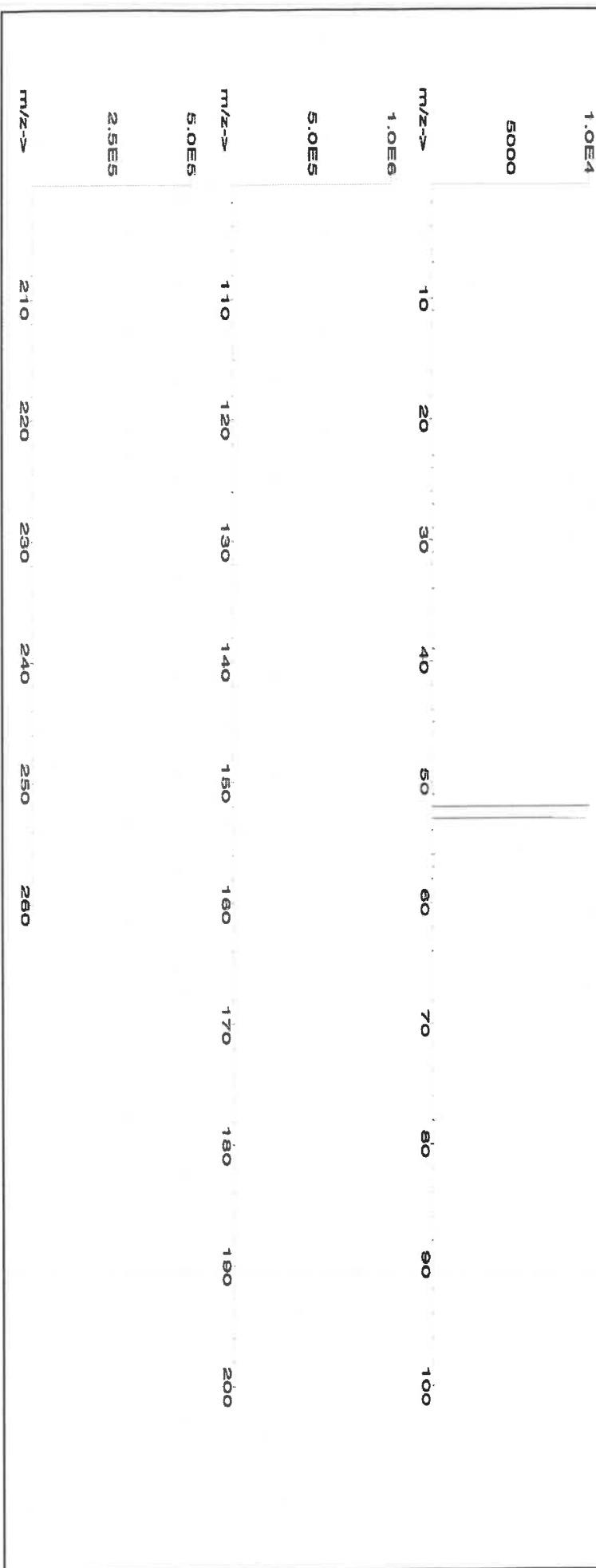
Formulated By:	Lawrence Barry
	060523
Reviewed By:	Pedro L. Ruelas
	060523

Expiration Date: 060526
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 1000
NIST Test Number: 6UTB
Volume shown below was diluted to (mL): 2000.02
5E-05 Balance Uncertainty
0.058 Flask Uncertainty

Compound	Part Number	Lot Number	Dilution Factor	Initial Vol. (mL)	Uncertainty (mL)	Nominal Conc. (µg/mL)	Initial Conc. (µg/mL)	Final Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
----------	-------------	------------	-----------------	-------------------	------------------	-----------------------	-----------------------	---------------------	----------------------------------	------	----------------	------	----------

1. Chromium(III) nitrate nonahydrate (Cr) 58124 071122 0.1000 200.0 0.084 1000 10000.1 1000.0 2.2 7789-02-8 0.5 mg(Cr)/m3 or rat 3250 mg/kg 3112a

[1] Spectrum No.1 [31.393 sec]:57024.D# [Count] [Linear]





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

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pr	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	T	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<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.
- * 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 certified (+/-) 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



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

M5697 R: 10/27/23

CERTIFIED WEIGHT REPORT:

Part Number: **58029**
Lot Number: **102523**
Description: **Copper (Cu)**

Lot # **24002546**
Solvent: **Nitric Acid**

2.0% 40.0
(mL) Nitric Acid

Expiration Date: **102526**

Recommended Storage: **Ambient (20 °C)**

Nominal Concentration (µg/mL): **1000**

NIST Test Number: **6UTB**

5E-05 Balance Uncertainty

Volume shown below was diluted to (mL): **2000.02** 0.058 Flask Uncertainty

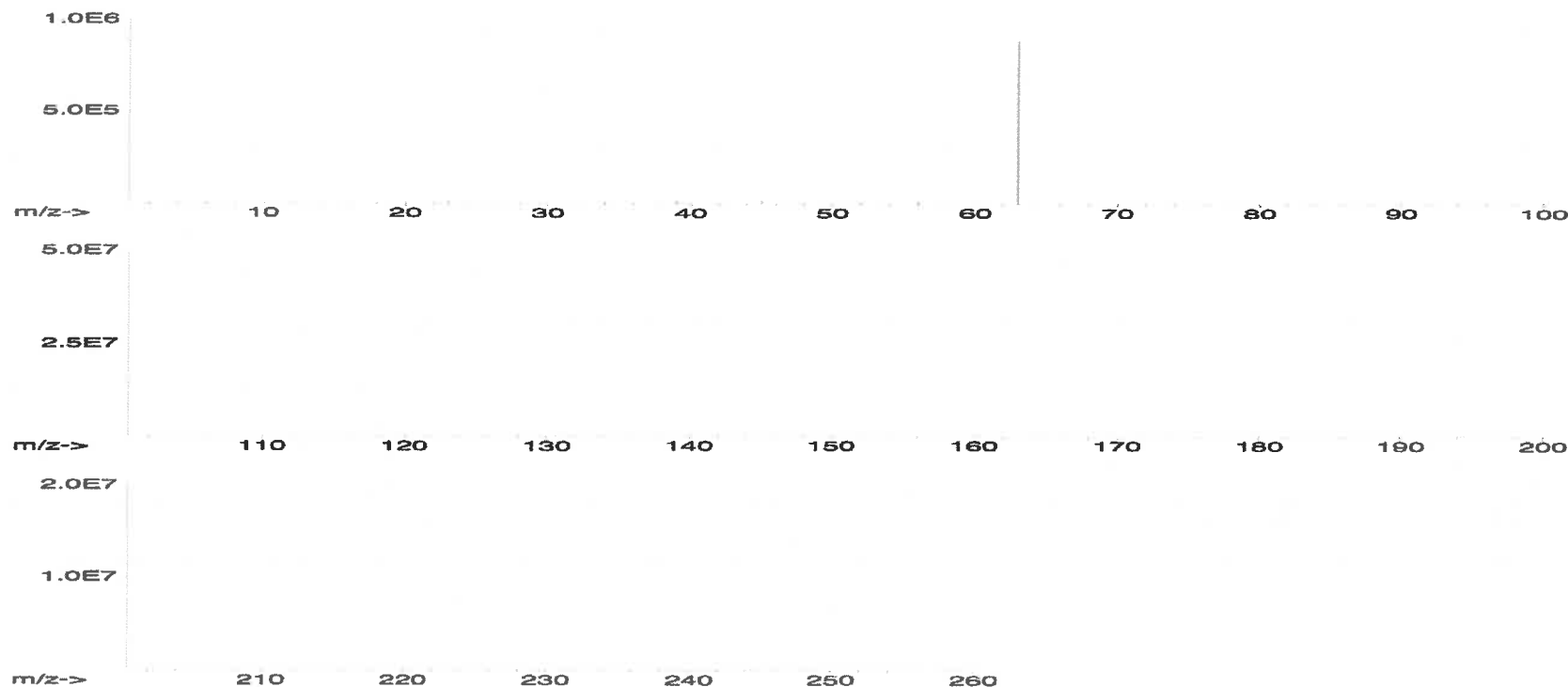
Formulated By:	Benson Chan	102523
Reviewed By:	Pedro L. Rentas	102523

Expanded

SDS Information

Compound	Part Number	Lot Number	Dilution Factor	Initial Vol. (mL)	Uncertainty Pipette (mL)	Nominal Conc. (µg/mL)	Initial Conc. (µg/mL)	Final Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	(Solvent Safety Info. On Attached pg.) CAS#	OSHA PEL (TWA)	LD50	NIST SRM
1. Copper(II) nitrate trihydrate (Cu)	58129	100223	0.1000	200.0	0.084	1000	10000.1	1000.0	2.2	10031-43-3	1 mg/m3	ori-rat 794 mg/kg	3114

[1] Spectrum No.1 [33.422 sec]:58029.D# [Count] [Linear]





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

Trace Metals Verification by ICP-MS ($\mu\text{g/mL}$)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pr	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	T	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<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.
- * 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).
- * Standards are certified (+/-) 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 WEIGHT REPORT:

Part Number: 57004
Lot Number: 102523
Description: Beryllium (Be)

Lot # 24002546
Solvent: Nitric Acid

Expiration Date:

102526

2.0%

40.0 (mL)

Nitric Acid

Recommended Storage:

Ambient (20 °C)

Nominal Concentration (µg/mL):

1000

NIST Test Number:

6UTB

Volume shown below was diluted to (mL): 2000.02

5E-05 Balance Uncertainty

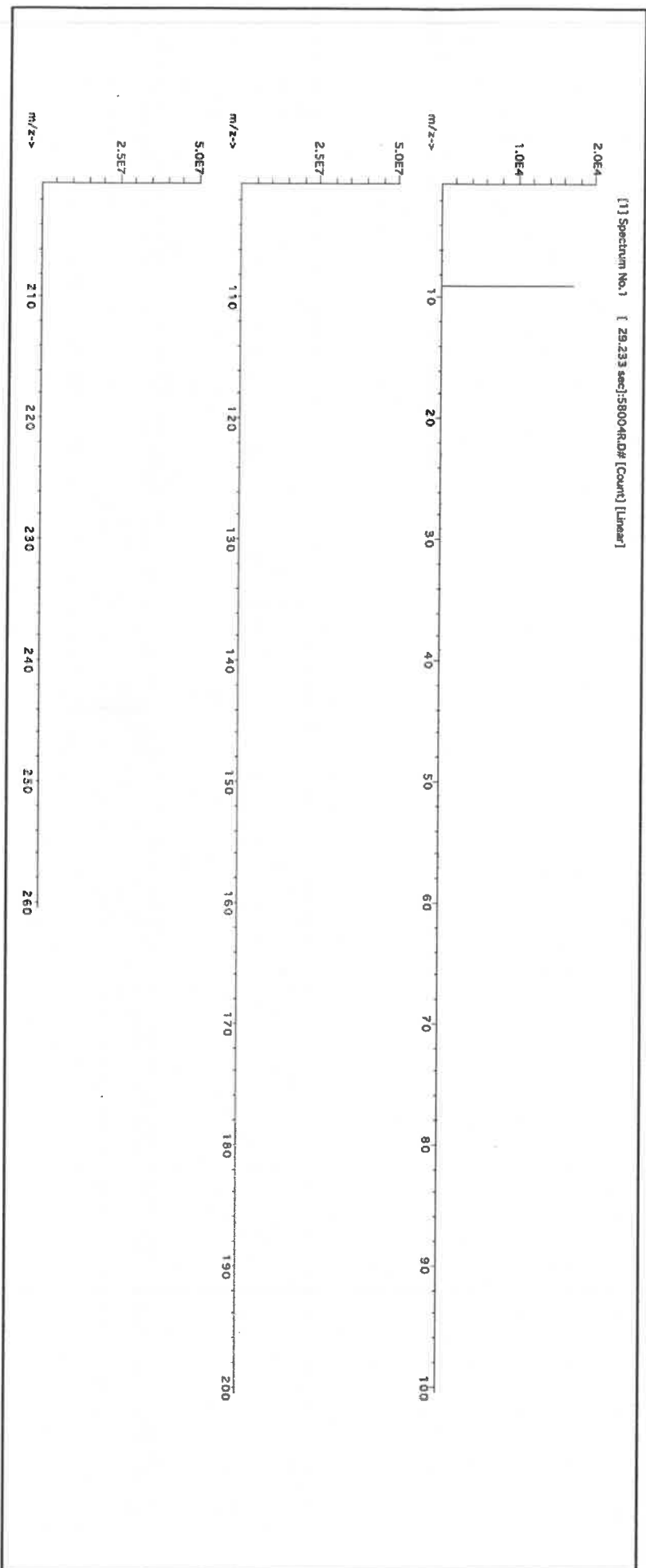
0.058 Flask Uncertainty

Formulated By:	Benson Chan	102523
Reviewed By:	Pedro L. Rentas	102523

SDS Information

Compound	Part Number	Lot Number	Dilution Factor	Initial Vol. (mL)	Uncertainty Pipette (mL)	Nominal Conc. (µg/mL)	Initial Conc. (µg/mL)	Final Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
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1. Beryllium nitrate (Be) 58104 091423 0.1000 200.0 0.084 1000 10001.5 1000.0 2.2 13597-99-4 0.2µg/m3 Inj/mg-rat 3.16mg/kg NA





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

Trace Metals Verification by ICP-MS ($\mu\text{g/mL}$)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Tc	<0.02	U	<0.02
As	<0.02	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Ti	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	T	Cr	<0.02	Ga	<0.02	Fe	<0.02	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Ta	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.02	Sc	<0.02	Ta	<0.02	Tl	<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.
 * 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 certified (+/-) 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

CERTIFIED WEIGHT REPORT:

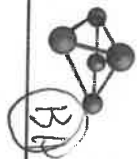
Part Number: 57050
Lot Number: 071123
Description: Tin (Sn)

Solvents: 21110221 Nitric Acid
22D0562008 Hydrochloric acid

Lot #

R-02509124

M599



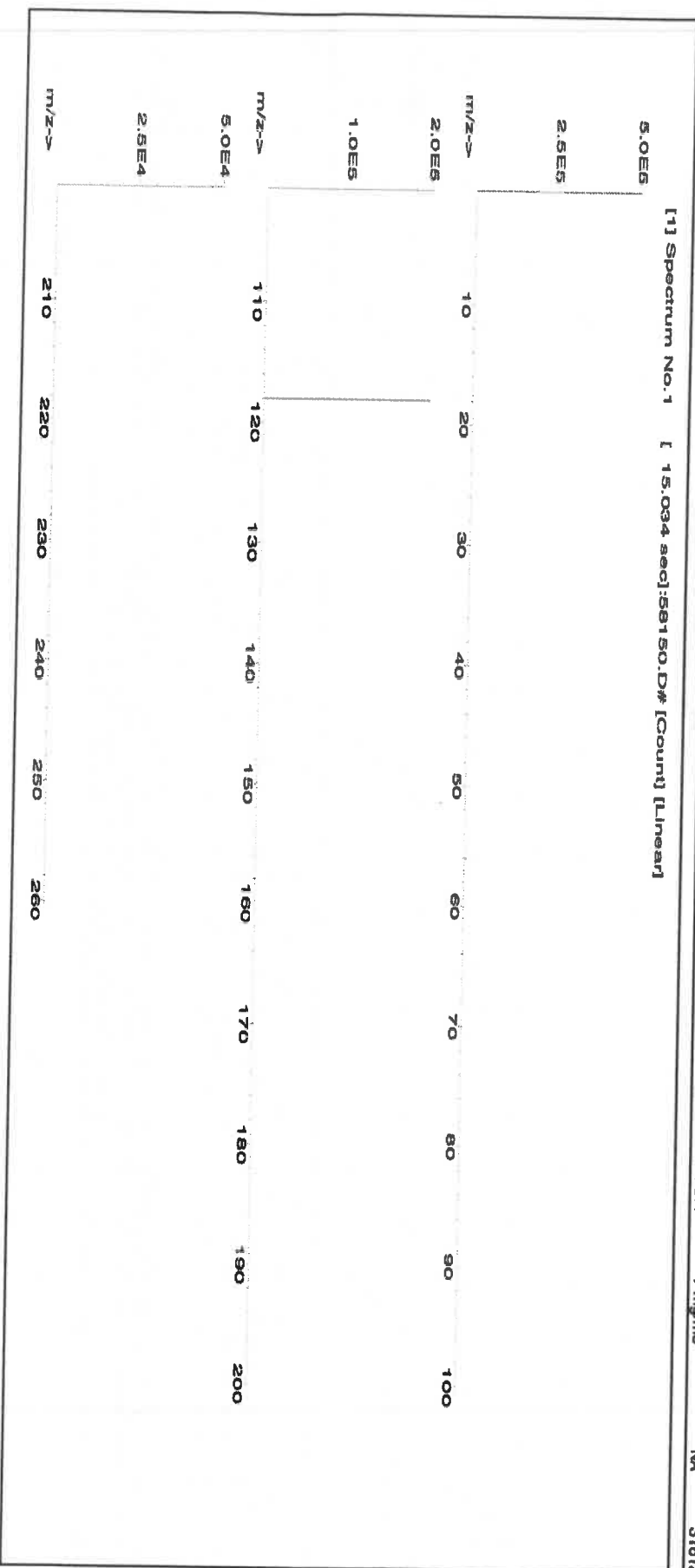
Expiration Date: 071126
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 1000
NIST Test Number: 6UTB
Weight shown below was diluted to (mL): 499.93
5E-05 Balance Uncertainty
0.058 Flask Uncertainty

Formulated By: Benson Chan		071123
Reviewed By: Pedro L. Rientas		071123

Compound	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty		CAS#	OSHA PEL (TWA)	LD50	NIST SRM
									+/- (µg/mL)	(µg/mL)				

1. Ammonium hexafluoroantimonate(V) (Sn) INO10 SMD042023A1 1000 99.999 0.10 44.2 1.13107 1.13286 1001.6 2.0 16919-24-7 7 mg/m3 NA 3161a

[1] Spectrum No. 1 [15.034 sec] :56150.D# [Count] [Linear]





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

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pr	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Ti	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<500	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Ta	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<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.
- * 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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- * 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).



R: 02/09/24 115800 (BA)

CERTIFIED WEIGHT REPORT:

Part Number: 57027
Lot Number: 091923
Description: Cobalt (Co)

Expiration Date: 091926
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 1000
NIST Test Number: 6UTB

Volume shown below was diluted to (mL): 2000.02

5E-05 Balance Uncertainty
0.058 Flask Uncertainty

Lot # 24002546
Solvent: Nitric Acid

2.0% Nitric Acid
40.0 (mL)

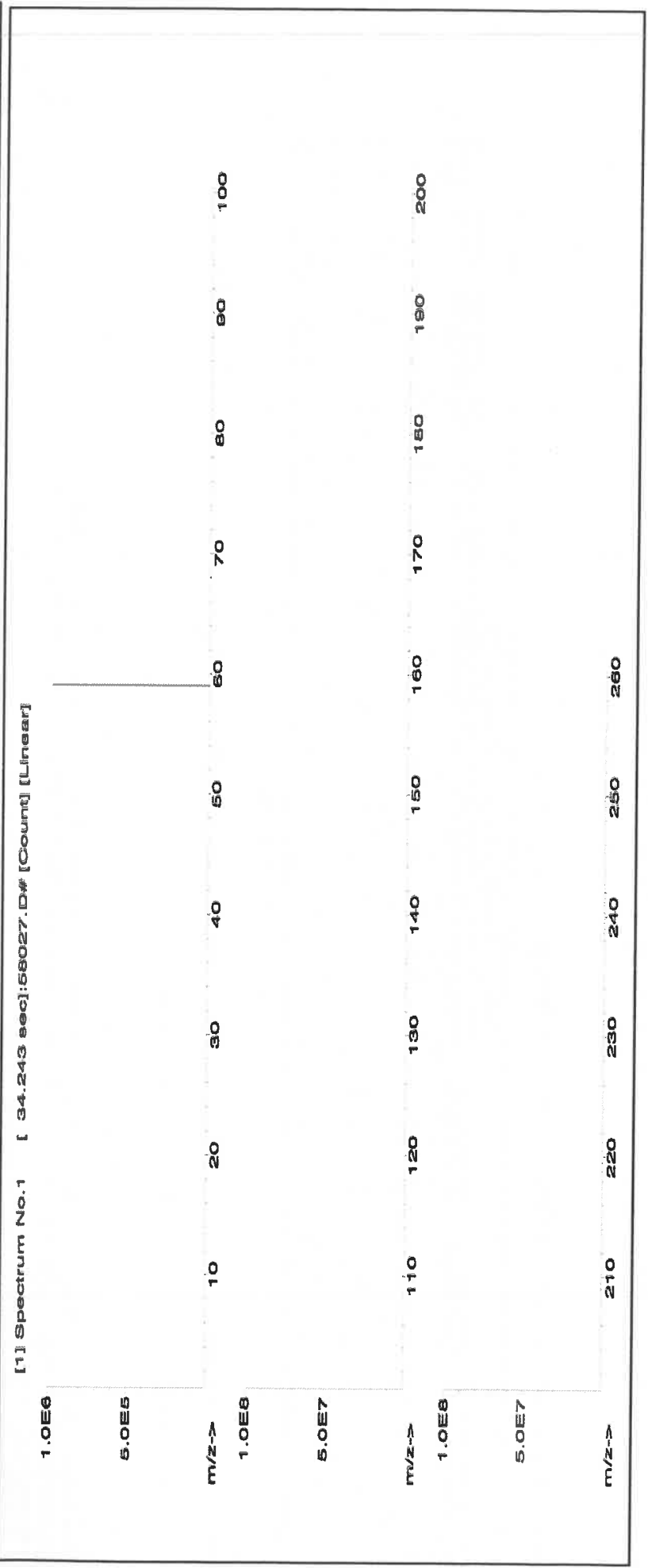
Formulated By:	Lawrence Barry
Reviewed By:	Pedro L. Rentas

SDS Information

Expanded Uncertainty +/- (µg/mL)
Final Conc. (µg/mL)
Initial Conc. (µg/mL)
Nominal Conc. (µg/mL)
Pipette (mL)
Initial Vol. (mL)
Dilution Factor
Part Number
Lot Number

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

1. Cobalt(II) nitrate hexahydrate (Co) 58127 050923 0.1000 200.0 0.084 1000 10000.0 1000.0 2.2 10026-22-9 0.02 mg/m3 orl-rat 691 mg/kg 3113





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

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pr	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.02	Os	<0.01	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.2	Na	<0.02	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	T	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.2	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T)= Target analyte

Physical Characterization:

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

Certified by:

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CERTIFIED WEIGHT REPORT:

Part Number:
Lot Number:
Description:

57033
111323
Arsenic (As)

Lot #
Solvent:

24002546
Nitric Acid

2.0%
80.0 (mL)

Nitric Acid

Expiration Date:
Recommended Storage:
Nominal Concentration (µg/mL):

111326
Ambient (20 °C)
1000

NIST Test Number:
Volume shown below was diluted to (mL):

6UTB
4000.0

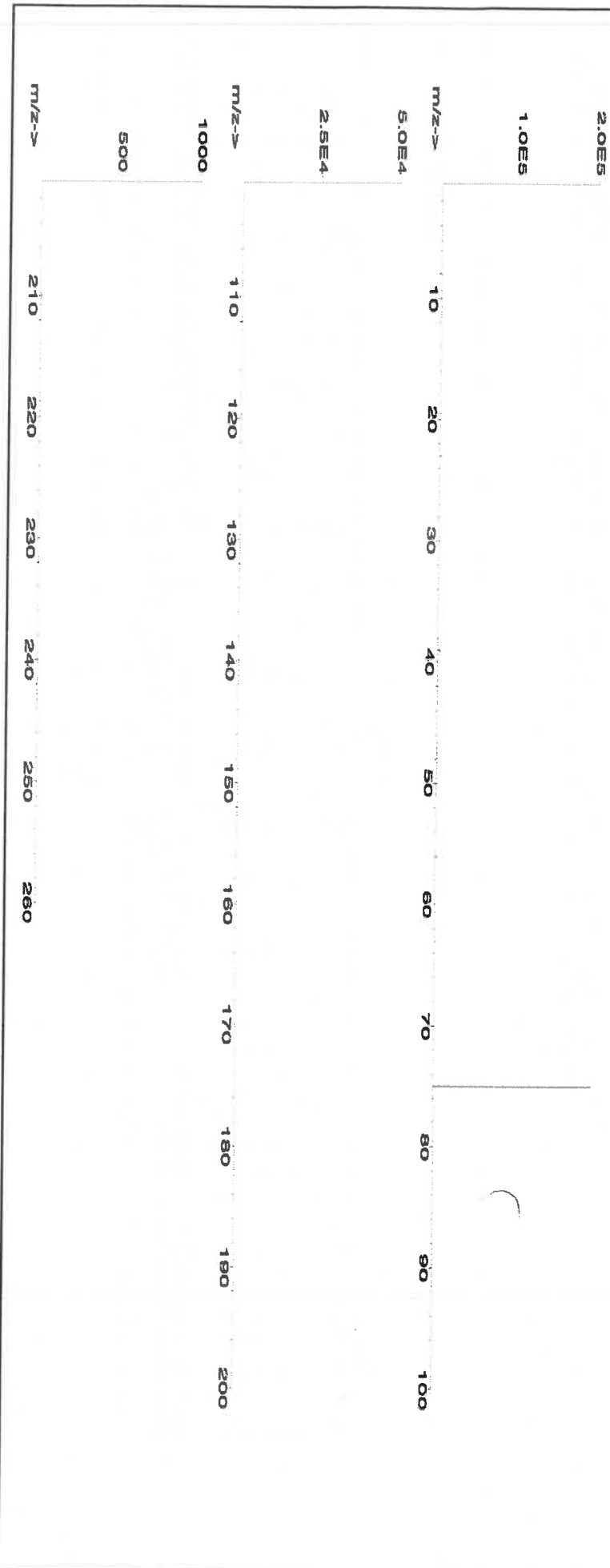
<i>[Signature]</i>	
Formulated By:	Lawrence Barry
Reviewed By:	<i>[Signature]</i>
	Pedro L. Rendas
	111323

Compound

Part Number	Lot Number	Dilution Factor	Initial Vol. (mL)	Uncertainty Pipette (mL)	Nominal Conc. (µg/mL)	Initial Conc. (µg/mL)	Final Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
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1. Arsenic (As)	58133	020522	0.1000	400.0	0.084	1000	10001.0	1000.0	2.0	7440-38-2	0.5 mg/m3	or-rat 500 mg/kg	3103a
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[1] Spectrum No.1 [34.433 sec]:57033.D# [Count] [Linear]





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

Trace Metals Verification by ICP-MS ($\mu\text{g/mL}$)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	T	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Tl _n	<0.02	Yb	<0.02
Bc	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge [*]	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<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.
- * 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 certified (+/-) 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 WEIGHT REPORT:

Part Number: 57115
Lot Number: 041723
Description: Phosphorous (P)

Solvent: 21110221 Nitric Acid

Lot #

R102109124 M5815

Expiration Date: 041726
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 10000
NIST Test Number: 6UTB

2% 40.0 (mL) Nitric Acid

Weight shown below was diluted to (mL): 2000.02 0.058 Balance Uncertainty Flask Uncertainty

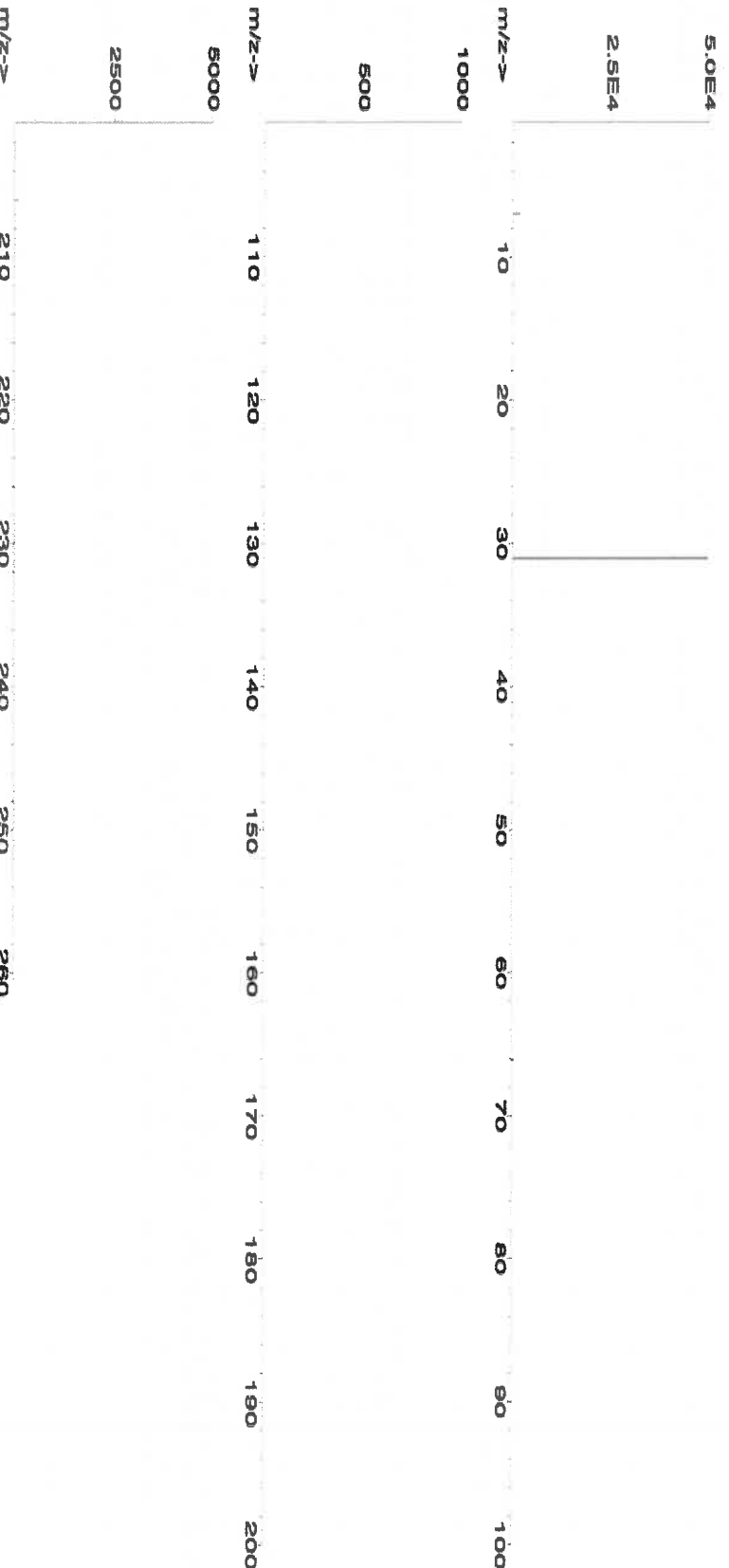
Formulated By: Lawrence Barry	041723
Reviewed By: Pedro L. Rentas	041723

SDS Information

Compound	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
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1. Ammonium dihydrogen phosphate (P) IN008 PVR2019A1 10000 99.999 0.10 27.5 72.7287 72.7289 10000.0 20.0 7722-76-1 5 mg/m3 or-hal >2000mg/kg 3186

[1] Spectrum No.1 [12.074 sec]:58115.D# [Count] [Linear]





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

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	T	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<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.
- * 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 certified (+/-) 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 WEIGHT REPORT:

Part Number: **57116**
Lot Number: **071123**
Description: **Sulfur (S)**

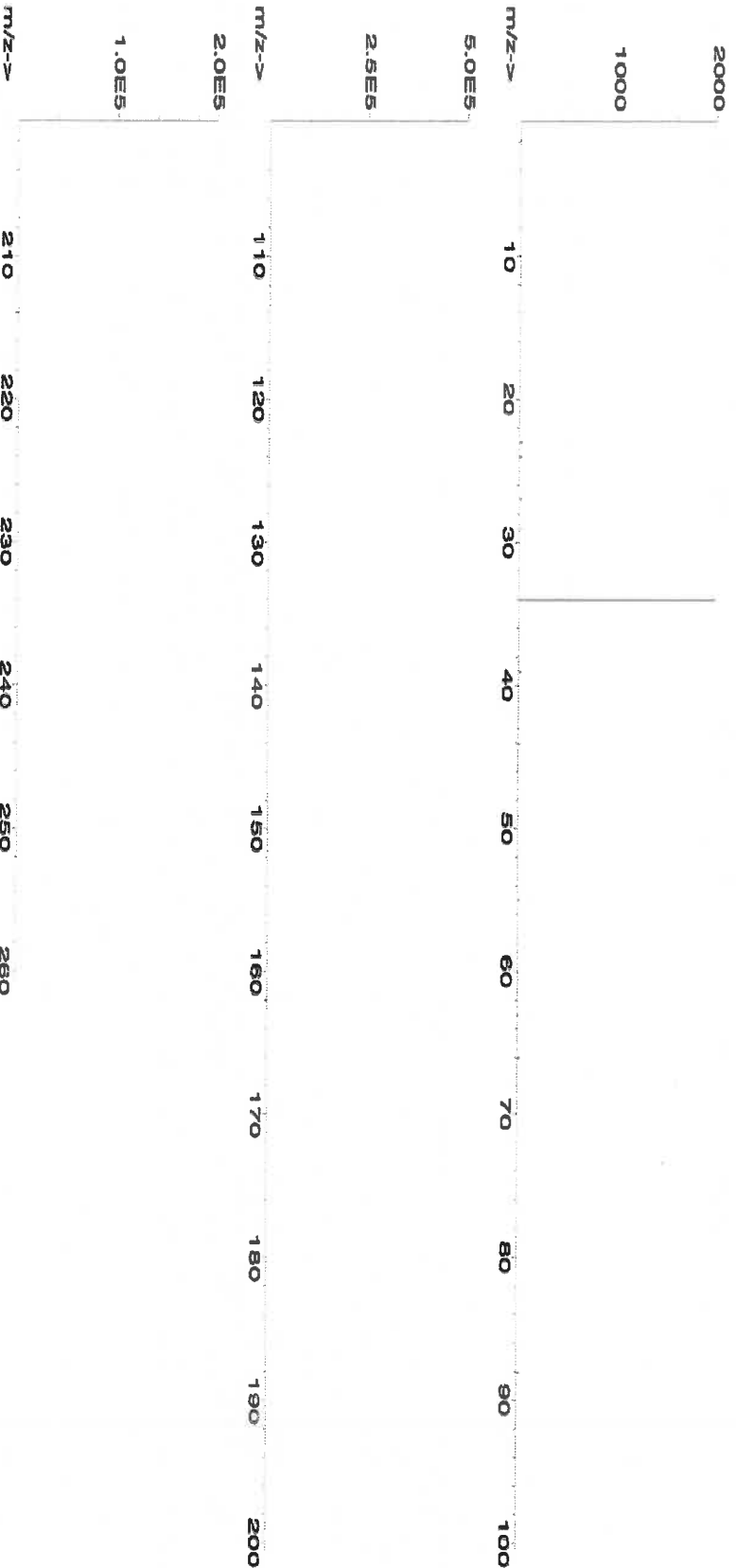
Lot #
Solvent: 071123
ASTM Type 1 Water

Formulated By:	Lawrence Barry
Reviewed By:	
Pedro L. Rentas	
071123	

Expiration Date: 071126
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 10000
NIST Test Number: 6UTB
Weight shown below was diluted to (mL): 1999.48
5E-05 Balance Uncertainty
0.058 Flask Uncertainty

SDS Information									
Compound	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty Purity (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)
Ammonium sulfate (S)	IN117 SLBR725V	10000	99.9	0.10	24.3	82.4675	82.4692	10000.1	20.0
						7763-20-2	NA	oral 4250mg/kg	3181

[1] Spectrum No. 1 [24.004 sec]:58116.D# [Count] [Linear]





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

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Ti	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	T	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

Physical Characterization:

(T)= Target analyte

Certified by:

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



MS824
MB

Material No.: 3624-01

Batch No.: 0000281938

Manufactured Date: 2021-06-07

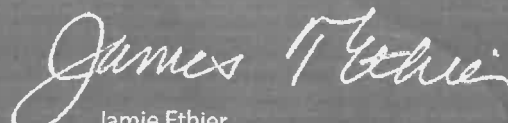
Retest Date: 2026-06-07

Revision No.: 1

Certificate of Analysis

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


Jamie Ethier
Vice President Global Quality

For questions on this Certificate of Analysis please contact Technical Services at 855.282.6867 or +1.610.386.1700

Avantor Performance Materials, LLC

100 Mansford Rd, Suite 200, Radnor, PA 19087. U.S.A. Phone 610.386.1700



Certified Reference Material CRM
M5962 **R10614124**



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

CERTIFIED WEIGHT REPORT:

Part Number: 57034
Lot Number: 060624
Description: Selenium (Se)

Lot # 24002546
Solvent: Nitric Acid

2.0% 40.0 (mL) Nitric Acid

Expiration Date: 060627

Recommended Storage: Ambient (20 °C)

Nominal Concentration (µg/mL): 1000

NIST Test Number: 6UTB

Volume shown below was diluted to (mL): 2000.07

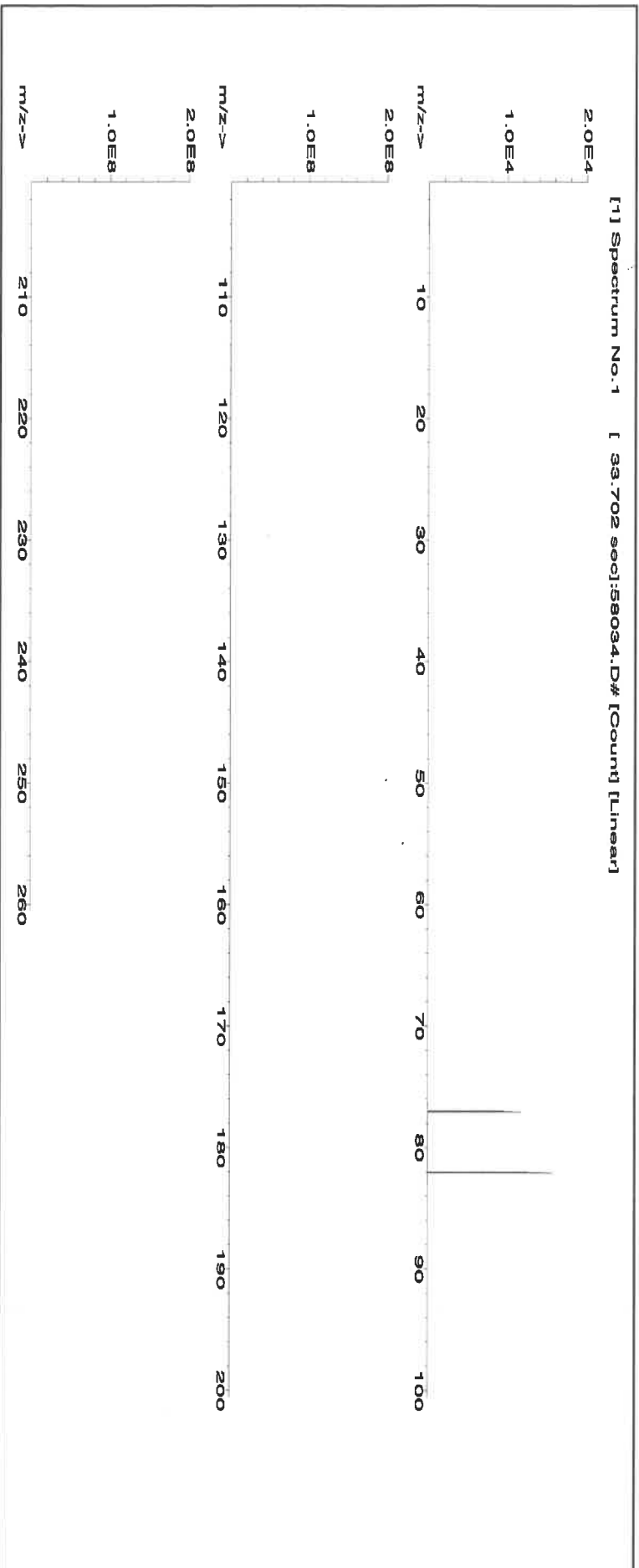
SE-05 Balance Uncertainty
0.100 Flask Uncertainty

Formulated By:	Benson Chan
	060624
Reviewed By:	Pedro L. Rantas
	060624

SDS Information

Compound	Part Number	Lot Number	Dilution Factor	Initial Vol. (mL)	Pipette (mL)	Nominal Conc. (µg/mL)	Initial Conc. (µg/mL)	Final Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	(Solvent Safety Info. On Attached pg.)	CAS#	OSHA PEL (TWA)	LDSO	NIST SRM
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1. Selenium (Se)	58134	071223	0.1000	200.0	0.084	1000	10002.5	1000.0	2.2	7782-49-2	0.2 mg/m3	or-tral 6700 mg/kg	3149
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Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.02	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Ru	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Sr	<0.02	S	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	Ta	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02			Ti	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

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Certified by:

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Certificate of Analysis

MS978, MS979



Refine your results. Redefine your industry.

300 Technology Drive
Christiansburg, VA 24073 USA
inorganicventures.com

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



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).

1.0 ACCREDITATION / REGISTRATION

2.0 PRODUCT DESCRIPTION

Product Code: Single Analyte Custom Grade Solution

Catalog Number: CGT1

Lot Number: T2-T1719972

Matrix: 2% (v/v) HNO₃

Value / Analyte(s): tr. HF

Starting Material: 1 000 µg/mL ea.

Starting Material: Titanium

Starting Material Lot#: T1 Metal

Starting Material Purity: 2094

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Value: 1002 ± 5 µg/mL

Density: 1.012 g/mL (measured at 20 ± 4 °C)

Assay Method #1

1002 ± 4 µg/mL

ICP Assay NIST SRM 3162a Lot Number: 130925

- 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, $X_{CRM/RM}$, where two or more methods of characterization are used is the weighted mean of the results:

$X_{CRM/RM} = \sum (X_i / U_i^2)$ where X_i = mean of Assay Method A with

U_i = the standard uncertainty of characterization Method A

$U_{CRM/RM} = (k)^2 (U_{CRM/RM})$

k = coverage factor = 2

$U_{CRM/RM} = [(U_{CRM/RM})^2 + (U_{CRM/RM})^2 + \dots + (U_{CRM/RM})^2]^{1/2}$ where $U_{CRM/RM}$ = the error from each characterization method

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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 UHPA-filtered Clean Room. An UHPA-filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

M Ag	<	0.000536	M Eu	<	0.000268	O Na	<	0.032670	M Se	<	0.001204	O Zn	<	0.003267
M Al	<	0.000872	O Fe	<	0.003225	O Nb	<	0.043560	O Si	<	0.004735	O Zr	<	0.043560
M As	<	0.008586	M Ga	<	0.000268	M Nd	<	0.000268	M Sm	<	0.000268			
M Au	<	0.004577	M Gd	<	0.000268	O Ni	<	0.010890	M Sn	<	0.000986			
O B	<	0.008929	M Ge	<	0.002146	M Os	<	0.000269	O Sr	<	0.000986			
M Ba	<	0.002683	M Hf	<	0.002161	O P	<	0.054450	M Ta	<	0.010560			
M Be	<	0.005366	M Hg	<	0.003231	M Pb	<	0.001073	M Tb	<	0.000268			
M Bi	<	0.001609	M Ho	<	0.000268	M Pd	<	0.000268	M Th	<	0.001341			
O Ca	<	0.000676	M In	<	0.002683	M Pr	<	0.000268	M Tl	<	0.053663			
M Cd	<	0.000268	M Ir	<	0.000269	M Pt	<	0.000536	S Tl	<				
M Co	<	0.000268	M K	<	0.001172	M Rb	<	0.000268	M Ti	<	0.000268			
M Cr	<	0.000752	O Li	<	0.000268	M Re	<	0.000268	M Tm	<	0.000268			
M Cs	<	0.000268	M Lu	<	0.000268	M Rh	<	0.000268	M U	<	0.000268			
O Cu	<	0.010890	O Mg	<	0.005445	I S	<	0.006976	M Y	<	0.002146			
M Dy	<	0.000268	O Mn	<	0.003267	M Sb	<	0.004900	M Yb	<	0.000536			
M Er	<	0.000268	M Mo	<	0.000774	O Sc	<							

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° - 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 - 47.87 ± 4.6 Ti(F)₆-2 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 hydrated oxide in all dilute acids except HF.

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 single element solutions as the Ti(F)₆-2 chemically stable for years in 2-5% HNO₃ / trace HF in an LDPE container.

TI Containing Samples (Preparation and Solution) - Metal (Soluble in H₂O / HF caution - powder reacts violently). Oxide - low temperature history anatase or rutile (Dissolved by heating in 1:1:1 H₂O / HF / H₂SO₄); K₂SiO₇ - no KF if silica not present); Organic Matrices (Dry ash at 450EC in P10 and dissolve by heating with 1:1:1 H₂O / HF / H₂SO₄ or fuse ash with pyrosulfate if oxide is as plastic pigment and likely in brookite crystaline form).

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

Technique/Line	Estimated D.L.	14 ppt
ICP-MS 48 amu	N/A	
ICP-OES 323.452 nm	0.0054 / 0.00092 µg/mL	
ICP-OES 334.941 nm	0.0038 / 0.00028 µg/mL	
ICP-OES 336.121 nm	0.0053 / 0.00034 µg/mL	
HF Note: This standard should not be prepared or stored in glass.		
		W, Mo, Co
		Nb, Ta, Cr, U
		Ce, Ar, Ni
		Ru
		(where X = Zr, Mo,
		14N17N2, 36Ar12C,
		48Ca, 196X=2
		14N16O18O,
		32S16O, 32S14N,
		N/A
		Order Interferences (underlined indicates severe)

8.0 HAZARDOUS INFORMATION

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

9.0 HOMOGENEITY

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

- 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: 800.868.6786; 540.565.3030; Fax: 540.565.3030; Email: info@inorganicventures.com; <http://www.inorganicventures.com>

11.0

CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

June 17, 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

- June 17, 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

- 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 Approved By:

Thomas Kozlikowski
Manager, Quality Control

Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director

Paul Gaines

80978



MS981

R:6/11/24



CERTIFIED WEIGHT REPORT:

Part Number:
Lot Number:
Description:

57092
060724
Uranium (U)

Expiration Date:
Recommended Storage:
Nominal Concentration (µg/mL):
NIST Test Number:

060727
Ambient (20 °C)
1000
6UTB

Volume shown below was diluted to (mL): 2000.07

5E-05 Balance Uncertainty
0.100 Flask Uncertainty

Lot #

24002546

Solvent:

Nitric Acid
2.0% Nitric Acid
40.0 (mL)

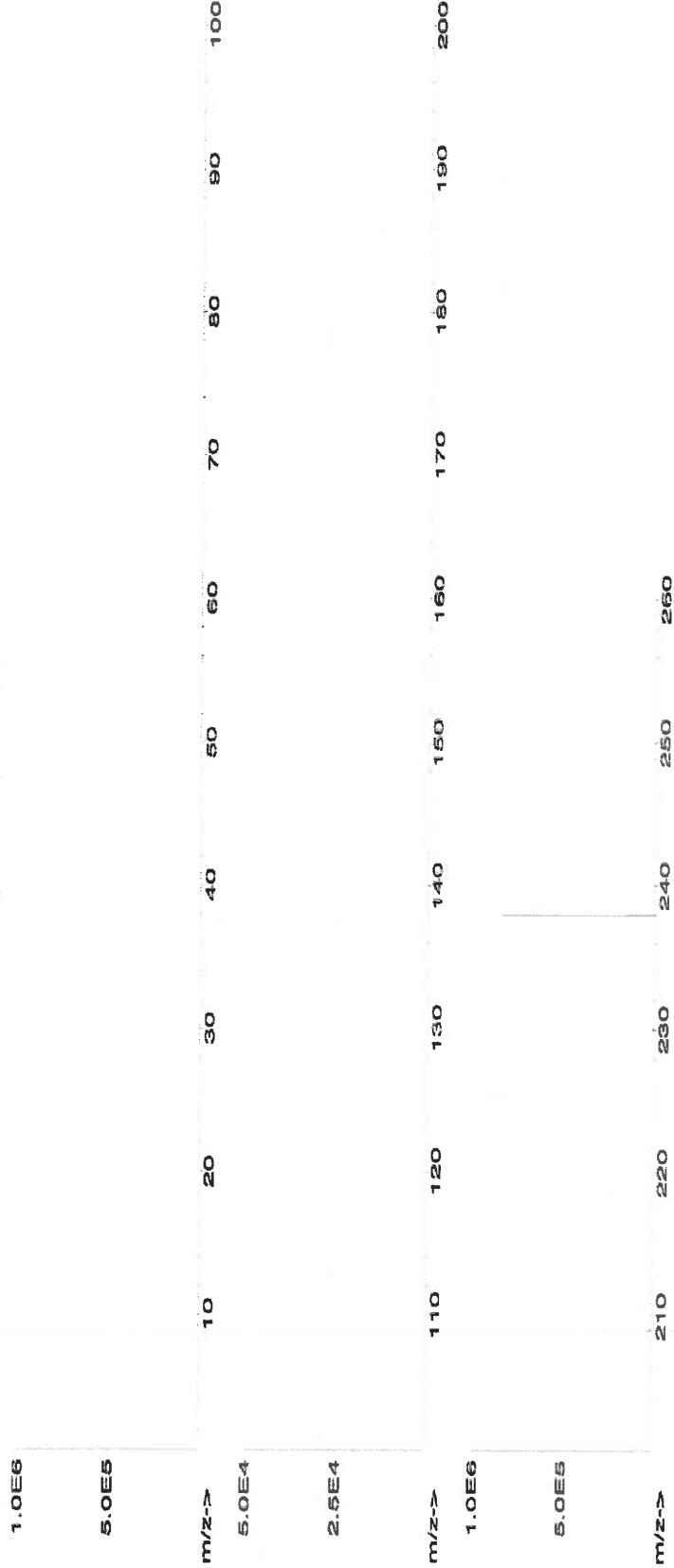
<i>Giovanni Esposito</i>	
Formulated By:	Giovanni Esposito
<i>Pedro L. Rentas</i>	
Reviewed By:	Pedro L. Rentas

SDS Information

Compound	Part Number	Lot Number	Dilution Factor	Initial Vol. (mL)	Uncertainty Pipette (mL)	Nominal Conc. (µg/mL)	Initial Conc. (µg/mL)	Final Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	(Solvent Safety Info. On Attached pg.)	CAS#	LD50	NIST SRM
----------	-------------	------------	-----------------	-------------------	--------------------------	-----------------------	-----------------------	---------------------	----------------------------------	--	------	------	----------

1. Uranyl nitrate hexahydrate (U) 58192 041524 0.1000 200.0 0.084 1000 10001.5 1000.0 2.2 13620-83-7 0.05 mg/m3 orl-rat 1040 mg/kg 3164

[1] Spectrum No.1 [23.264 sec]:57092.D# [Count] [Linear]





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

Trace Metals Verification by ICP-MS ($\mu\text{g/mL}$)																			
Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.02	Os	<0.01	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.02	Hg	<0.2	P	<0.2	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.02	Sc	<0.2	Ta	<0.02	Ti	<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.
- * 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 certified (+/-) 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).

7236 673 3.67

18/19/24, M6055

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: IV-STOCK-12
Lot Number: U2-MEB734294
Matrix: 5% (v/v) HNO₃
Value / Analyte(s): 10 µg/mL ea:
Barium, Beryllium,
Bismuth, Cerium,
Cobalt, Indium,
Lithium, Nickel,
Lead, Uranium

3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE	CERTIFIED VALUE	ANALYTE	CERTIFIED VALUE
Barium, Ba	10.01 ± 0.04 µg/mL	Beryllium, Be	10.01 ± 0.05 µg/mL
Bismuth, Bi	10.01 ± 0.06 µg/mL	Cerium, Ce	10.01 ± 0.04 µg/mL
Cobalt, Co	10.01 ± 0.05 µg/mL	Indium, In	10.01 ± 0.04 µg/mL
Lead, Pb	10.00 ± 0.04 µg/mL	Lithium, Li	10.01 ± 0.04 µg/mL
Nickel, Ni	10.01 ± 0.04 µg/mL	Uranium, U	10.01 ± 0.05 µg/mL

Density: 1.025 g/mL (measured at 20 ± 4 °C)

Assay Information:

ANALYTE	METHOD	NIST SRM#	SRM LOT#
Ba	ICP Assay	3104a	140909
Ba	Calculated		See Sec. 4.2
Ba	Gravimetric		See Sec. 4.2
Be	ICP Assay	3105a	090514
Be	Calculated		See Sec. 4.2
Bi	ICP Assay	3106	180815
Ce	ICP Assay	3110	160830
Ce	EDTA	928	928
Ce	Calculated		See Sec. 4.2
Co	ICP Assay	3113	190630
Co	EDTA	928	928
Co	Calculated		See Sec. 4.2
In	ICP Assay	3124a	110516
In	EDTA	928	928
In	Calculated		See Sec. 4.2
Li	ICP Assay	3129a	100714
Li	Calculated		See Sec. 4.2
Li	Gravimetric		See Sec. 4.2
Ni	ICP Assay	3136	120619
Ni	EDTA	928	928
Ni	Calculated		See Sec. 4.2
Pb	ICP Assay	3128	101026
Pb	EDTA	928	928
Pb	Calculated		See Sec. 4.2
U	ICP Assay	traceable to 3164	R2-U689597
U	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, $X_{CRM/RM}$, where two or more methods of characterization are used is the weighted mean of the results:

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

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

w_i = the weighting factors for each method calculated using the inverse square of the variance:

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{ts} = long term stability standard uncertainty (storage)

u_{ts} = 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:

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

X_a = mean of Assay Method A with

$u_{char a}$ = the standard uncertainty of characterization Method A

$$CRM/RM \text{ Expanded Uncertainty } (\pm) = U_{CRM/RM} = k (u_{char a}^2 + u_{bb}^2 + u_{ts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

$u_{char a}$ = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{ts} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

Certified Abundance:

IV's Certified Abundance

Isotope	Atom %
Uranium 238U	99.8 ± 0.1
Uranium 235U	0.19 ± 0.05

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, <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

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

June 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

- June 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

- 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 Approved By:

Thomas Kozikowski
Manager, Quality Control



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director





Certified Reference Material CRM



CERTIFIED WEIGHT REPORT:

Part Number: **57040**
Lot Number: **071423**
Description: **Zirconium (Zr)**

Lot # **21110221**
Solvent: **Nitric Acid**

2.0% 40.0 (mL) Nitric Acid

Expiration Date: 071426
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 1000
NIST Test Number: 6UTB

Volume shown below was diluted to (mL): 2000.02 5E-05 Balance Uncertainty 0.058 Flask Uncertainty

Formulated By:	Benson Chan	071423
Reviewed By:	Pedro L. Renteria	071423

Compound	Part Number	Lot Number	Dilution Factor	Initial Vol. (mL)	Uncertainty Pipette (mL)	Nominal Conc. (µg/mL)	Initial Conc. (µg/mL)	Final Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	SDS Information		
										(Solvent Safety Info. On Attached pg.)	LDSO	NIST SRM

1. Zirconyl chloride octahydrate (Zr) 58140 070621 0.1000 200.0 0.084 1000 10000.3 1000.0 2.2 13520-82-8 NA NA NA

[1] Spectrum No. 1 [41.163 sec]: 57040.DW [Count] [Linear]

1.OE6	m/z->	10	20	30	40	50	60	70	80	90	100
5.OE6	m/z->	110	120	130	140	150	160	170	180	190	200
1.OE8	m/z->	210	220	230	240	250	260				
5.OE7	m/z->										



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

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pr	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Tc	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<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.
- * 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 certified (+/-) 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 WEIGHT REPORT:

Part Number:
Lot Number:
Description:

58025
101124
Manganese (Mn)

R-71113128

Lot #
Solvent: 24002546 Nitric Acid

Expiration Date:

101127

2% 80.0 (mL) Nitric Acid

Recommended Storage:

Ambient (20 °C)

Nominal Concentration (µg/mL):

1000

NIST Test Number:

6UTB

SE-05 Balance Uncertainty

Weight shown below was diluted to (mL):

4000.2

0.10 Flask Uncertainty

<i>Giovanni Esposito</i>	
Formulated By:	Giovanni Esposito
Reviewed By:	<i>Pedro L. Renteria</i>
	101124

Compound

RM#	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty Purity (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
-----	------------	-----------------------	------------	------------------------	-----------	-------------------	-------------------	----------------------	----------------------------------	------	----------------	------	----------

1. Manganese(II) nitrate hydrate (Mn) IN031 MNM02020A1 1000 99.999 0.10 20.8 19.2322 19.2344 1000.1 2.0 15710-66-4 5 mg/m3 or-rel >300mg/kg 3132

[1] Spectrum No.1 [34.243 sec]:57025.D# [Count] [Linear]

5.0E6													
2.5E6													
m/z->	10	20	30	40	50	60	70	80	90	100			
1.0E6													
5.0E7													
m/z->	110	120	130	140	150	160	170	180	190	200			
1.0E6													
5.0E7													
m/z->	210	220	230	240	250	260							



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

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pr	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	T	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<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.
- * 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 certified (+/-) 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

M6137
R-71013124

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, $X_{CRM/RM}$, where two or more methods of characterization are used is the weighted mean of the results:

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

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

w_i = the weighting factors for each method calculated using the inverse square of the variance:

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

$$CRM/RM \text{ Expanded Uncertainty } (z) = U_{CRM/RM} = k (u_{char}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = 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:

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

X_a = mean of Assay Method A with

$u_{char a}$ = the standard uncertainty of characterization Method A

$$CRM/RM \text{ Expanded Uncertainty } (z) = U_{CRM/RM} = k (u_{char a}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

$u_{char a}$ = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = 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.

M Ag <	0.000310	M Eu <	0.000310	O Na	0.001656	M Se <	0.022000	M Zn <	0.002500
M Al	0.010787	M Fe <	0.027000	M Nb <	0.001300	s Si <		O Zr <	0.001900
M As <	0.001900	M Ga <	0.001300	M Nd <	0.000310	M Sm <	0.000310		
M Au <	0.000910	M Gd <	0.000310	M Ni <	0.005500	M Sn	0.000096		
M B	0.016180	M Ge <	0.001900	M Os <	0.000610	O Sr	0.000092		
M Ba	0.000096	M Hf	0.000423	i P <		M Ta	0.002542		
O Be <	0.000570	M Hg <	0.000610	M Pb <	0.000310	M Tb <	0.000310		
M Bi <	0.000310	M Ho <	0.000610	M Pd <	0.000610	M Te <	0.000910		
O Ca	0.011557	M In <	0.000310	M Pr <	0.000310	M Th <	0.001900		
M Cd <	0.000310	M Ir <	0.000310	M Pt <	0.000310	M Ti	0.001078		
M Ce <	0.000610	O K	0.000577	M Rb <	0.009100	M Tl <	0.000310		
M Co <	0.001600	M La <	0.000310	M Re <	0.000310	M Tm <	0.000310		
M Cr <	0.010000	O Li <	0.000460	M Rh <	0.000310	M U <	0.000310		
M Cs <	0.000310	M Lu <	0.000310	M Ru <	0.000310	O V <	0.001300		
M Cu <	0.002500	O Mg	0.001348	O S <	0.570000	M W <	0.001900		
M Dy <	0.000310	M Mn <	0.002500	M Sb <	0.000310	M Y <	0.000310		
M Er <	0.000310	M Mo <	0.000310	O 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 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

Atomic Weight; 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 except HF.

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, amorphous (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 HCl 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 HCl / 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.

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; 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

- 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
Custom Processing Supervisor



Certificate Approved By:

Muzzammil Khan
Stock Laboratory Supervisor



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director





CERTIFIED WEIGHT REPORT:

Part Number:
Lot Number:
Description:

58126
011025
Iron (Fe)

R-113125
M6140

Lot #
Solvent: 24012496
Nitric Acid

Expiration Date:

011028

2%
40.0
(mL)
Nitric Acid

Recommended Storage:

Ambient (20 °C)

Nominal Concentration (µg/mL):

10000

NIST Test Number:

6U7B

Weight shown below was diluted to (mL):

2000.07

5E-05 Balance Uncertainty
0.100 Flask Uncertainty

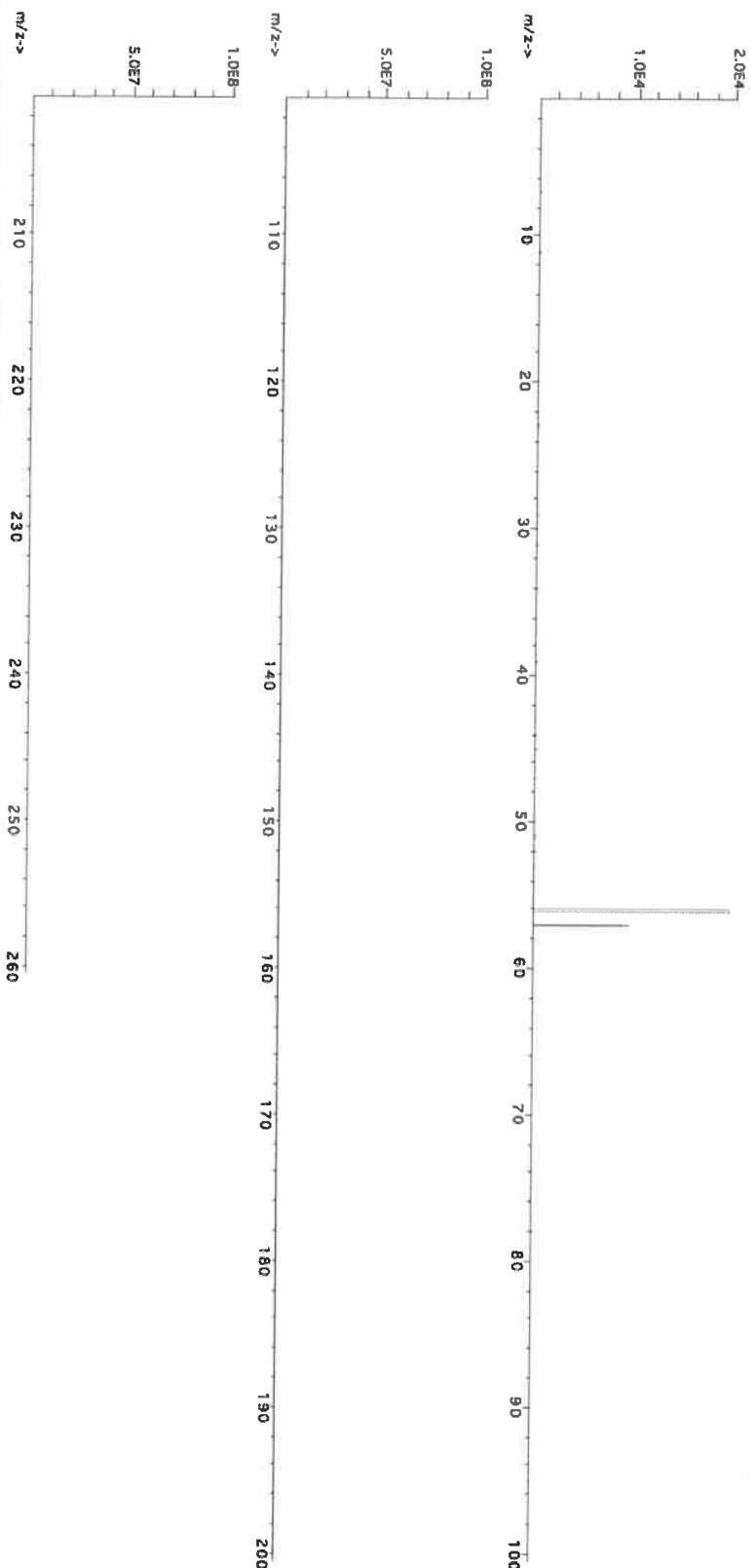
Formulated By:	Benson Chan	011025
Reviewed By:	Pedro L. Renteria	011025

Compound

RM#	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty Purity (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LDSO	NIST SRM
-----	------------	-----------------------	------------	------------------------	-----------	-------------------	-------------------	----------------------	----------------------------------	------	----------------	------	----------

1. Iron(III) nitrate nonahydrate (Fe) IN028 FED082023A1 10000 99.999 0.10 13.0 153.8534 ##### 10000.2 20.0 7782-61-8 1 mg/m³ or-rel 3250mg/kg 3126A

[1] Spectrum No.1 [30.763 sec]58126.D# [Count] [Linear]





CERTIFIED WEIGHT REPORT:

Part Number: 57119
Lot Number: 103024
Description: Potassium (K)

R-21113125

Solvent: 24002546 Nitric Acid
Lot #

Expiration Date: 103027
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 10000
NIST Test Number: 6UTB

M6141
M6142
M6143

2% 80.0 (mL) Nitric Acid

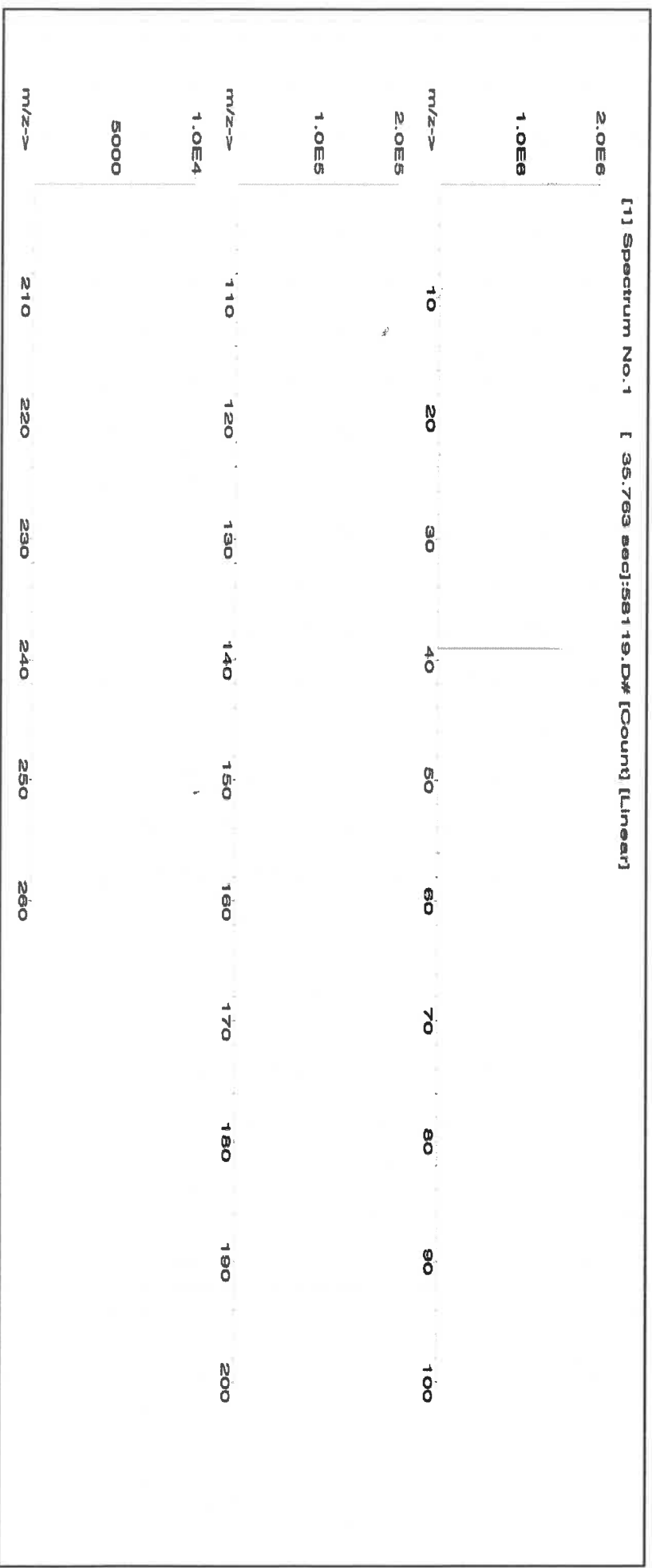
Weight shown below was diluted to (mL): 4000.1 0.15 Flask Uncertainty

<i>Giovanni Esposito</i>	
Formulated By:	Giovanni Esposito
Reviewed By:	Pedro L. Renteria
	103024

Compound	RM#	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty Purity (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty		CAS#	OSHA PEL (TWA)	LD50	NIST SRM
										±	(µg/mL)				

1. Potassium nitrate (K) IN034 KD062022A1 10000 99.999 0.10 37.7 106.1040 ##### 10001.1 20.0 7757-79-1 5 mg/m3 orl-rat 3750 mg/kg 3141a

[1] Spectrum No. 1 [35.763 sec]:58119.D# [Count] [Linear]





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

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	T	Sc	<0.02	Ta	<0.02	Ti	<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.
- * 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 certified (+/-) 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 WEIGHT REPORT:

Part Number:
Lot Number:
Description:

58030
121724
Zinc (Zn)

R → 11/13/25 Solvent: 24012496 Nitric Acid

Lot #

Expiration Date:

121727

M6145

2%

40.0 (mL)

Nitric Acid

Recommended Storage:

Ambient (20 °C)

Nominal Concentration (µg/mL):

1000

NIST Test Number:

6UTB

5E-05 Balance Uncertainty

Weight shown below was diluted to (mL):

2000.1

0.10 Flask Uncertainty

<i>Aleah O'Brady</i>	
Formulated By:	Aleah O'Brady
Reviewed By:	<i>Pedro L. Rentias</i>
	Pedro L. Rentias
	121724

Compound

RM#

Lot Number

Nominal Conc. (µg/mL)

Purity (%)

Uncertainty Purity (%)

Assay (%)

Target Weight (g)

Actual Weight (g)

Actual Conc. (µg/mL)

Expanded Uncertainty +/- (µg/mL)

CAS#

OSHA PEL (TWA)

LD50

NIST SRM

SDS Information

(Solvent Safety Info. On Attached pg.)

1. Zinc nitrate hexahydrate (Zn)

IN016 ZNE032021A1

1000

99.999

0.10

24.3

8.2308

8.2311

1000.0

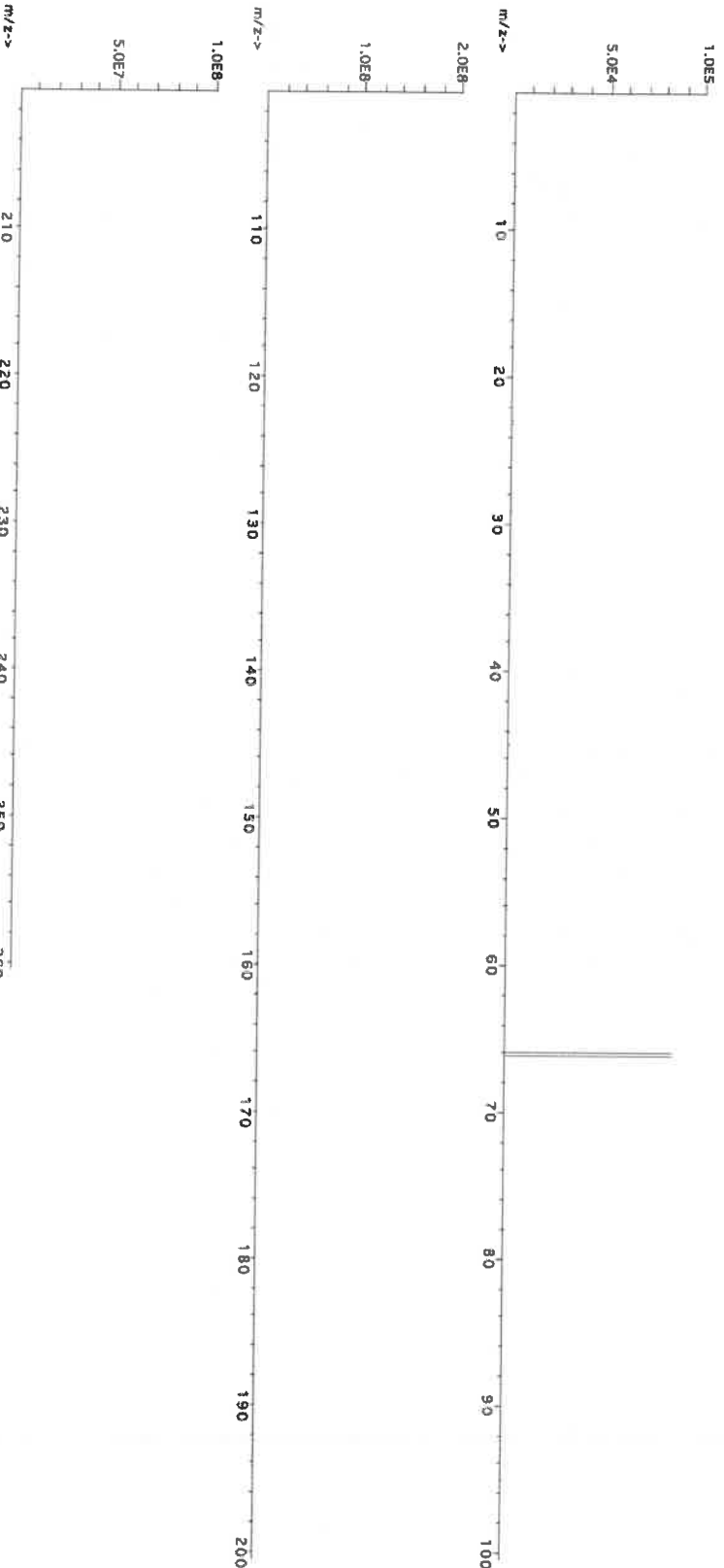
2.0

10196-18-6

1 mg/m3

or-rat 1190mg/kg 3168

[1] Spectrum No.1 [31.103 sec;58130.D# [Count] [Lines]





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

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Bu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<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.
- * 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 certified (+/-) 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).

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

 **avantor™**



M6151

R → 11/15/25

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 HCl) (by acid–base titrn)	36.5 – 38.0 %	37.9 %
ACS – Color (APHA)	≤ 10	5
ACS – Residue after Ignition	≤ 3 ppm	< 1 ppm
ACS – Specific Gravity at 60°/60°F	1.185 – 1.192	1.191
ACS – Bromide (Br)	≤ 0.005 %	< 0.005 %
ACS – Extractable Organic Substances	≤ 5 ppm	< 1 ppm
ACS – Free Chlorine (as Cl ₂)	≤ 0.5 ppm	< 0.5 ppm
Phosphate (PO ₄)	≤ 0.05 ppm	< 0.03 ppm
Sulfate (SO ₄)	≤ 0.5 ppm	< 0.3 ppm
Sulfite (SO ₃)	≤ 0.8 ppm	0.3 ppm
Ammonium (NH ₄)	≤ 3 ppm	< 1 ppm
Trace Impurities – Arsenic (As)	≤ 0.010 ppm	< 0.003 ppm
Trace Impurities – Aluminum (Al)	≤ 10.0 ppb	1.3 ppb
Arsenic and Antimony (as As)	≤ 5.0 ppb	< 3.0 ppb
Trace Impurities – Barium (Ba)	≤ 1.0 ppb	0.2 ppb
Trace Impurities – Beryllium (Be)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Bismuth (Bi)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Boron (B)	≤ 20.0 ppb	< 5.0 ppb
Trace Impurities – Cadmium (Cd)	≤ 1.0 ppb	< 0.3 ppb
Trace Impurities – Calcium (Ca)	≤ 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
Trace Impurities – Gold (Au)	≤ 4.0 ppb	0.6 ppb
Heavy Metals (as Pb)	≤ 100 ppb	< 50 ppb
Trace 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

 **avantorsm**



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 (Tl)	≤ 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
Trace Impurities – Zirconium (Zr)	≤ 1.0 ppb	0.3 ppb

>>> Continued on page 3 >>>

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

A handwritten signature in cursive script that reads 'Jamie Ethier'.
Jamie Ethier
Vice President Global Quality

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

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M6153

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: CGSR10
Lot Number: V2-SR745329
Matrix: 2% (v/v) HNO₃
Value / Analyte(s): 10 000 µg/mL ea:
Strontium
Starting Material: Strontium Carbonate
Starting Material Lot#: 2647
Starting Material Purity: 99.9960%

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Value: 10081 ± 39 µg/mL
Density: 1.030 g/mL (measured at 20 ± 4 °C)

Assay Information:

Assay Method #1 **10059 ± 50 µg/mL**
ICP Assay NIST SRM Traceable to 3153a Lot Number: K2-SR650985

Assay Method #2 **10087 ± 26 µg/mL**
EDTA NIST SRM 928 Lot Number: 928

- 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, $X_{CRM/RM}$, where two or more methods of characterization are used is the weighted mean of the results:

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

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

w_i = the weighting factors for each method calculated using the inverse square of the variance:

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{ts} = long term stability standard uncertainty (storage)

u_{ts} = 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:

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

X_a = mean of Assay Method A with

$u_{char a}$ = the standard uncertainty of characterization Method A

$$CRM/RM \text{ Expanded Uncertainty } (z) = U_{CRM/RM} = k (u_{char a}^2 + u_{bb}^2 + u_{ts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

$u_{char a}$ = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{ts} = long term stability standard uncertainty (storage)

u_{ts} = 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.

M	Ag	<	0.000960	M	Eu	<	0.000480	O	Na		0.002964	M	Se	<	0.042000	M	Zn		0.004560
M	Al		0.003420	O	Fe		0.013225	M	Nb	<	0.000480	O	Si		0.012997	M	Zr		0.001847
M	As	<	0.007200	M	Ga	<	0.002900	M	Nd	<	0.000480	M	Sm	<	0.000480				
M	Au	<	0.003900	M	Gd	<	0.000480	O	Ni		0.001482	M	Sn	<	0.000480				
O	B	<	0.003200	M	Ge	<	0.004800	M	Os	<	0.001500	s	Sr	<					
M	Ba		0.638494	M	Hf	<	0.000480	O	P	<	0.017000	M	Ta	<	0.000480				
O	Be	<	0.000450	M	Hg	<	0.000960	M	Pb		0.010717	M	Tb	<	0.000480				
M	Bi	<	0.002000	M	Ho	<	0.000480	M	Pd	<	0.002000	M	Te	<	0.016000				
O	Ca		0.025083	M	In	<	0.008600	M	Pr		0.000547	M	Th	<	0.000480				
M	Cd	<	0.000960	M	Ir	<	0.000480	M	Pt	<	0.000480	M	Ti		0.004560				
M	Ce		0.000661	O	K		0.025083	M	Rb	<	0.003400	M	Tl	<	0.000480				
M	Co		0.001527	M	La	<	0.000480	M	Re	<	0.000480	M	Tm		0.004332				
O	Cr	<	0.004700	O	Li	<	0.005600	O	Rh	<	0.013000	M	U	<	0.000480				
M	Cs	<	0.000480	M	Lu	<	0.000480	M	Ru	<	0.000960	M	V	<	0.000960				
O	Cu	<	0.003800	O	Mg		0.001048	O	S	<	0.045000	M	W	<	0.002400				
M	Dy	<	0.000960	O	Mn		0.000319	M	Sb	<	0.009600	O	Y	<	0.001200				
M	Er	<	0.000480	M	Mo	<	0.002900	M	Sc	<	0.001500	M	Yb	<	0.000480				

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 [Terms and Conditions of Sale](https://www.inorganicventures.com/terms-and-conditions-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

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 87.62 +2 6 Sr(H₂O)₆+2

Chemical Compatibility - Soluble in HCl, and HNO₃. Avoid H₂SO₄, HF and neutral to basic media. Stable with most metals and inorganic anions forming insoluble silicate, carbonate, hydroxide, oxide, fluoride, sulfate, oxalate, chromate, arsenate and tungstate in neutral aqueous media.

Stability - 2-100 ppb levels stable for months in 1% HNO₃ / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1 - 3.5% HNO₃ / LDPE container.

Sr Containing Samples (Preparation and Solution) -Metal (Best dissolved in diluted HNO₃); Ores (Carbonate fusion in PtO followed by HCl dissolution); Organic Matrices (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 88 amu	1200 ppt	N/A	72Ge16O, 176Yb+2, 176Lu+2 , 176Hf+2
ICP-OES 407.771 nm	0.0004 / 0.00006 µg/mL	1	U, Ce
ICP-OES 421.552 nm	0.0008 / 0.00004 µg/mL	1	Rb
ICP-OES 460.733 nm	0.07 / 0.003 µg/mL	1	Ce

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

August 26, 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

- August 26, 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 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



Certificate Approved By:

Muzzammil Khan
Stock Laboratory Supervisor



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director



Nitric Acid 69%
CMOS

avantor™



R- 0210212025

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

Test	Specification	Result
Assay (HNO ₃)	69.0 – 70.0 %	69.7 %
Appearance	Passes Test	Passes Test
Color (APHA)	≤ 10	5
Residue after Ignition	≤ 2 ppm	1 ppm
Chloride (Cl)	≤ 0.08 ppm	< 0.03 ppm
Phosphate (PO ₄)	≤ 0.10 ppm	< 0.03 ppm
Sulfate (SO ₄)	≤ 0.2 ppm	< 0.2 ppm
Trace Impurities – Aluminum (Al)	≤ 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	2.3 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 – Germanium (Ge)	≤ 20 ppb	< 10 ppb
Trace Impurities – Gold (Au)	≤ 20 ppb	< 5 ppb
Heavy Metals (as Pb)	≤ 100 ppb	100 ppb
Trace Impurities – Iron (Fe)	≤ 40.0 ppb	< 1.0 ppb
Trace Impurities – Lead (Pb)	≤ 20.0 ppb	< 10.0 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 – Nickel (Ni)	≤ 20.0 ppb	< 5.0 ppb

>>> Continued on page 2 >>>

Nitric Acid 69%
CMOS

 **avantorsTM**



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

Test	Specification	Result
Trace Impurities – Niobium (Nb)	≤ 50.0 ppb	< 1.0 ppb
Trace Impurities – Potassium (K)	≤ 50 ppb	16 ppb
Trace Impurities – Silicon (Si)	≤ 50 ppb	< 10 ppb
Trace Impurities – Silver (Ag)	≤ 20.0 ppb	< 1.0 ppb
Trace Impurities – Sodium (Na)	≤ 150.0 ppb	< 5.0 ppb
Trace Impurities – Strontium (Sr)	≤ 30.0 ppb	< 1.0 ppb
Trace Impurities – Tantalum (Ta)	≤ 10.0 ppb	< 5.0 ppb
Trace Impurities – Thallium (Tl)	≤ 10.0 ppb	< 5.0 ppb
Trace Impurities – Tin (Sn)	≤ 20.0 ppb	< 10.0 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	10 par/ml
Particle Count – 1.0 µm and greater	≤ 10 par/ml	3 par/ml

>>> Continued on page 3 >>>

Nitric Acid 69%
CMOS

 **avantor™**



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

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) HNO ₃		
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	CERTIFIED VALUE	ANALYTE	CERTIFIED VALUE
Aluminum, Al	1 000 ± 4 µg/mL	Barium, Ba	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 ± 4 °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
Ba	ICP Assay	3104a	140909
Ba	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, $X_{\text{CRM/RM}}$, where two or more methods of characterization are used is the weighted mean of the results:

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

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

w_i = the weighting factors for each method calculated using the inverse square of the variance:

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

$$\text{CRM/RM Expanded Uncertainty } (\pm) = U_{\text{CRM/RM}} = k (u_{\text{char}}^2 + u_{\text{bb}}^2 + u_{\text{Its}}^2 + u_{\text{ts}}^2)^{1/2}$$

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{Its} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

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

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

X_a = mean of Assay Method A with

$u_{\text{char } a}$ = the standard uncertainty of characterization Method A

$$\text{CRM/RM Expanded Uncertainty } (\pm) = U_{\text{CRM/RM}} = k (u_{\text{char } a}^2 + u_{\text{bb}}^2 + u_{\text{Its}}^2 + u_{\text{ts}}^2)^{1/2}$$

k = coverage factor = 2

$u_{\text{char } a}$ = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{Its} = long term stability standard uncertainty (storage)

u_{ts} = 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](https://www.inorganicventures.com/terms-and-conditions-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 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 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: _____

- 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:

Justin Dirico
Stock Processing Supervisor



Certificate Approved By:

Jodie Wall
Stock VSM Coordinator



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director



300 Technology Drive
 Christiansburg, VA 24073 USA
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 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 ± 2.8 µg/mL		

Density: 1.017 g/mL (measured at 20 ± 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, $X_{CRM/RM}$, where two or more methods of characterization are used is the weighted mean of the results:

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

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

w_i = the weighting factors for each method calculated using the inverse square of the variance:

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

$$CRM/RM \text{ Expanded Uncertainty } (\pm) = U_{CRM/RM} = k(u_{char}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = 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:

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

X_a = mean of Assay Method A with

$u_{char a}$ = the standard uncertainty of characterization Method A

$$CRM/RM \text{ Expanded Uncertainty } (\pm) = U_{CRM/RM} = k(u_{char a}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

$u_{char a}$ = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = 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](https://www.inorganicventures.com/terms-and-conditions-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

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

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: _____

- 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



300 Technology Drive
 Christiansburg, VA 24073 USA
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 F: 540-585-3012
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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 ± 3.1 µg/mL	Cadmium, Cd	250.1 ± 1.1 µg/mL
Lead, Pb	500.0 ± 2.3 µg/mL	Selenium, Se	500.0 ± 3.2 µg/mL
Thallium, Tl	500.0 ± 3.0 µg/mL		

Density: 1.040 g/mL (measured at 20 ± 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
Tl	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, $X_{\text{CRM/RM}}$, where two or more methods of characterization are used is the weighted mean of the results:

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

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

w_i = the weighting factors for each method calculated using the inverse square of the variance:

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

$$\text{CRM/RM Expanded Uncertainty } (\pm) = U_{\text{CRM/RM}} = k (u_{\text{char}}^2 + u_{\text{bb}}^2 + u_{\text{Its}}^2 + u_{\text{ts}}^2)^{1/2}$$

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{Its} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

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

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

X_a = mean of Assay Method A with

$u_{\text{char } a}$ = the standard uncertainty of characterization Method A

$$\text{CRM/RM Expanded Uncertainty } (\pm) = U_{\text{CRM/RM}} = k (u_{\text{char } a}^2 + u_{\text{bb}}^2 + u_{\text{Its}}^2 + u_{\text{ts}}^2)^{1/2}$$

k = coverage factor = 2

$u_{\text{char } a}$ = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{Its} = long term stability standard uncertainty (storage)

u_{ts} = 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](https://www.inorganicventures.com/terms-and-conditions-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

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: _____

- 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:

Justin Dirico
Stock Processing Supervisor



Certificate Approved By:

Jodie Wall
Stock VSM Coordinator



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director



Hydrogen Peroxide, 30%

CMOS

(Stabilized)

M-6170

avantor™



R.Date . 8-05/20/2025

Material No.: 2190-03

Batch No.: 24D1961001

Test	Specification	Result
Trace Impurities – Manganese (Mn)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Molybdenum (Mo)	≤ 10.0 ppb	< 5.0 ppb
Trace Impurities – Nickel (Ni)	≤ 10.0 ppb	< 5.0 ppb
Trace Impurities – Niobium (Nb)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Potassium (K)	≤ 600.0 ppb	176.7 ppb
Trace Impurities – Silicon (Si)	≤ 100.0 ppb	< 10.0 ppb
Trace Impurities – Silver (Ag)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Sodium (Na)	≤ 100.0 ppb	< 5.0 ppb
Trace Impurities – Strontium (Sr)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Tantalum (Ta)	≤ 10.0 ppb	< 5.0 ppb
Trace Impurities – Thallium (Tl)	≤ 50.0 ppb	< 5.0 ppb
Trace Impurities – Tin (Sn)	190.0 – 500.0 ppb	272.3 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)	≤ 50 ppb	< 1 ppb
Trace Impurities – Zirconium (Zr)	≤ 10.0 ppb	< 1.0 ppb
Particle Count – 0.2 µm and greater	≤ 1175 par/ml	202 par/ml
Particle Count – 0.5 µm and greater	≤ 100 par/ml	33 par/ml

>>> Continued on page 3 >>>

Hydrogen Peroxide, 30%

CMOS

(Stabilized)

 **avantor™**



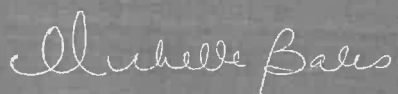
Material No.: 2190-03
Batch No.: 24D1961001

Test	Specification	Result
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For Microelectronic Use

Country of Origin: USA

Packaging Site: Paris Mfg Ctr & DC



Michelle Bales
Sr. Manager, Quality Assurance

Hydrogen Peroxide, 30%
CMOS
(Stabilized)



Material No.: 2190-03
Batch No.: 24D1961001
Manufactured Date: 2024-04-17
Expiration Date: 2025-10-16
Revision No.: 0

Certificate of Analysis

Test	Specification	Result
Assay (H ₂ O ₂)	30.0 – 32.0 %	31.6 %
Color (APHA)	≤ 10	< 5
Free Acid (μeq/g)	≤ 0.2	0.1
Residue after Evaporation	≤ 10 ppm	2 ppm
Ammonium (NH ₄)	≤ 3 ppm	< 3 ppm
Chloride (Cl)	≤ 0.2 ppm	< 0.2 ppm
Nitrate (NO ₃)	≤ 2 ppm	< 2 ppm
Phosphate (PO ₄)	≤ 1 ppm	1 ppm
Sulfate (SO ₄)	≤ 3 ppm	< 3 ppm
Trace Impurities – Aluminum (Al)	≤ 70.0 ppb	< 5.0 ppb
Arsenic and Antimony (as As)	≤ 10.0 ppb	< 10.0 ppb
Trace Impurities – Barium (Ba)	≤ 20.0 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)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Calcium (Ca)	≤ 50.0 ppb	< 1.0 ppb
Trace Impurities – Chromium (Cr)	≤ 20.0 ppb	1.5 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)	≤ 20.0 ppb	< 1.0 ppb
Trace Impurities – Germanium (Ge)	≤ 10.0 ppb	< 10.0 ppb
Trace Impurities – Gold (Au)	≤ 10.0 ppb	< 5.0 ppb
Heavy Metals (as Pb)	≤ 500.0 ppb	< 250.0 ppb
Trace Impurities – Iron (Fe)	≤ 50.0 ppb	4.6 ppb
Trace Impurities – Lead (Pb)	≤ 10.0 ppb	< 10.0 ppb
Trace Impurities – Lithium (Li)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Magnesium (Mg)	≤ 10.0 ppb	< 1.0 ppb

>>> Continued on page 2 >>>



Certified Reference Material CRM



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

CERTIFIED WEIGHT REPORT:

Part Number: 58112
Lot Number: 011525
Description: Magnesium (Mg)
Solvent: 24012496 Nitric Acid

Expiration Date: 011528
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 10000
NIST Test Number: 6UTB
Weight shown below was diluted to (mL): 2000.07
5E-05 Balance Uncertainty
0.100 Flask Uncertainty

Formulated By:	Benson Chan	011525
Reviewed By:	Pedro L. Rentas	011525

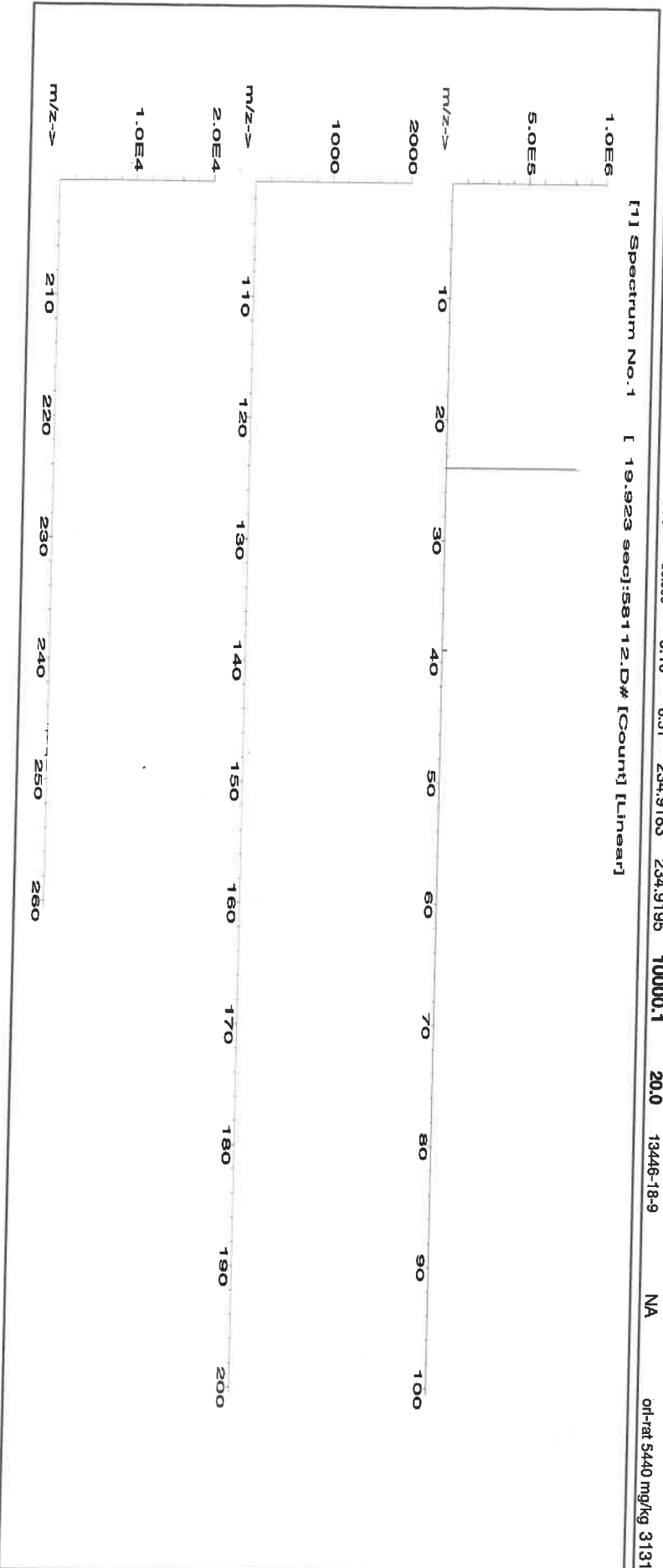
Compound

1. Magnesium nitrate hexahydrate (Mg) IN030 MGD05023A1 10000 99.999 0.10 8.51 234.9183 234.9195 10000.1 20.0 13446-18-9 NA off-ret 5440 mg/kg 3131a

Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty Purity (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
011525	10000	99.999	0.10	8.51	234.9183	234.9195	10000.1	20.0	13446-18-9	NA	off-ret 5440 mg/kg	3131a

SDS Information

(Solvent Safety Info. On Attached pg.)





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

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pr	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	T	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ku	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<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.
- * 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 certified (+/-) 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).

1.0 ACCREDITATION / REGISTRATION

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**2.0 PRODUCT DESCRIPTION**

Product Code: Single Analyte Custom Grade Solution
Catalog Number: CGNA10
Lot Number: V2-NA740547
Matrix: 2% (v/v) HNO₃
Value / Analyte(s): 10 000 µg/mL ea:
Sodium
Starting Material: Sodium Carbonate
Starting Material Lot#: 2453 and 2606
Starting Material Purity: 99.9976%

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Value: 10018 ± 30 µg/mL
Density: 1.033 g/mL (measured at 20 ± 4 °C)

Assay Information:

Assay Method #1	10026 ± 18 µg/mL Gravimetric NIST SRM Lot Number: See Sec. 4.2
Assay Method #2	9986 ± 66 µg/mL ICP Assay NIST SRM 3152a Lot Number: 200413
Assay Method #3	10002 ± 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, $X_{CRM/RM}$, where two or more methods of characterization are used is the weighted mean of the results:

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

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

w_i = the weighting factors for each method calculated using the inverse square of the variance:

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

$$CRM/RM \text{ Expanded Uncertainty } (z) = U_{CRM/RM} = k(u_{char}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = 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:

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

X_a = mean of Assay Method A with

$u_{char a}$ = the standard uncertainty of characterization Method A

$$CRM/RM \text{ Expanded Uncertainty } (z) = U_{CRM/RM} = k(u_{char a}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

$u_{char a}$ = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = 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 errors 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.

M	Ag	<	0.000860	M	Eu	<	0.000860	s	Na	<		O	Se	<	0.034000	O	Zn		0.000387
O	Al		0.003121	O	Fe		0.001622	M	Nb	<	0.000860	O	Si		0.044943	M	Zr	<	0.001800
M	As	<	0.001800	M	Ga	<	0.000860	M	Nd	<	0.000860	M	Sm	<	0.000860				
M	Au	<	0.005700	M	Gd	<	0.000860	O	Ni	<	0.000980	M	Sn	<	0.000860				
O	B	<	0.025000	M	Ge	<	0.003500	M	Os	<	0.029000	M	Sr		0.000436				
M	Ba		0.004494	M	Hf	<	0.000860	O	P		0.005742	M	Ta	<	0.000086				
O	Be	<	0.000160	M	Hg	<	0.002900	M	Pb	<	0.002600	M	Tb	<	0.000860				
M	Bi	<	0.000860	M	Ho	<	0.000860	M	Pd	<	0.004300	M	Te	<	0.004300				
O	Ca		0.112358	M	In	<	0.000860	M	Pr	<	0.000860	M	Th	<	0.003500				
O	Cd	<	0.000730	M	Ir	<	0.000940	M	Pt	<	0.000860	O	Ti		0.000399				
M	Ce	<	0.000860	O	K		0.349560	M	Rb		0.000436	M	Tl	<	0.000860				
M	Co	<	0.000860	M	La	<	0.000860	M	Re	<	0.000860	M	Tm	<	0.000860				
O	Cr	<	0.002000	O	Li		0.000224	M	Rh	<	0.000860	M	U	<	0.000860				
M	Cs		0.000287	M	Lu	<	0.000860	M	Ru	<	0.000940	O	V	<	0.001500				
O	Cu	<	0.004100	M	Mg		0.097377	O	S		0.018726	M	W	<	0.007700				
M	Dy	<	0.000860	M	Mn	<	0.007700	M	Sb	<	0.000860	M	Y	<	0.000860				
M	Er	<	0.000860	O	Mo	<	0.002800	O	Sc	<	0.000610	M	Yb	<	0.000860				

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 [Terms and Conditions of Sale](https://www.inorganicventures.com/terms-and-conditions-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

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 22.99 +1 (6) Na+(aq) largely ionic in nature

Chemical Compatibility -Soluble in HCl, HNO₃, H₂SO₄ and HF aqueous matrices. Stable with all metals and inorganic anions.

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

Na Containing Samples (Preparation and Solution) - Metal (Dissolves very rapidly in water); Ores (Lithium carbonate fusion in graphite crucible followed by HCl dissolution - blank levels of Na in lithium carbonate critical); Organic Matrices (Sulfuric / peroxide digestion or nitric/sulfuric/perchloric acid decomposition).

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 23 amu	310 ppt	n/a	46Ti+2, 46Ca+2
ICP-OES 330.237 nm	2.0 / 0.09 µg/mL	1	Pd, Zn
ICP-OES 588.995 nm	0.03 / 0.006 µg/mL	1	2nd order radiation from R.E.s on some optical designs
ICP-OES 589.595 nm	0.07 / 0.00009 µg/mL	1	2nd order radiation from R.E.s on some optical designs

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 23, 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 23, 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 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



Certificate Approved By:

Muzzammil Khan
Stock Laboratory Supervisor



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director



Certificate of Analysis

P: 800-669-6799/540-585-3030

F: 540-585-3012

info@inorganicventures.com

R → 1127125

M6175

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: 6020CAL-1
Lot Number: V2-MEB742014
Matrix: 5% (v/v) HNO₃
tr. HF
Value / Analyte(s): 20 µg/mL ea:
Silver, Aluminum,
Arsenic, Barium,
Beryllium, Calcium,
Cadmium, Cobalt,
Chromium, Copper,
Iron, Potassium,
Magnesium, Manganese,
Sodium, Nickel,
Lead, Antimony,
Selenium, Thallium,
Vanadium, Zinc

3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE	CERTIFIED VALUE	ANALYTE	CERTIFIED VALUE
Aluminum, Al	20.02 ± 0.08 µg/mL	Antimony, Sb	20.03 ± 0.11 µg/mL
Arsenic, As	20.03 ± 0.16 µg/mL	Barium, Ba	20.02 ± 0.11 µg/mL
Beryllium, Be	20.02 ± 0.15 µg/mL	Cadmium, Cd	20.02 ± 0.11 µg/mL
Calcium, Ca	20.03 ± 0.09 µg/mL	Chromium, Cr	20.03 ± 0.13 µg/mL
Cobalt, Co	20.03 ± 0.12 µg/mL	Copper, Cu	20.03 ± 0.10 µg/mL
Iron, Fe	20.04 ± 0.09 µg/mL	Lead, Pb	20.03 ± 0.11 µg/mL
Magnesium, Mg	20.03 ± 0.10 µg/mL	Manganese, Mn	20.03 ± 0.11 µg/mL
Nickel, Ni	20.03 ± 0.11 µg/mL	Potassium, K	20.03 ± 0.10 µg/mL
Selenium, Se	20.03 ± 0.13 µg/mL	Silver, Ag	20.03 ± 0.09 µg/mL
Sodium, Na	20.03 ± 0.10 µg/mL	Thallium, Tl	20.03 ± 0.10 µg/mL
Vanadium, V	20.03 ± 0.11 µg/mL	Zinc, Zn	20.03 ± 0.11 µg/mL

Density: 1.027 g/mL (measured at 20 ± 4 °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
As	Calculated		See Sec. 4.2
Ba	ICP Assay	3104a	140909
Ba	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
Co	ICP Assay	3113	190630
Co	EDTA	928	928
Cr	ICP Assay	3112a	170630
Cu	ICP Assay	3114	121207
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	120715
Na	Gravimetric		See Sec. 4.2
Ni	ICP Assay	3136	120619
Ni	EDTA	928	928
Pb	ICP Assay	3128	101026
Pb	EDTA	928	928
Sb	ICP Assay	3102a	140911
Se	ICP Assay	3149	100901
Tl	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, $X_{\text{CRM/RM}}$, where two or more methods of characterization are used is the weighted mean of the results:

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

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

w_i = the weighting factors for each method calculated using the inverse square of the variance:

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{Its} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

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

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

X_a = mean of Assay Method A with

$u_{\text{char } a}$ = the standard uncertainty of characterization Method A

$$\text{CRM/RM Expanded Uncertainty } (k) = U_{\text{CRM/RM}} = k (u_{\text{char } a}^2 + u_{\text{bb}}^2 + u_{\text{Its}}^2 + u_{\text{ts}}^2)^{1/2}$$

k = coverage factor = 2

$u_{\text{char } a}$ = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{Its} = long term stability standard uncertainty (storage)

u_{ts} = 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](https://www.inorganicventures.com/terms-and-conditions-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

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

Low Silver Note: This solution contains "LOW" levels of Silver. Please store this entire bottle inside a sealed glass jar.

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

March 11, 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 11, 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 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



Certificate Approved By:

Muzzammil Khan
Stock Laboratory Supervisor



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director



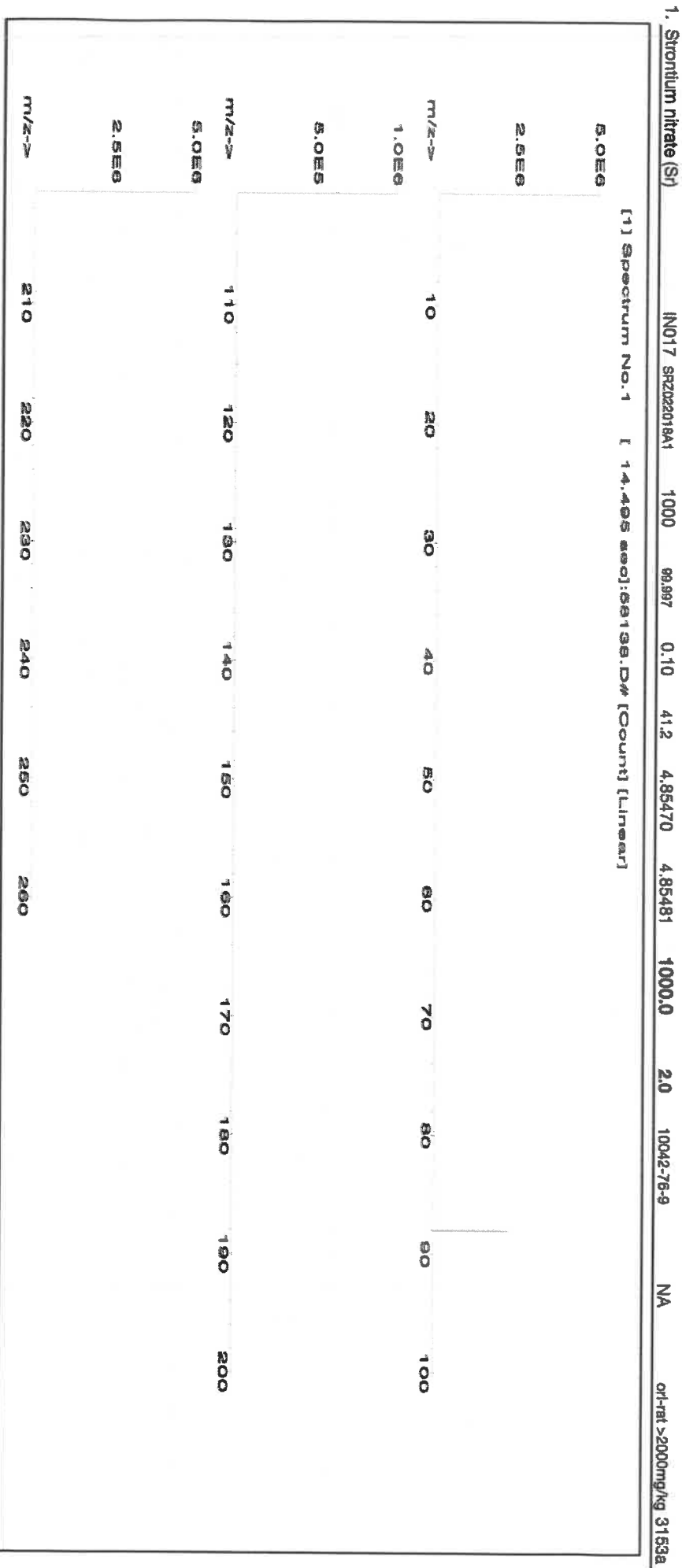


CERTIFIED WEIGHT REPORT:

Part Number: 57038 **Lot #** 24002546 **Solvent:** Nitric Acid
Lot Number: 092724
Description: Strontium (Sr)
Expiration Date: 092727 **2%** **40.0** **Nitric Acid**
Recommended Storage: Ambient (20 °C) **(mL)**
Nominal Concentration (µg/mL): 1000
NIST Test Number: 8UTB **5E-05** **Balance Uncertainty**
Weight shown below was diluted to (mL): 2000.07 **0.100** **Flask Uncertainty**

<i>[Signature]</i>	
Formulated By:	Benson Chan
	092724
<i>[Signature]</i>	
Reviewed By:	Pedro L. Rentas
	092724

SDS Information									
Compound	Lot	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty Purity (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)
Strontium nitrate (Sr)	IN017 SR2022018A1	1000	99.997	0.10	41.2	4.85470	4.85481	1000.0	2.0
						10042-76-9	NA		or -rel >2000mg/kg 3153a





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

Trace Metals Verification by ICP-MS ($\mu\text{g/mL}$)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Bu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	T	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<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.
- * 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 certified (+/-) 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 WEIGHT REPORT:

Part Number:
Lot Number:
Description:

57082
031525
Lead (Pb)

Lot #

Nitric Acid

Expiration Date:

031528

Recommended Storage:

Ambient (20 °C)

Nominal Concentration (µg/mL):

1000

NIST Test Number:

6UTB

Weight shown below was diluted to (mL):

2000.07

0.10 Flask Uncertainty

2%

40.0 (mL)

Nitric Acid

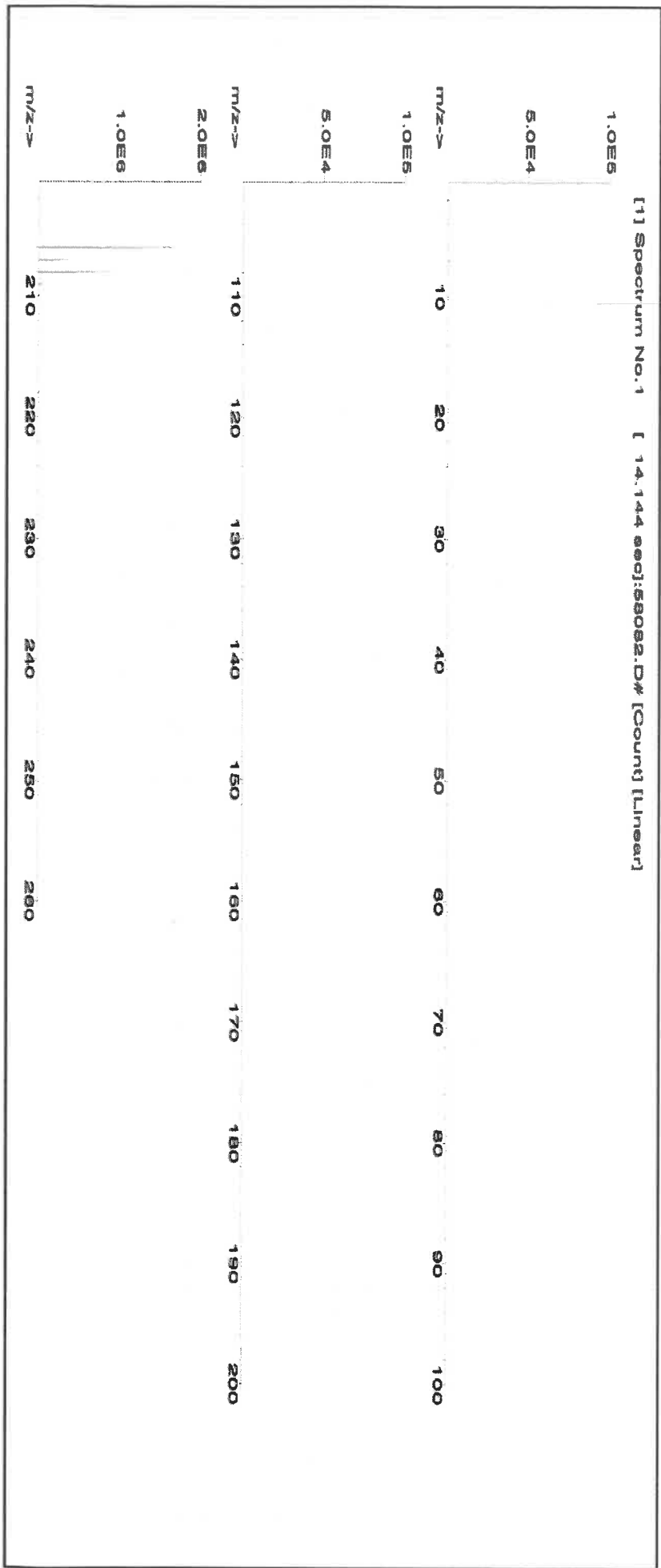
<i>Giovanni Esposito</i>	
Formulated By:	Giovanni Esposito
Reviewed By:	Pedro L. Renteria
	031525

SDS Information

Compound	Lot	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty Purity (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
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1. **Lead(II) nitrate (Pb)** IN029 PBD122016A1 1000 99.999 0.10 62.5 3.20015 3.20067 1000.2 2.0 10099-74-8 0.05 mg/m3 Intrins-ral 93 mg/kg 3128

[1] Spectrum No. 1 [14.144 sec]:58082.D# [Count] [Linear]





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

Trace Metals Verification by ICP-MS ($\mu\text{g/mL}$)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Sc	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Tc	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Bu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Se	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

Certified by:

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 certified (+/-) 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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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) HNO ₃

M6180
R-37/22/23

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	CERTIFIED VALUE	ANALYTE	CERTIFIED VALUE
Aluminum, Al	200.2 ± 0.7 µg/mL	Arsenic, As	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
Calcium, Ca	100.1 ± 0.3 µg/mL	Cerium, 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, Tl	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
B	ICP Assay	3107	190605
B	Calculated		See Sec. 4.2
Ba	ICP Assay	3104a	140909
Ba	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
Ce	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
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		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
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
Tl	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, $X_{\text{CRM/RM}}$, where two or more methods of characterization are used is the weighted mean of the results:

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

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

w_i = the weighting factors for each method calculated using the inverse square of the variance:

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

$$\text{CRM/RM Expanded Uncertainty } (\pm) = U_{\text{CRM/RM}} = k (u_{\text{char}}^2 + u_{\text{bb}}^2 + u_{\text{ITS}}^2 + u_{\text{TS}}^2)^{1/2}$$

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{ITS} = long term stability standard uncertainty (storage)

u_{TS} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

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

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

X_a = mean of Assay Method A with

$u_{\text{char } a}$ = the standard uncertainty of characterization Method A

$$\text{CRM/RM Expanded Uncertainty } (\pm) = U_{\text{CRM/RM}} = k (u_{\text{char } a}^2 + u_{\text{bb}}^2 + u_{\text{ITS}}^2 + u_{\text{TS}}^2)^{1/2}$$

k = coverage factor = 2

$u_{\text{char } a}$ = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{ITS} = long term stability standard uncertainty (storage)

u_{TS} = 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. <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° - 25° C to minimize the effects of transpiration. Use at 20° ± 5° 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; 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: _____

- 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:

Justin Dirico
Stock Processing Supervisor



Certificate Approved By:

Jodie Wall
Stock VSM Coordinator



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director



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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	CERTIFIED VALUE	ANALYTE	CERTIFIED VALUE
Antimony, Sb	80.1 ± 0.5 µg/mL	Molybdenum, Mo	40.05 ± 0.22 µg/mL
Silica, SiO ₂	200.3 ± 1.4 µg/mL	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:

ANALYTE	METHOD	NIST SRM#	SRM LOT#
Mo	ICP Assay	3134	130418
Sb	ICP Assay	3102a	140911
SiO ₂	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, $X_{\text{CRM/RM}}$, where two or more methods of characterization are used is the weighted mean of the results:

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

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

w_i = the weighting factors for each method calculated using the inverse square of the variance:

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

$$\text{CRM/RM Expanded Uncertainty (z)} = U_{\text{CRM/RM}} = k (u_{\text{char}}^2 + u_{\text{bb}}^2 + u_{\text{Its}}^2 + u_{\text{ts}}^2)^{1/2}$$

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{Its} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

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

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

X_a = mean of Assay Method A with

$u_{\text{char } a}$ = the standard uncertainty of characterization Method A

$$\text{CRM/RM Expanded Uncertainty (z)} = U_{\text{CRM/RM}} = k (u_{\text{char } a}^2 + u_{\text{bb}}^2 + u_{\text{Its}}^2 + u_{\text{ts}}^2)^{1/2}$$

k = coverage factor = 2

$u_{\text{char } a}$ = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{Its} = long term stability standard uncertainty (storage)

u_{ts} = 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. <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

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

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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: _____

- 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:

Justin Dirico
Stock Processing Supervisor



Certificate Approved By:

Thomas Kozikowski
Stock VS Manager



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director





QUALITY ASSURANCE TECHNICAL SUPPORT LABORATORY
"An ISO 9001:2015 Certified Program"

Instructions for QATS Reference Material: ICP-MS ICS

**QATS LABORATORY INORGANIC REFERENCE MATERIAL
INTERFERENCE CHECK SAMPLE SET FOR ICP-MS (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

(A) SAMPLE DESCRIPTION

Enclosed is a set of one (1) or more bottles of an 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-0803" and for the ICSAB mixture use "ICSA-0803+ICSB-0803".**

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 the Contracting Officer, Ross Miller at miller.ross@epa.gov. If directed by Ross Miller, 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

This interference check sample set is to be used to verify elemental isobaric correction factors of inductively coupled plasma-mass spectrometers (ICP-MS). This reference material set consists of two (2) concentrated solutions. The ICSA solution contains several interferent elements and species; for a complete listing refer to the CLP SOW. The ICSB solution contains the analytes: Ag, As, Sb, Ba, Be, Cd, Co, Cr, Cu, Mn, Ni, Pb, Tl, Se, V, and Zn. This instruction sheet provides the nominal values for the ICP-MS ICS 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-0803, Interferents: Pipet 10 mL of the ICSA solution into a 100 mL volumetric flask and dilute to volume with 1% v/v HNO₃. Analyze this solution by ICP-MS.

ICSB-0803, Analytes, mixed with ICSA-0803, 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 1% v/v HNO₃. Analyze this ICSAB solution by ICP-MS.

(D) "CERTIFIED VALUE" CONCENTRATIONS OF QATS ICP-MS 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.

M6185
ICSA

Table 1. "CERTIFIED VALUES" FOR INTERFERENCE CHECK SAMPLE ICP-MS ICSA-0803, AND ICSA-0803 MIXED WITH ICSB-0803							
Element	CRQL	Part A (µg/L)	Lower Limit (µg/L)	Upper Limit (µg/L)	Part A +Part B (µg/L)	Lower Limit (µg/L)	Upper Limit (µg/L)
Al	20.0	[100000]			[100000]		
Sb	2.0	(1.5)	-2.5	5.5	(22.0)	18.0	26.0
As	1.0	(0.1)	-1.9	2.1	19.0	16.2	21.9
Ba	10.0	(1.2)	-18.8	21.2	(22.0)	2.0	42.0
Be	1.0	(0)	-2.0	2.0	19.0	16.2	21.9
Cd	1.0	(0.7)	-1.3	2.7	20.0	17.0	23.0
Ca	500	[100000]			[100000]		
C		[200000]			[200000]		
Cl		[1000000]			[1000000]		
Cr	2.0	(21.0)	17.0	25.0	40.0	34.0	46.0
Co	1.0	(1.0)	-1.0	3.0	20.0	17.0	23.0
Cu	2.0	(8.0)	4.0	12.0	(25.0)	21.0	29.0
Fe	200	[100000]			[100000]		
Pb	1.0	(4.0)	2.0	6.0	25.0	21.3	28.8
Mg	500	[100000]			[100000]		
Mn	1.0	(7.0)	5.0	9.0	27.0	23.0	31.1
Mo		[2000]			[2000]		
Ni	1.0	(6.0)	4.0	8.0	24.0	20.4	27.6
P		[100000]			[100000]		
K	500	[100000]			[100000]		
Se	5.0	(0.3)	-9.7	10.3	(19.0)	9.0	29.0
Ag	1.0	(0)	-2.0	2.0	18.0	15.3	20.7
Na	500	[100000]			[100000]		
S		[100000]			[100000]		
Tl	1.0	(0)	-2.0	2.0	21.0	17.9	24.2
Ti		[2000]			[2000]		
V	5.0	(0.5)	-9.5	10.5	(19.0)	9.0	29.0
Zn	5.0	(11.0)	1.0	21.0	(29.0)	19.0	39.0

[] Indicates analytes that do not require ICP-MS determination in the ICS.

The acceptance ranges for all analytes in parentheses in the above table were determined using the listed certified value $\pm$ 2 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.

Nitric Acid 69%
CMOS



M6187

R.D :- 08/08/25

Material No.: 9606-03
Batch No.: 24H0162012
Manufactured Date: 2024-06-28
Retest Date: 2029-06-27
Revision No.: 0

Certificate of Analysis

Test	Specification	Result
Assay (HNO ₃)	69.0 – 70.0 %	69.7 %
Appearance	Passes Test	Passes Test
Color (APHA)	≤ 10	5
Residue after Ignition	≤ 2 ppm	< 1 ppm
Chloride (Cl)	≤ 0.08 ppm	0.03 ppm
Phosphate (PO ₄)	≤ 0.10 ppm	< 0.03 ppm
Sulfate (SO ₄)	≤ 0.2 ppm	< 0.2 ppm
Trace Impurities – Aluminum (Al)	≤ 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
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 – Nickel (Ni)	≤ 20.0 ppb	< 1.0 ppb

>>> Continued on page 2 >>>

Nitric Acid 69%
CMOS



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 (Tl)	≤ 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

>>> Continued on page 3 >>>

Nitric Acid 69%
CMOS

 **avantor™**



Material No.: 9606-03
Batch No.: 24H0162012

Test	Specification	Result
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For Microelectronic Use

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



Jamie Croak
Director Quality Operations, Bioscience Production

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



M6200
R.O → 08/25/25

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 HCl) (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 Cl ₂)	≤ 0.5 ppm	< 0.5 ppm
Phosphate (PO ₄)	≤ 0.05 ppm	0.03 ppm
Sulfate (SO ₄)	≤ 0.5 ppm	< 0.3 ppm
Sulfite (SO ₃)	≤ 0.8 ppm	0.3 ppm
Ammonium (NH ₄)	≤ 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 >>>

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



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 (Tl)	≤ 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
Trace Impurities – Vanadium (V)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Zinc (Zn)	≤ 5.0 ppb	< 0.2 ppb
Trace Impurities – Zirconium (Zr)	≤ 1.0 ppb	< 0.1 ppb

>>> Continued on page 3 >>>

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



Material No.: 9530-33
Batch No.: 24D1562005

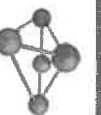
Test	Specification	Result
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For Laboratory, Research, or Manufacturing Use
Product Information (not specifications):
Appearance (clear, fuming liquid)
Meets ACS Specifications
Storage Condition: Store below 25 °C.

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

A handwritten signature in dark ink, appearing to read 'JCroak', is positioned above the printed name.

Jamie Croak
Director Quality Operations, Bioscience Production



CERTIFIED WEIGHT REPORT:

Part Number: **57028**
Lot Number: **062024**
Description: **Nickel (NI)**

Lot # **24002546**
Solvent: **Nitric Acid**

Formulated By: *Benson Chan*
Reviewed By: *Pedro L. Rentes*

Benson Chan

062024

Expiration Date: **062027**

2.0%

40.0 (mL)

Nitric Acid

Recommended Storage: **Ambient (20 °C)**

Nominal Concentration (µg/mL): **1000**

NIST Test Number: **6UTB**

5E-05 Balance Uncertainty

Volume shown below was diluted to (mL): **2000.07**

0.100 Flask Uncertainty

Expanded

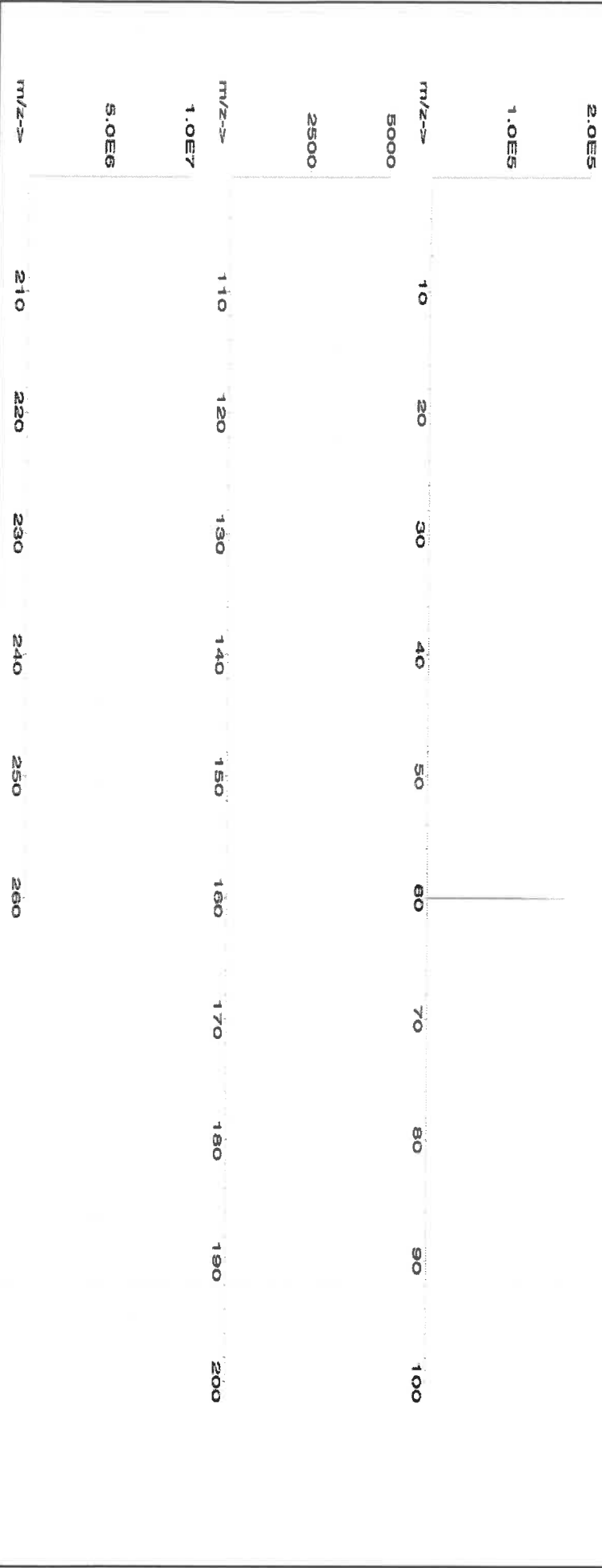
SDS Information

Compound

Part Number	Lot Number	Dilution Factor	Initial Vol. (mL)	Uncertainty (mL)	Conc. (µg/mL)	Initial Conc. (µg/mL)	Final Conc. (µg/mL)	Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
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1. Nickel(II) nitrate hexahydrate (NI) 58128 062023 0.1000 200.0 0.084 1000 10000.4 1000.0 2.2 13478-00-7 1 mg/m3 orl-rat 1620 mg/kg 3136

[1] Spectrum No.1 [9.136 sec]:S8028.D# [Count] [Linear]





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

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	T	Pr	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<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.
- * 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 certified (+/-) 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).

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: 6020ISS
Lot Number: S2-MEB709511
Matrix: 7% (v/v) HNO₃
Value / Analyte(s): 10 µg/mL ea:
Bismuth, Holmium,
Indium, 6-Lithium,
Rhodium, Scandium,
Terbium, Yttrium

3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE	CERTIFIED VALUE	ANALYTE	CERTIFIED VALUE
6-Lithium, Li6	10.00 ± 0.03 µg/mL	Bismuth, Bi	10.00 ± 0.05 µg/mL
Holmium, Ho	10.00 ± 0.05 µg/mL	Indium, In	10.00 ± 0.04 µg/mL
Rhodium, Rh	10.00 ± 0.07 µg/mL	Scandium, Sc	10.00 ± 0.04 µg/mL
Terbium, Tb	10.00 ± 0.04 µg/mL	Yttrium, Y	10.00 ± 0.04 µg/mL

Density: 1.035 g/mL (measured at 20 ± 4 °C)

Assay Information:

ANALYTE	METHOD	NIST SRM#	SRM LOT#
Bi	ICP Assay	3106	180815
Bi	Calculated		See Sec. 4.2
Ho	ICP Assay	3123a	090408
Ho	EDTA	928	928
In	ICP Assay	3124a	110516
In	EDTA	928	928
In	Calculated		See Sec. 4.2
Li6	Gravimetric		See Sec. 4.2
Rh	ICP Assay	3144	070619
Sc	ICP Assay	3148a	100701
Sc	EDTA	928	928
Tb	ICP Assay	3157a	100518
Tb	EDTA	928	928
Tb	Calculated		See Sec. 4.2
Y	ICP Assay	3167a	120314
Y	EDTA	928	928
Y	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, $X_{CRM/RM}$, where two or more methods of characterization are used is the weighted mean of the results:

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

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

w_i = the weighting factors for each method calculated using the inverse square of the variance:

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

$$CRM/RM \text{ Expanded Uncertainty } (\pm) = U_{CRM/RM} = k(u_{char}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = 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:

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

X_a = mean of Assay Method A with

$u_{char a}$ = the standard uncertainty of characterization Method A

$$CRM/RM \text{ Expanded Uncertainty } (\pm) = U_{CRM/RM} = k(u_{char a}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

$u_{char a}$ = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

Certified Abundance:

IV's Certified Abundance

Isotope	Atom %
Lithium Li6	95.6 ± 0.3
Lithium Li7	4.4 ± 0.1

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

- 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° - 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

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 03, 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 03, 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 Approved By:

Michael Booth
Director, Quality Control



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director





Certified Reference Material CRM

M6030



CERTIFIED WEIGHT REPORT:

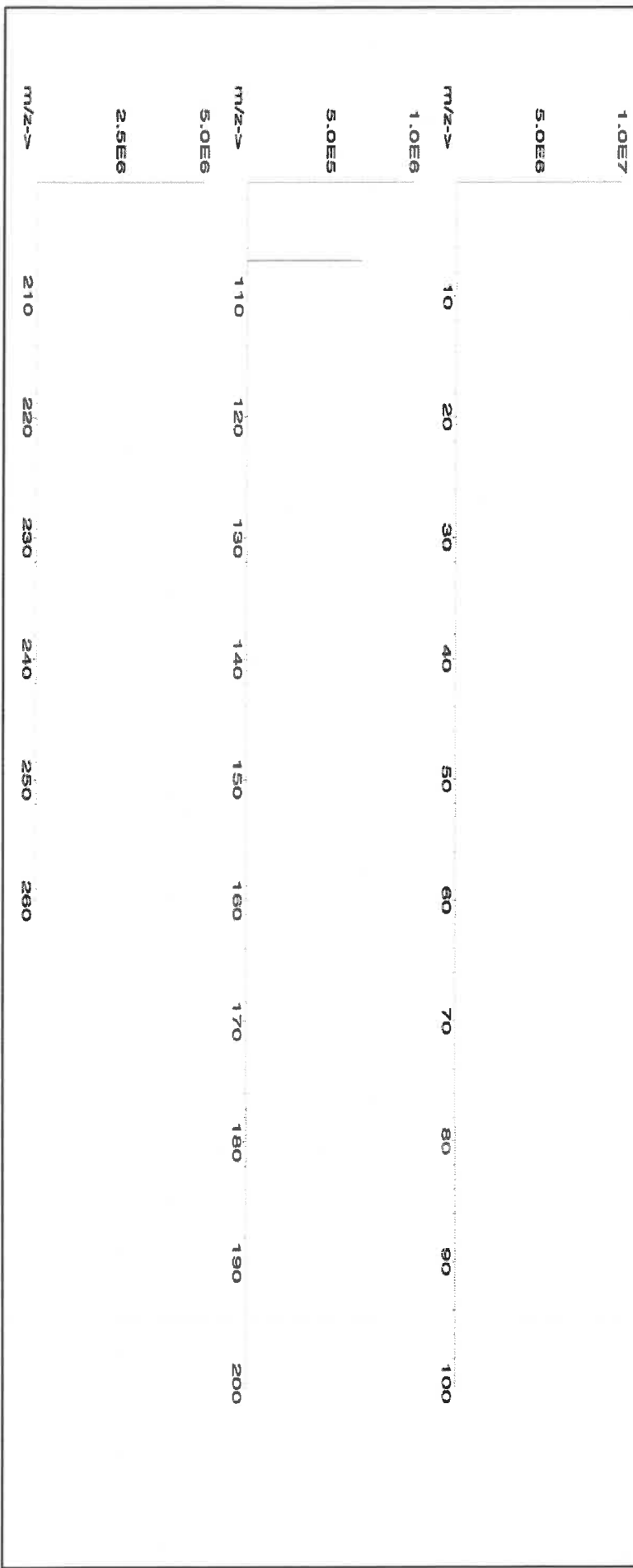
Part Number: 57047
Lot Number: 122823
Description: Silver (Ag)
Solvent: 24002546 Nitric Acid
Lot #

Expiration Date: 122826
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 1000
NIST Test Number: 6UTB
Weight shown below was diluted to (mL): 4000.30
5E-05 Balance Uncertainty
0.058 Flask Uncertainty

Formulated By:	Benson Chan
Reviewed By:	Pedro L. Rentas
	122823

SDS Information									
Compound	RM#	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty Purity (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)
1. Silver nitrate (Ag)	IN035	J0612AGA1	1000.0	99.9996	0.10	63.7	6.27992	6.27998	1000.0
							2.0	7761-88-8	10 µg/mL
									NA
									3151

[1] Spectrum No. 1 [14.044 sec]:58147.D# [Count] [Linear]





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

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	T	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<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.
- * Purified acids, 18.2 meghom 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 certified (+/-) 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).



R: 10/18/24
Certified Reference Material CRM



CERTIFIED WEIGHT REPORT:

Part Number:
Lot Number:
Description:

57051
071724
Antimony (Sb)

Lot #
24002546
Solvent:
Nitric Acid

Expiration Date:

071727

2.0%

40.0 (mL)

Nitric Acid

Recommended Storage:
Ambient (20 °C)

Nominal Concentration (µg/mL):

1000

NIST Test Number:

6UJB

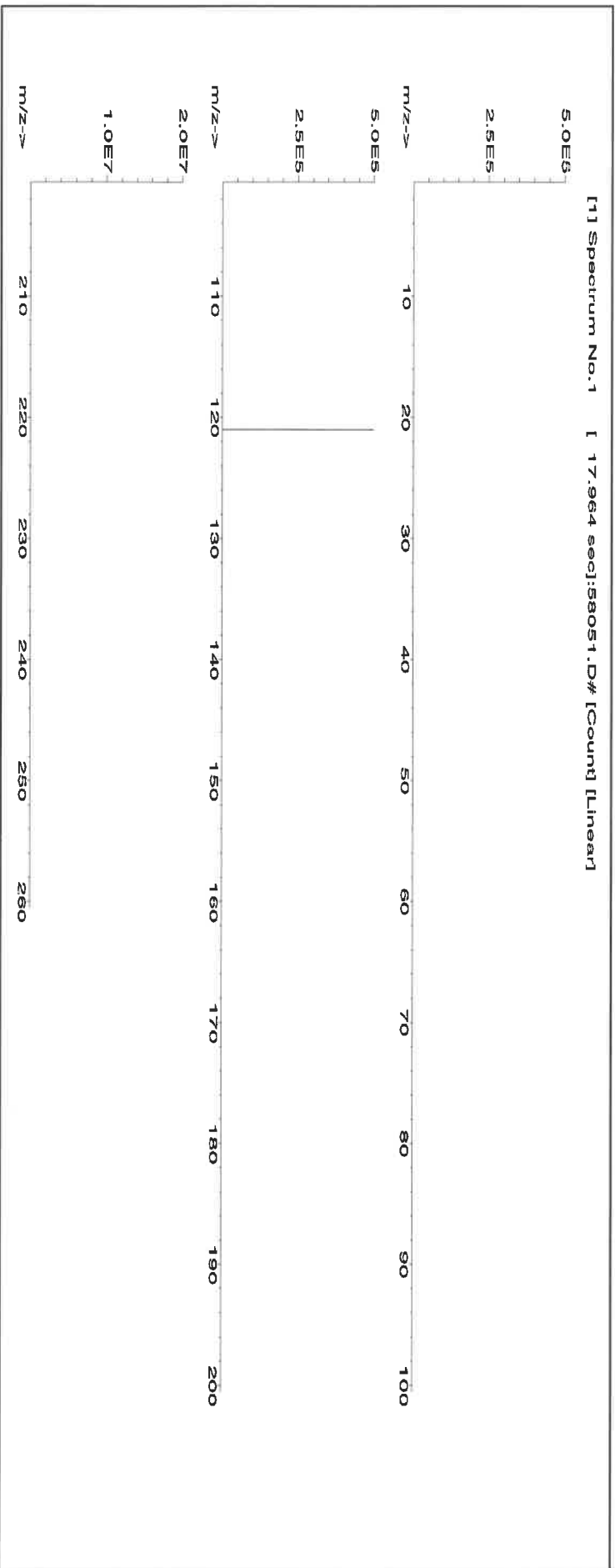
Volume shown below was diluted to (mL):

2000.26

5E-05 Balance Uncertainty
0.058 Flask Uncertainty

<i>Giovanni Esposito</i>	
Formulated By:	Giovanni Esposito
	071724
<i>Pedro L. Rentas</i>	
Reviewed By:	Pedro L. Rentas
	071724

SDS Information									
Compound	Part Number	Lot Number	Dilution Factor	Initial Vol. (mL)	Uncertainty (mL)	Nominal Conc. (µg/mL)	Initial Conc. (µg/mL)	Final Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)
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	or: rat 7000 mg/kg	3102a





Har P. R.



CERTIFIED WEIGHT REPORT:

Part Number: 57081
Lot Number: 062724
Description: Thallium (TI)

Lot #

Solvent: 24002546 Nitric Acid

2% 40.0 Nitric Acid (mL)

Expiration Date:

062727

Recommended Storage: Ambient (20 °C)

Nominal Concentration (µg/mL):

1000

NIST Test Number:

6UTB

Weight shown below was diluted to (mL): 2000.1

5E-05 Balance Uncertainty
0.10 Flask Uncertainty

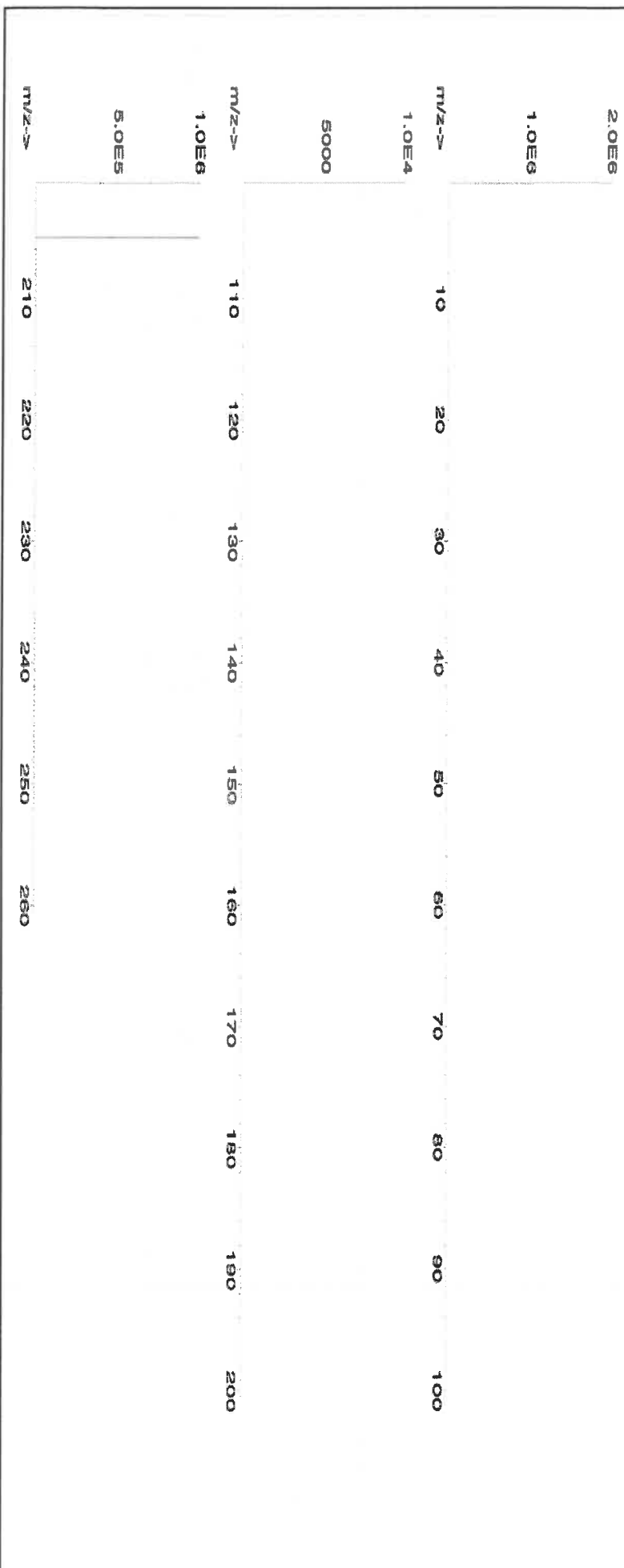
<i>Aleah O'Brady</i>	
Formulated By:	Aleah O'Brady
	062724
Reviewed By:	<i>Pedro L. Rendas</i>
	Pedro L. Rendas
	062724

SDS Information

Compound	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
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1. Thallium nitrate (TI) IN037 BCCF4399 1000 99.999 0.10 77.0 2.5975 2.5977 1000.1 2.0 10102-45-1 0.1 mg/m3 orl-mus 15mg/kg 3158

[1] Spectrum No.1 [14.044 sec]:57081.D# [Count] [Linear]





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

Trace Metals Verification by ICP-MS (µg/mL)

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.02	Pt	<0.02	Sc	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	T	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Tm	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Sn	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Ti	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Se	<0.02	Ta	<0.02			Zr	<0.02

(T) = Target analyte

Physical Characterization:

Certified by:

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 certified (+/-) 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

M6021



ANAB ISO 17034 Accredited
AR-1539 Certificate Number
<https://absolutestandards.com>

CERTIFIED WEIGHT REPORT:

Part Number: **57023**
Lot Number: **062424**
Description: **Vanadium (V)**

Lot # **24002546**
Solvent: **Nitric Acid**

<i>Aleah O'Brady</i>	
Formulated By:	Aleah O'Brady
Reviewed By:	Pedro L. Rantas
	062424

Expiration Date: **062427**
Recommended Storage: **Ambient (20 °C)**
Nominal Concentration (µg/mL): **1000**
NIST Test Number: **6UTB**

2.0%
40.0 (mL)
Nitric Acid

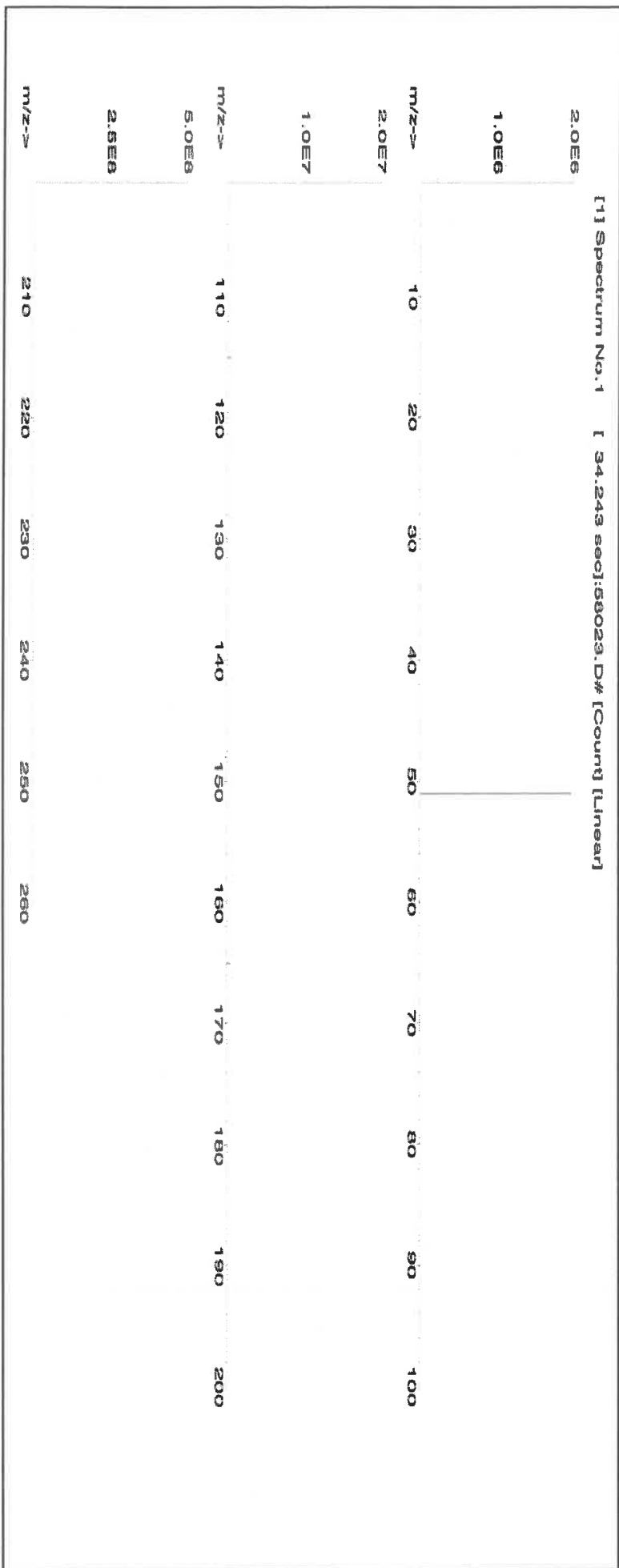
Volume shown below was diluted to (mL): **2000.3**

5E-05 Balance Uncertainty
0.06 Flask Uncertainty

Compound	Part Number	Lot Number	Dilution Factor	Initial Vol. (mL)	Uncertainty Pipette (mL)	Nominal Conc. (µg/mL)	Initial Conc. (µg/mL)	Final Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	SDS Information (Solvent Safety Info. On Attached pg.)	NIST SRM

1. Ammonium metavanadate (V) 58123 021224 0.1000 200.0 0.084 1000 10000.3 1000.0 2.2 7803-55-6 0.05 mg/m3 or-at 58.1mg/kg 3165

[1] Spectrum No.1 [34.243 sec]:58023.D# [Count] [Linear]





SHIPPING DOCUMENTS

CLIENT INFORMATION

REPORT TO BE SENT TO:

COMPANY: Gen Environmental
ADDRESS: B Carriado
CITY: Successville STATE: NJ ZIP:
ATTENTION:
PHONE: FAX:

CLIENT PROJECT INFORMATION

PROJECT NAME: Newport
PROJECT NO.: LOCATION:
PROJECT MANAGER: GA
e-mail:
PHONE: FAX:

CLIENT BILLING INFORMATION

BILL TO: G Environmental PO#:
ADDRESS: B Carriado
CITY: Successville STATE: NJ ZIP:
ATTENTION: PHONE:

ANALYSIS

DATA TURNAROUND INFORMATION

FAX (RUSH) Strongly DAYS*
HARDCOPY (DATA PACKAGE) Strongly DAYS*
EDD: Strongly DAYS*
*TO BE APPROVED BY CHEMTECH
STANDARD HARDCOPY TURNAROUND TIME IS 10 BUSINESS

DATA DELIVERABLE INFORMATION

☐ Level 1 (Results Only) ☐ Level 4 (QC + Full Raw Data)
☐ Level 2 (Results + QC) ☒ NJ Reduced ☐ US EPA CLP
☐ Level 3 (Results + QC) ☐ NYS ASP A ☐ NYS ASP B
+ Raw Data ☐ Other edd, has site
☒ EDD FORMAT edd, has site

1: EPH 2: VOC 3: GRD 4: THAL Metals 5: PCBS 6: ICUP Metals 7: PCB 8: ICUP Metals 9: ICUP Metals

PRESERVATIVES

COMMENTS

ALLIANCE SAMPLE ID	PROJECT SAMPLE IDENTIFICATION	SAMPLE MATRIX	SAMPLE TYPE		SAMPLE COLLECTION		# OF BOTTLES										← Specify Preservatives A-HCl D-NaOH B-HNO3 E-ICE C-H2SO4 F-OTHER
			COMP	GRAB	DATE	TIME		1	2	3	4	5	6	7	8	9	
1.	<u>WC1</u>	<u>9/30/15</u> <u>5011</u>	<u>X</u>	<u>9/30/15</u>	<u>1600</u>	<u>3</u>	<u>*</u>									<u>X</u>	
2.																	
3.																	
4.																	
5.																	
6.																	
7.																	
8.																	
9.																	
10.																	

SAMPLE CUSTODY MUST BE DOCUMENTED BELOW EACH TIME SAMPLES CHANGE POSSESSION INCLUDING COURIER DELIVERY

RELINQUISHED BY SAMPLER: 1. <u>[Signature]</u>	DATE/TIME: <u>1540</u> <u>10/2/25</u>	RECEIVED BY: 1. <u>[Signature]</u>	Conditions of bottles or coolers at receipt: ☐ COMPLIANT ☐ NON COMPLIANT ☐ COOLER TEMP <u>2.1</u> °C
RELINQUISHED BY SAMPLER: 2. <u>[Signature]</u>	DATE/TIME: <u></u>	RECEIVED BY: 2. <u>[Signature]</u>	Comments: <u>Waste Class</u>
RELINQUISHED BY SAMPLER: 3. <u>[Signature]</u>	DATE/TIME: <u></u>	RECEIVED BY: 3. <u>[Signature]</u>	Page <u></u> of <u></u> CLIENT: ☐ Hand Delivered ☐ Other <u>Shipment Complete</u> ☐ YES ☐ NO

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

LOGIN REPORT/SAMPLE TRANSFER

Order ID : Q3277 GENV01

Order Date : 10/2/2025 3:50:00 PM

Project Mgr :

Client Name : G Environmental

Project Name : ~~Lexington~~ **Newport**

Report Type : NJ Reduced

Client Contact : Gary Landis

Receive DateTime : 10/2/2025 3:40:00 PM

EDD Type : NJ HAZSITE

Invoice Name : G Environmental

Purchase Order :

Hard Copy Date :

Invoice Contact : Gary Landis

Date Signoff :

LAB ID	CLIENT ID	MATRIX	SAMPLE DATE	SAMPLE TIME	TEST	TEST GROUP	METHOD	FAX DATE	DUE DATES
Q3277-01	WC1	Solid	09/30/2025	16:00	VOC-TCLVOA-10		8260D		10 Bus. Days

Relinquished By : *GL*

Date / Time : 10/2/25 1620

Received By : *Sam*

Date / Time : 10/03/25

Storage Area : VOA Refridgerator Room