

DATA REPORTING QUALIFIERS- INORGANIC

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

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



LAB CHRONICLE

OrderID: Q3619

Client: Ambric Technology Corporation

Contact: Gary Meisel

OrderDate: 11/12/2025 2:37:47 PM

Project: 6506 Haverford Road **Location:** D31,VOA Ref. #2 Soil

LabID ClientID **Anal Date** Matrix Test Method Sample Date **Prep Date** Received Q3619-03 GP-B1(8-12) SOIL 11/12/25 11/12/25 Metals Group10 6010D 11/13/25 11/13/25 Q3619-04 GP-B1(12-16) SOIL 11/12/25 11/12/25 Metals Group10 6010D 11/13/25 11/13/25 Q3619-09 SOIL 11/12/25 GP-B2(12-16) 11/12/25 Metals Group10 6010D 11/13/25 11/13/25 Q3619-14 GP-B3(13.2) SOIL 11/12/25 11/12/25 Metals Group10 6010D 11/13/25 11/13/25 SOIL Q3619-17 GP-B4(8-12) 11/12/25 11/12/25 Metals Group10 6010D 11/13/25 11/13/25 SOIL 11/12/25 11/12/25 Q3619-18 GP-B4(13.2) Metals Group10 6010D 11/13/25 11/13/25



Fax: 908 789 8922

Hit Summary Sheet SW-846

SDG No.:	Q3619			Order ID:	Q3619		
Client:	Ambric Technology Corporation	1		Project ID:	6506 Haverford Road		
Sample ID	Client ID	Matrix	Parameter	Concentration C	MDL	RDL	Units
Client ID:	GP-B1(8-12)						
Q3619-03	GP-B1(8-12)	SOIL	Lead	5.46	0.13	0.60	mg/Kg
Client ID :	GP-B1(12-16)						
	,	COII	Tand	20.2	0.15	0.70	/IZ
Q3619-04	GP-B1(12-16)	SOIL	Lead	38.3	0.15	0.70	mg/Kg
Client ID:	GP-B2(12-16)						
Q3619-09	GP-B2(12-16)	SOIL	Lead	22.7	0.14	0.65	mg/Kg
Client ID :	GP-B3(13.2)						
		COII	Tand	7.20	0.12	0.50	
Q3619-14	GP-B3(13.2)	SOIL	Lead	7.38	0.13	0.58	mg/Kg
Client ID:	GP-B4(8-12)						
Q3619-17	GP-B4(8-12)	SOIL	Lead	92.8	0.17	0.78	mg/Kg
Client ID :	GP-B4(13.2)						
		SOII	Tand	7.46	0.14	0.62	/IZ
Q3619-18	GP-B4(13.2)	SOIL	Lead	7.46	0.14	0.63	mg/Kg



SAMPLE DATA



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Report of Analysis

Client: Ambric Technology Corporation Date Collected: 11/12/25 Project: 6506 Haverford Road Date Received: 11/12/25 Client Sample ID: GP-B1(8-12) SDG No.: Q3619 Lab Sample ID: Q3619-03 Matrix: SOIL Level (low/med): % Solid: 84.9 low

Cas	Parameter	Conc.	Qua. DF MDL	LOQ / CRQL	Units	Prep Date	Date Ana.	Ana Met.	Prep Met.
7439-92-1	Lead	5.46	1 0.13	0.60	mg/Kg	11/13/25 10:55	11/13/25 16:00) 6010D	SW3050

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



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Report of Analysis

Client: Ambric Technology Corporation Date Collected: 11/12/25 Project: 6506 Haverford Road Date Received: 11/12/25 Client Sample ID: GP-B1(12-16) SDG No.: Q3619 Lab Sample ID: Q3619-04 Matrix: SOIL Level (low/med): % Solid: 71.9 low

Cas	Parameter	Conc.	Qua. DF MDL	LOQ / CRQL	Units	Prep Date	Date Ana.	Ana Met.	Prep Met.
7439-92-1	Lead	38.3	1 0.15	0.70	mg/Kg	11/13/25 10:55	11/13/25 16:04	6010D	SW3050

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



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Report of Analysis

Client: Ambric Technology Corporation Date Collected: 11/12/25 Project: 6506 Haverford Road Date Received: 11/12/25 Client Sample ID: GP-B2(12-16) SDG No.: Q3619 Lab Sample ID: Q3619-09 Matrix: SOIL Level (low/med): % Solid: 78.5 low

Cas	Parameter	Conc.	Qua. DF MDL	LOQ / CRQL	Units	Prep Date	Date Ana.	Ana Met.	Prep Met.
7439-92-1	Lead	22.7	1 0.14	0.65	mg/Kg	11/13/25 10:55	11/13/25 16:03	8 6010D	SW3050

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



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Report of Analysis

Client: Ambric Technology Corporation Date Collected: 11/12/25 Project: 6506 Haverford Road Date Received: 11/12/25 Client Sample ID: GP-B3(13.2) SDG No.: Q3619 Lab Sample ID: Q3619-14 Matrix: SOIL Level (low/med): % Solid: 91 low

Cas	Parameter	Conc.	Qua. DF MDL	LOQ / CRQL	Units	Prep Date	Date Ana.	Ana Met.	Prep Met.
7439-92-1	Lead	7.38	1 0.13	0.58	mg/Kg	11/13/25 10:55	11/13/25 16:12	6010D	SW3050

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



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Report of Analysis

Client: Ambric Technology Corporation Date Collected: 11/12/25 Project: 6506 Haverford Road Date Received: 11/12/25 Client Sample ID: GP-B4(8-12) SDG No.: Q3619 Lab Sample ID: Q3619-17 Matrix: SOIL Level (low/med): % Solid: 69.5 low

Cas	Parameter	Conc.	Qua. DF MDL	LOQ / CRQL	Units	Prep Date	Date Ana.	Ana Met.	Prep Met.
7439-92-1	Lead	92.8	1 0.17	0.78	mg/Kg	11/13/25 10:55	11/13/25 16:16	6010D	SW3050

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



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Report of Analysis

Client: Ambric Technology Corporation Date Collected: 11/12/25 Project: 6506 Haverford Road Date Received: 11/12/25 Client Sample ID: GP-B4(13.2) SDG No.: Q3619 Lab Sample ID: Q3619-18 Matrix: SOIL Level (low/med): % Solid: low 90.5

Cas	Parameter	Conc.	Qua. DF MDL	LOQ / CRQL	Units	Prep Date	Date Ana.	Ana Met.	Prep Met.
7439-92-1	Lead	7.46	1 0.14	0.63	mg/Kg	11/13/25 10:55	11/13/25 16:20	6010D	SW3050

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



METAL CALIBRATION DATA



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Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client:	Ambric Technology Co	orporation	_	SDG No.:	Q3619
Contract:	AMBR01		_	Lab Code:	ACE
Initial Cali	ibration 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	Lead	3920	4000	98	90 - 110	Р		11/13/2025	13:12	LB137889



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Metals

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client:	Ambric Technology Corporation		_	SDG No.:	Q3619
Contract:	AMBR01		_	Lab Code:	ACE
Initial Cali	ibration Source:	EPA	_		
Continuing	g Calibration Source:	Inorganic Ventures			

Sample ID	Analyte	Result ug/L	True Value	% Recovery	Acceptance Window (%R)	N	Analysis M Date	Analysis Time	Run Number	
LLICV01	Lead	12.0	12.0	100	80 - 120	Р	11/13/2025	13:16	LB137889	



CCV07

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Metals

- 2a - INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client:	Ambric Technology Corporation	SDG No.:	Q3619	
		•		

Contract: AMBR01 Lab Code: ACE

4960

Initial Calibration Source: EPA

Continuing Calibration Source: Inorganic Ventures

Lead

Result ug/L **True Value %** Acceptance Analysis Analysis Run Sample ID Analyte Recovery Window (%R) M Date Time Number CCV01 4930 5000 99 90 - 110 P 11/13/2025 13:46 LB137889 Lead 90 - 110 CCV02 Lead 4830 5000 96 P 11/13/2025 14:35 LB137889 5000 97 CCV03 90 - 110 P Lead 4860 11/13/2025 15:48 LB137889 CCV04 Lead 5010 5000 100 90 - 110 P 11/13/2025 16:36 LB137889 CCV05 Lead 4860 5000 97 90 - 110 P 11/13/2025 17:27 LB137889 4900 5000 98 90 - 110 P CCV06 Lead 11/13/2025 18:17 LB137889

99

90 - 110

P

11/13/2025

18:38

LB137889

5000



Client:

CRI01

Lead

Contract:

Ambric Technology Corporation

14.4

AMBR01

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SDG No.:

Lab Code:

65 - 135

Q3619

ACE

11/13/2025

LB137889

13:25

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12.0

Metals

- 2b -CRDL STANDARD FOR AA & ICP

Sample ID	Analyte	Result ug/L	True Value ug/L	% Recovery	Acceptance Window (%R)	M	Analysis Date	Analysis Time	Run Number
Continuing (Calibration Sour	ce:		<u>—</u>					
Initial Calib	ration Source:	-							

120



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Metals

- 3a - INITIAL AND CONTINUING CALIBRATION BLANK SUMMARY

Client: Ambric Technology Corporation SDG No.: Q3619

Contract: AMBR01 Lab Code: ACE

Sample ID	Analyte	Result ug/L	Acceptance Limit	Conc Qual	CRQL	M	Analysis Date	Analysis Time	Run Number
ICB01	Lead	2.30	+/-6	U	12.0	P	11/13/2025	13:21	LB137889





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Metals

- 3a - INITIAL AND CONTINUING CALIBRATION BLANK SUMMARY

Client: Ambric Technology Corporation SDG No.: Q3619

Contract: AMBR01 Lab Code: ACE

Sample ID	Analyte	Result ug/L	Acceptance Limit	Conc Qual	CRQL	M	Analysis Date	Analysis Time	Run Number
CCB01	Lead	2.30	+/-6	U	12.0	P	11/13/2025	13:50	LB137889
CCB02	Lead	2.30	+/-6	U	12.0	P	11/13/2025	14:39	LB137889
CCB03	Lead	2.30	+/-6	U	12.0	P	11/13/2025	15:51	LB137889
CCB04	Lead	2.30	+/-6	U	12.0	P	11/13/2025	16:40	LB137889
CCB05	Lead	2.30	+/-6	U	12.0	P	11/13/2025	17:31	LB137889
CCB06	Lead	2.30	+/-6	U	12.0	P	11/13/2025	18:25	LB137889
CCB07	Lead	3.19	+/-6	J	12.0	P	11/13/2025	18:42	LB137889



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Metals - 3b -PREPARATION BLANK SUMMARY

Client: Ambric Technology Corporation SDG No.: Q3619

Instrument: P4

Sample ID	Analyte	Result (mg/Kg)	Acceptance Limit	Conc Qual	CRQL mg/Kg	M	Analysis Date	Analysis Time	Run
PB170522BL		SOLID		Batch Number:	PB170522		Prep Date:	11/13/20	25
	Lead	0.13	< 0.3	U	0.60	P	11/13/2025	13:54	LB137889



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Metals - 4 -INTERFERENCE CHECK SAMPLE

Client: Ambric Technology Corporation SDG No.: Q3619

Contract: AMBR01 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	Lead	-8.14			-12	12	11/13/2025	13:29	LB137889
ICSA01	Lead	42.2	49.0	86	37	61	11/13/2025	13:33	LB137889



METAL QC DATA



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metals - 5a -MATRIX SPIKE SUMMARY

client:	Ambric Technolog	y Corporation	lev	el:	low		sdg no.:	Q3619			
contract:	AMBR01						lab code	: ACE		<u></u>	
matrix:	Solid		sample	id:	Q3609-01		client id:	AU-713-0	COMP-01	MS	
Percent So	olids for Sample:	81.6	Spiked	ID:	Q3609-01	MS	Percent Soli	ids for Spike Sa	mple:	81.6	
Analyte	Units	Acceptance Limit %R	Spiked Result	C	Sample Result	C	Spike Added	% Recovery	Qual	M	
Lead	mg/Kg	75 - 125	62.6		14.0		54.5	89		P	



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metals - 5a -

MATRIX SPIKE DUPLICATE SUMMARY

client:	Ambric Technolog	y Corporation	le	vel:	low		sdg no.:	Q3619			
contract:	AMBR01						lab code	: ACE		<u></u>	
matrix:	Solid		sample	e id:	Q3609-01		client id:	AU-713-	COMP-01	1MSD	
Percent So	olids for Sample:	81.6	Spiked	ID:	Q3609-011	MSD	Percent Soli	ids for Spike Sa	ample:	81.6	
Analyte	Units	Acceptance Limit %R	MSD Result	C	Sample Result	C	Spike Added	% Recovery	Qual	M	
I ead	mσ/K σ	75 - 125	59 ′	2	14 0		53.3	85		р	



Metals - 5b -

Client:	Ambric Tech	nology Corporation				SDG No	.: Q3619			
Contract:	AMBR01					Lab Cod	le: ACE		_	
Matrix:			Level:	LOW		Client II	D:			
Sample ID:	:		Spiked ID:							
Analyte	Units	Acceptance Limit %R	C	Sample Result	C	Spike Added	% Recovery	Qual	M	
Analyte	Units	•	C	-	C	•		Qual	M	



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Metals

- 6 -

DUPLICATE SAMPLE SUMMARY

Client: Ambric Technology Corporation Level: LOW SDG No.: Q3619

Contract: AMBR01 Lab Code: ACE

Matrix:SolidSample ID:Q3609-01Client ID:AU-713-COMP-01DUP

Percent Solids for Sample: 81.6 Duplicate ID Q3609-01DUP Percent Solids for Spike Sample: 81.

•		Acceptance	Sample		Duplicate				
Analyte	Units	Limit	Result	C	Result	C	RPD	Qual	M
Lead	mg/Kg	20	14.0		12.	5	11		P



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Metals

- 6 -

DUPLICATE SAMPLE SUMMARY

Client: Ambric Technology Corporation Level: LOW SDG No.: Q3619

Contract: AMBR01 Lab Code: ACE

Matrix: Solid Sample ID: Q3609-01MS Client ID: AU-713-COMP-01MSD

Percent Solids for Sample: 81.6 Duplicate ID Q3609-01MSD Percent Solids for Spike Sample: 81.6

		Acceptance	Sample		Duplicate				
Analyte	Units	Limit	Result	C	Result	C	RPD	Qual	M
Lead	mg/Kg	20	62.6		59.2	2	6		P



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Metals

- 7 -

LABORATORY CONTROL SAMPLE SUMMARY

Client: Ambric Technology Corporation SDG No.: Q3619

Contract: AMBR01 Lab Code: ACE

Analyte	Units	True Value	Result	C	% Recovery	Acceptance Limits	M	
PB170522BS Lead	mg/Kg	50.0	46.2		92	80 - 120	P	



Metals

-9 -

ICP SERIAL DILUTIONS

SAMPLE NO.

AU-713-COMP-01L	

Lab Name:	Alliance	Alliance			Contract: A			AMBR01		
Lab Code:	ACE		Lb No.:	lb137889	Lab Sample ID :	Q3609-01L		SDG No.:	Q3619	
Matrix (soil/v	water):	Solid			Level (low/	/med):	LC	OW		
			Concen	tration Units:	mg/Kg					
		Initial	Sample		Serial Dilution			% Diffe		

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	С	% Differ- ence	Q	М
Lead	14	1.0		13.8	2		P



METAL PREPARATION & INSTRUMENT DATA



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Metals - 11 -

ICP INTERELEMENT CORRECTION FACTORS

Client:	Ambric Technology Corporation	SDG No.:	Q3619
Contract:	AMBR01	Lab Code:	ACE
Instrument	t ID:	Date:	
Interelemen	t Correction Factors (apparent ppb analyte/ppm interferent)		

	Wave-	ICP Interelement Correction Factors For:				
Analyte	Length (nm)	Al	Ca	Fe	Mg	Ag
Lead	220.353	-0.0000920	0.0000000	0.0000380	0.0000000	0.0000000



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Metals - 11 -

ICP INTERELEMENT CORRECTION FACTORS

Client:	Ambric Technology Corporation	SDG No.:	Q3619
Contract:	AMBR01	Lab Code:	ACE
Instrument	ID:	Date:	
T41	4 C		

Interelement Correction Factors (apparent ppb analyte/ppm interferent)

	Wave-	ICP Inte				
Analyte	Length (nm)	As	Ba	Be	Cd	Со
Lead	220.353	0.0000000	0.0003170	0.0000000	0.0000000	0.0000000



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Metals - 11 -

ICP INTERELEMENT CORRECTION FACTORS

Client:	Ambric Technology Corporation	SDG No.:	Q3619
Contract:	AMBR01	Lab Code:	ACE
Instrument ID:		Date:	
T41	. C	·4)	

Interelement Correction Factors (apparent ppb analyte/ppm interferent)

	Wave-	ICP Interelement Correction Factors For:				
Analyte	Length (nm)	Cr	Cu	K	Mn	Мо
Lead	220.353	0.0000000	0.0000000	0.0000000	0.0001400	-0.0008600



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Metals - 11 -

ICP INTERELEMENT CORRECTION FACTORS

Client:	Ambric Technology Corporation	SDG No.:	Q3619
Contract:	AMBR01	Lab Code:	ACE
Instrument ID:		Date:	
Interelemen	t Correction Factors (apparent ppb analyte/p	pm interferent)	

	Wave-	ICP Interelement Correction Factors For:					
Analyte	Length (nm)	Na	Ni	Pb	Sb	Se	
Lead	220.353	0.0000000	0.0006580	0.0000000	0.0000000	0.0001290	



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Metals - 11 -

ICP INTERELEMENT CORRECTION FACTORS

Client:	Ambric Technology Corporation	SDG No.:	Q3619
Contract:	AMBR01	Lab Code:	ACE
Instrument ID:		Date:	
T41	. C	·4)	

Interelement Correction Factors (apparent ppb analyte/ppm interferent)

	Wave-	ICP Interelement Correction Factors For:				
Analyte	Length (nm)	Sn	Ti	Tl	V	Zn
Lead	220.353	0.0000000	-0.0003610	0.0000000	0.0000000	0.0000000



METAL PREPARATION & ANALYICAL SUMMARY



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Metals - 13 -SAMPLE PREPARATION SUMMARY

Client: Ambric Technology Corporation SDG No.: Q3619

Contract: AMBR01 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	: PB170522						
PB170522BL	PB170522BL	MB	SOLID	11/13/2025	2.00	100.0	100.00
PB170522BS	PB170522BS	LCS	SOLID	11/13/2025	2.00	100.0	100.00
Q3609-01DUP	AU-713-COMP-01DUP	DUP	SOLID	11/13/2025	2.45	100.0	81.60
Q3609-01MS	AU-713-COMP-01MS	MS	SOLID	11/13/2025	2.25	100.0	81.60
Q3609-01MSD	AU-713-COMP-01MSD	MSD	SOLID	11/13/2025	2.30	100.0	81.60
Q3619-03	GP-B1(8-12)	SAM	SOLID	11/13/2025	2.36	100.0	84.90
Q3619-04	GP-B1(12-16)	SAM	SOLID	11/13/2025	2.40	100.0	71.90
Q3619-09	GP-B2(12-16)	SAM	SOLID	11/13/2025	2.34	100.0	78.50
Q3619-14	GP-B3(13.2)	SAM	SOLID	11/13/2025	2.26	100.0	91.00
Q3619-17	GP-B4(8-12)	SAM	SOLID	11/13/2025	2.22	100.0	69.50
Q3619-18	GP-B4(13.2)	SAM	SOLID	11/13/2025	2.10	100.0	90.50



metals - 14 -

ANALYSIS RUN LOG

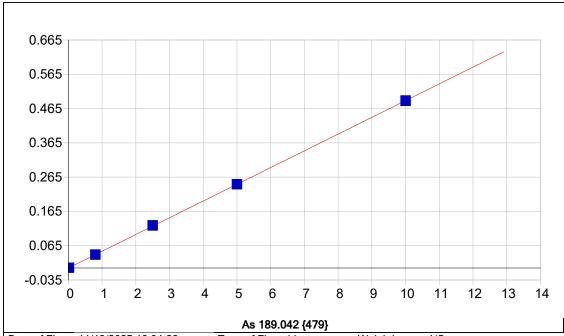
Client:	Ambric Technology	Corporation		Contract:	AMBR(01	
Lab code:	ACE			Sdg no.:	Q3619		
Instrument	id number:		Method:	 Run numbe	er: <u>LE</u>	3137889	

Start date: 11/13/2025 **End date:** 11/13/2025

Start date:	11/13/2025	End date:	1	1/13/2025
Lab sample id.	Client Sample Id	d/f	Time	Parameter list
S0	S0	1	1246	Pb
S1	S1	1	1251	Pb
S2	S2	1	1255	Pb
S3	S3	1	1259	Pb
S4	S4	1	1303	Pb
S5	S5	1	1307	Pb
ICV01	ICV01	1	1312	Pb
LLICV01	LLICV01	1	1316	Pb
ICB01	ICB01	1	1321	Pb
CRI01	CRI01	1	1325	Pb
ICSA01	ICSA01	1	1329	Pb
ICSAB01	ICSAB01	1	1333	Pb
CCV01	CCV01	1	1346	Pb
CCB01	CCB01	1	1350	Pb
PB170522BL	PB170522BL	1	1354	Pb
PB170522BS	PB170522BS	1	1358	Pb
Q3609-01DUP	AU-713-COMP-01DUP	1	1411	Pb
Q3609-01L	AU-713-COMP-01L	5	1415	Pb
Q3609-01MS	AU-713-COMP-01MS	1	1419	Pb
Q3609-01MSD	AU-713-COMP-01MSD	1	1423	Pb
CCV02	CCV02	1	1435	Pb
CCB02	CCB02	1	1439	Pb
CCV03	CCV03	1	1548	Pb
CCB03	CCB03	1	1551	Pb
Q3619-03	GP-B1(8-12)	1	1600	Pb
Q3619-04	GP-B1(12-16)	1	1604	Pb
Q3619-09	GP-B2(12-16)	1	1608	Pb
Q3619-14	GP-B3(13.2)	1	1612	Pb
Q3619-17	GP-B4(8-12)	1	1616	Pb
Q3619-18	GP-B4(13.2)	1	1620	Pb
CCV04	CCV04	1	1636	Pb
CCB04	CCB04	1	1640	Pb
CCV05	CCV05	1	1727	Pb
CCB05	CCB05	1	1731	Pb
CCV06	CCV06	1	1817	Pb
CCB06	CCB06	1	1825	Pb
CCV07	CCV07	1	1838	Pb
CCB07	CCB07	1	1842	Pb



METAL RAW DATA



A0 (Offset): 0.000002 Re-Slope: 1.000000 A1 (Gain): 0.048822 Y-int: 0.000000

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

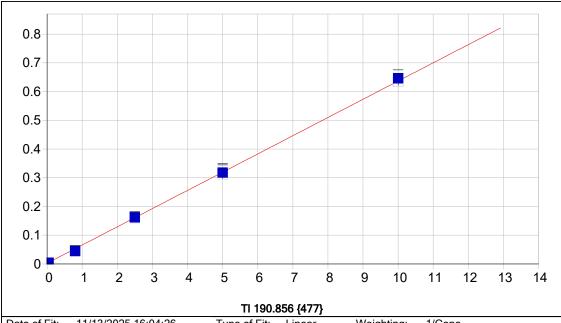
Correlation: 0.999984 Status: OK.

 Std Error of Est:
 0.000007

 Predicted MDL:
 0.005699

 Predicted MQL:
 0.018996

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00000	.000	.000	.00000	.000	1
S1	.02000	.01882	001	-5.91	.00092	.000	1
S3	2.5000	2.5325	.032	1.30	.12352	.000	1
S4	5.0000	4.9945	006	110	.24359	.000	1
S5	10.000	9.9811	019	189	.48679	.001	1
S2	.80000	.79312	007	860	.03868	.000	1



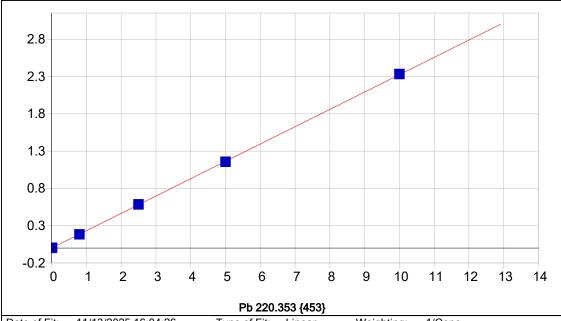
A0 (Offset): 0.002415 Re-Slope: 1.000000 Y-int: 0.000000 A1 (Gain): 0.063419

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

Correlation: 0.999244 OK. Status:

Std Error of Est: 0.000080 Predicted MDL: 0.005388 Predicted MQL: 0.017961

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00001	.000	.000	.00242	.000	1
S1	.04000	.03097	009	-22.6	.00422	.000	1
S3	2.5000	2.5219	.022	.877	.15946	.003	1
S4	5.0000	4.9743	026	514	.31210	.015	1
S5	10.000	10.146	.146	1.46	.63429	.013	1
S2	.80000	.66653	133	-16.7	.04376	.002	1



A0 (Offset): -0.000251 Re-Slope: 1.000000 A1 (Gain): 0.232541 Y-int: 0.000000

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

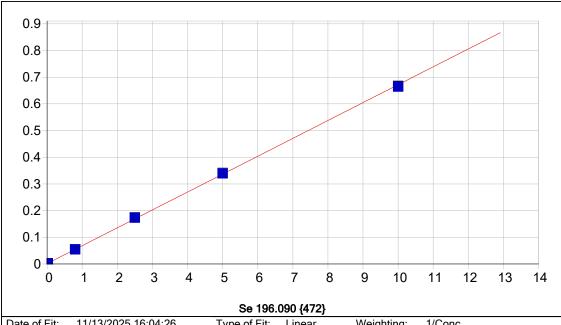
Correlation: 0.999974 Status: OK.

 Std Error of Est:
 0.000030

 Predicted MDL:
 0.002649

 Predicted MQL:
 0.008830

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00000	000	.000	00025	.000	1
S1	.01200	.01393	.002	16.1	.00293	.000	1
S3	2.5000	2.5111	.011	.445	.58304	.002	1
S4	5.0000	4.9713	029	574	1.1545	.002	1
S5	10.000	10.032	.032	.319	2.3300	.002	1
S2	.80000	.78383	016	-2.02	.18181	.001	1



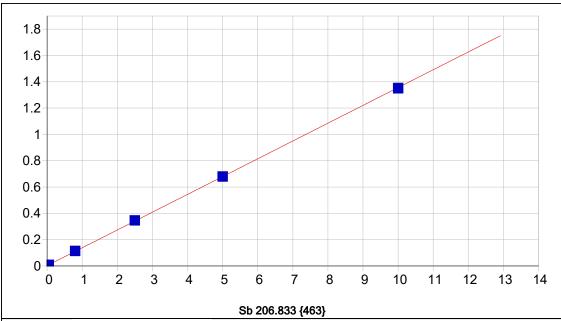
A0 (Offset): 0.001309 Re-Slope: 1.000000 Y-int: 0.000000 A1 (Gain): 0.067040

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

Correlation: 0.999911 OK. Status:

Std Error of Est: 0.000021 Predicted MDL: 0.005908 Predicted MQL: 0.019695

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00000	.000	.000	.00131	.000	1
S1	.02000	.01939	001	-3.06	.00261	.000	1
S3	2.5000	2.5666	.067	2.67	.17335	.001	1
S4	5.0000	5.0421	.042	.842	.33928	.001	1
S5	10.000	9.8942	106	-1.06	.66451	.002	1
S2	.80000	.79769	002	289	.05478	.000	1



A0 (Offset): 0.002605 Re-Slope: 1.000000 A1 (Gain): 0.135341 Y-int: 0.000000

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

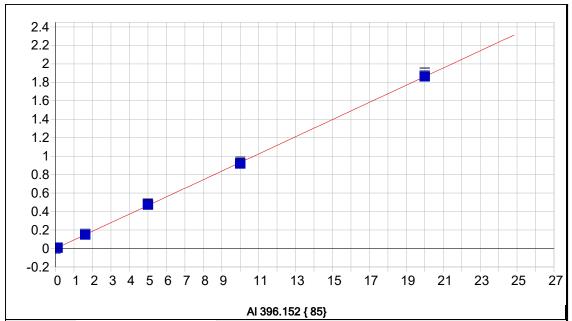
Correlation: 0.999976 Status: OK.

 Std Error of Est:
 0.000035

 Predicted MDL:
 0.003814

 Predicted MQL:
 0.012715

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00000	.000	.000	.00261	.000	1
S1	.05000	.04745	003	-5.10	.00904	.000	1
S3	2.5000	2.5309	.031	1.24	.34606	.001	1
S4	5.0000	4.9992	001	017	.68104	.001	1
S5	10.000	9.9598	040	402	1.3543	.001	1
S2	.80000	.81269	.013	1.59	.11289	.000	1



A0 (Offset): 0.000291 Re-Slope: 1.000000 A1 (Gain): 0.093090 Y-int: 0.000000

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

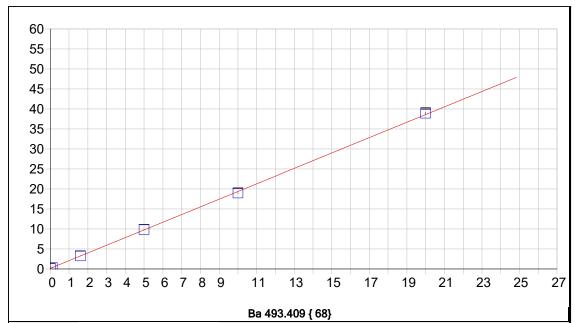
Correlation: 0.999896 Status: OK.

 Std Error of Est:
 0.000102

 Predicted MDL:
 0.026557

 Predicted MQL:
 0.088523

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00002	.000	.000	.00029	.003	1
S1	.10000	.07912	021	-20.9	.00838	.001	1
S3	5.0000	5.1001	.100	2.00	.48409	.004	1
S4	10.000	9.8810	119	-1.19	.93817	.004	1
S5	20.000	20.027	.027	.137	1.9008	.006	1
S2	1.6000	1.6135	.014	.844	.15338	.003	1



A0 (Offset): 0.150647 Re-Slope: 1.000000 A1 (Gain): 1.922396 Y-int: 0.000000

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

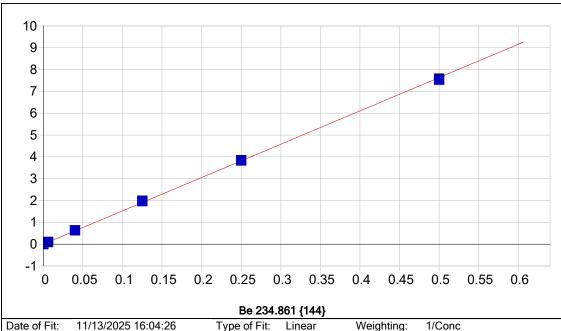
Correlation: 0.999903 Status: OK.

 Std Error of Est:
 0.001981

 Predicted MDL:
 0.002726

 Predicted MQL:
 0.009086

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00001	.000	.000	.15066	.006	1
S1	.10000	.09080	009	-9.20	.32520	.002	1
S3	5.0000	5.0449	.045	.899	9.8490	.051	1
S4	10.000	9.7898	210	-2.10	18.971	.079	1
S5	20.000	20.158	.158	.792	38.903	.217	1
S2	1.6000	1.6160	.016	.998	3.2572	.008	1



Weighting:

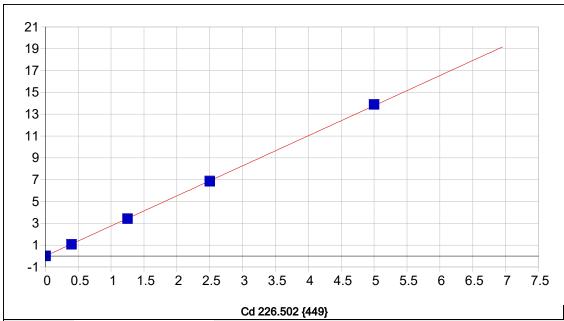
A0 (Offset): -0.002349 Re-Slope: 1.000000 Y-int: 0.000000 A1 (Gain): 15.273485

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

Correlation: 0.999853 OK. Status:

Std Error of Est: 0.000751 Predicted MDL: 0.000108 Predicted MQL: 0.000361

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00000	000	.000	00236	.002	1
S1	.00600	.00620	.000	3.31	.09164	.001	1
S3	.12500	.12897	.004	3.17	1.9589	.016	1
S4	.25000	.25117	.001	.468	3.8168	.012	1
S5	.50000	.49336	007	-1.33	7.4988	.057	1
S2	.04000	.04130	.001	3.26	.62576	.004	1



A0 (Offset): -0.002303 Re-Slope: 1.000000 A1 (Gain): 2.757840 Y-int: 0.000000

A2 (Curvature): 0.000000

n (Exponent): 1.000000

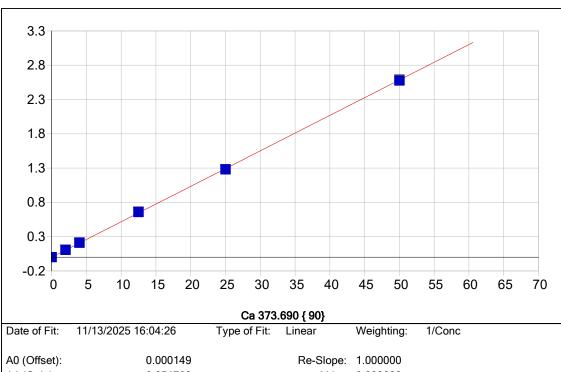
Correlation: 0.999949 Status: OK.

 Std Error of Est:
 0.000254

 Predicted MDL:
 0.000181

 Predicted MQL:
 0.000602

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00000	.000	.000	00230	.000	1
S1	.00600	.00593	000	-1.21	.01410	.000	1
S3	1.2500	1.2416	008	674	3.4240	.013	1
S4	2.5000	2.4841	016	635	6.8531	.020	1
S5	5.0000	5.0384	.038	.768	13.902	.007	1
S2	.40000	.38599	014	-3.50	1.0629	.002	1



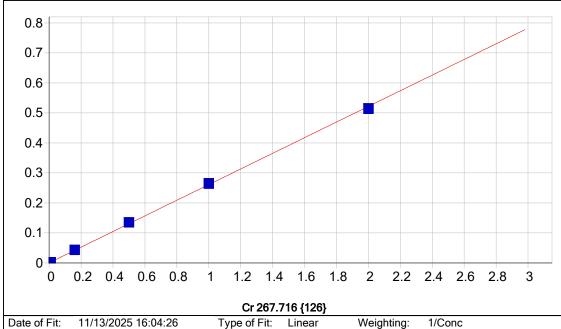
Y-int: 0.000000 A1 (Gain): 0.051700

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

Correlation: 0.999941 OK. Status:

Std Error of Est: 0.000297 Predicted MDL: 0.036222 Predicted MQL: 0.120740

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00011	000	.000	.00014	.002	1
S2	4.0000	4.0585	.059	1.46	.20997	.002	1
S3	12.500	12.755	.255	2.04	.65960	.004	1
S4	25.000	24.775	225	901	1.2810	.004	1
S5	50.000	49.842	158	315	2.5770	.010	1
S1	2.0000	2.0691	.069	3.45	.10712	.002	1



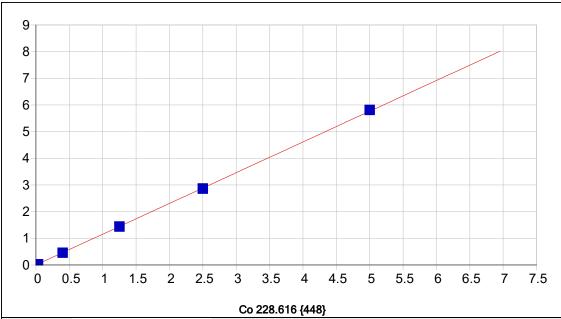
A0 (Offset): 0.000391 Re-Slope: 1.000000 Y-int: 0.000000 0.260663 A1 (Gain):

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

Correlation: 0.999832 OK. Status:

Std Error of Est: 0.000035 Predicted MDL: 0.000986 Predicted MQL: 0.003288

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00000	000	.000	.00039	.000	1
S1	.01000	.01052	.001	5.22	.00314	.000	1
S3	.50000	.51642	.016	3.28	.13511	.001	1
S4	1.0000	1.0101	.010	1.01	.26389	.001	1
S5	2.0000	1.9692	031	-1.54	.51410	.002	1
S2	.16000	.16380	.004	2.38	.04312	.000	1



A0 (Offset): 0.000757 Re-Slope: 1.000000 A1 (Gain): 1.152701 Y-int: 0.000000

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

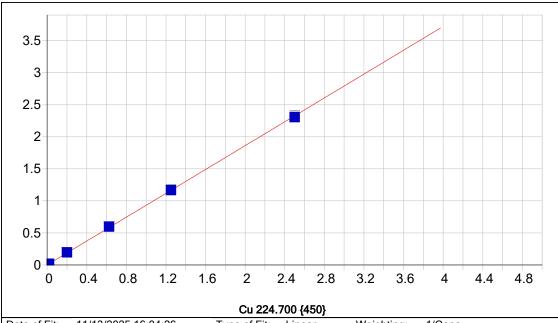
Correlation: 0.999960 Status: OK.

 Std Error of Est:
 0.000211

 Predicted MDL:
 0.000402

 Predicted MQL:
 0.001341

Std. Name	e Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00000	.000	.000	.00076	.000	1
S1	.03000	.02868	001	-4.40	.03367	.000	1
S3	1.2500	1.2445	006	442	1.4377	.005	1
S4	2.5000	2.4756	024	975	2.8593	.006	1
S5	5.0000	5.0384	.038	.768	5.8183	.007	1
S2	.40000	.39278	007	-1.80	.45430	.001	1



A0 (Offset): 0.001554 Re-Slope: 1.000000 A1 (Gain): 0.930213 Y-int: 0.000000

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

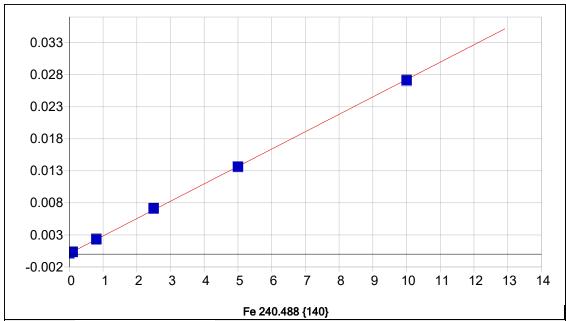
Correlation: 0.999892 Status: OK.

 Std Error of Est:
 0.000162

 Predicted MDL:
 0.000834

 Predicted MQL:
 0.002779

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00000	000	.000	.00155	.000	1
S1	.02000	.02160	.002	8.00	.02188	.001	1
S3	.62500	.64076	.016	2.52	.60304	.001	1
S4	1.2500	1.2508	.001	.063	1.1759	.000	1
S5	2.5000	2.4750	025	-1.00	2.3256	.001	1
S2	.20000	.20687	.007	3.44	.19573	.000	1



A0 (Offset): 0.000116 Re-Slope: 1.000000 A1 (Gain): 0.002713 Y-int: 0.000000

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

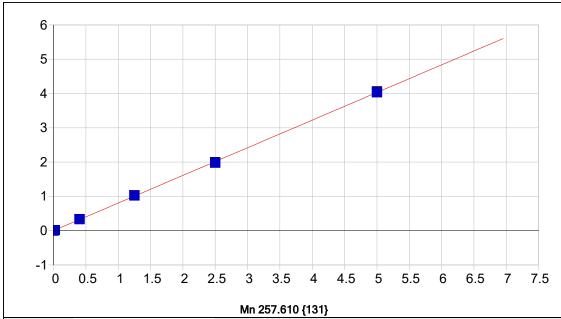
Correlation: 0.999767 Status: OK.

 Std Error of Est:
 0.000003

 Predicted MDL:
 0.025563

 Predicted MQL:
 0.085212

Std. Name	e Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00002	.000	.000	.00012	.000	1
S1	.10000	.07689	023	-23.1	.00032	.000	1
S3	2.5000	2.5829	.083	3.32	.00707	.000	1
S4	5.0000	4.9818	018	364	.01352	.000	1
S5	10.000	9.9521	048	479	.02689	.000	1
S2	.80000	.80622	.006	.778	.00229	.000	1



A0 (Offset): 0.000395 Re-Slope: 1.000000 A1 (Gain): 0.805914 Y-int: 0.000000

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

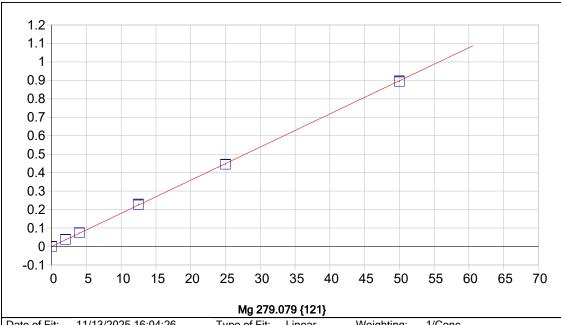
Correlation: 0.999919 Status: OK.

 Std Error of Est:
 0.000170

 Predicted MDL:
 0.000994

 Predicted MQL:
 0.003314

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00000	000	.000	.00039	.001	1
S1	.02000	.02063	.001	3.13	.01702	.001	1
S3	1.2500	1.2706	.021	1.65	1.0246	.004	1
S4	2.5000	2.4586	041	-1.65	1.9823	.010	1
S5	5.0000	5.0069	.007	.138	4.0363	.022	1
S2	.40000	.41323	.013	3.31	.33349	.001	1



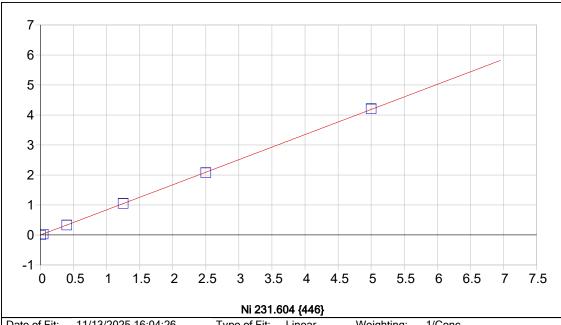
A0 (Offset): 0.000094 Re-Slope: 1.000000 Y-int: 0.000000 A1 (Gain): 0.017950

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

Correlation: 0.999920 OK. Status:

Std Error of Est: 0.000120 Predicted MDL: 0.053332 Predicted MQL: 0.177772

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00017	000	.000	.00009	.001	1
S2	4.0000	4.1268	.127	3.17	.07417	.001	1
S3	12.500	12.672	.172	1.37	.22755	.003	1
S4	25.000	24.771	229	915	.44474	.001	1
S5	50.000	49.822	178	356	.89440	.003	1
S1	2.0000	2.1085	.108	5.42	.03794	.000	1



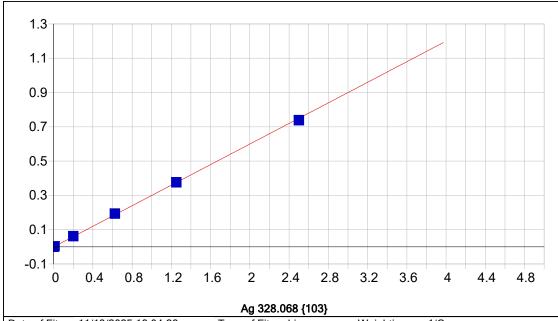
A0 (Offset): -0.001461 Re-Slope: 1.000000 Y-int: 0.000000 A1 (Gain): 0.836909

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

Correlation: 0.999979 OK. Status:

Std Error of Est: 0.000127 Predicted MDL: 0.000622 Predicted MQL: 0.002073

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00000	.000	.000	00146	.000	1
S1	.04000	.03872	001	-3.21	.03094	.000	1
S3	1.2500	1.2513	.001	.106	1.0458	.004	1
S4	2.5000	2.4806	019	778	2.0745	.004	1
S5	5.0000	5.0247	.025	.494	4.2037	.004	1
S2	.40000	.39472	005	-1.32	.32888	.000	1



A0 (Offset): -0.000497 Re-Slope: 1.000000 A1 (Gain): 0.300050 Y-int: 0.000000

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

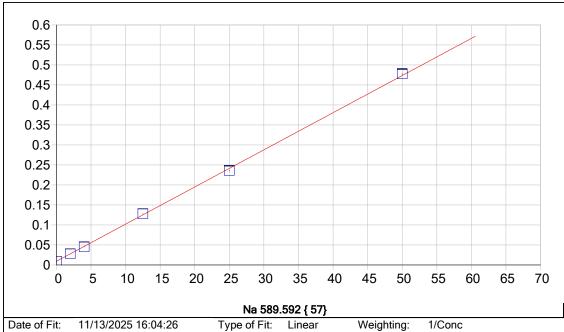
Correlation: 0.999797 Status: OK.

 Std Error of Est:
 0.000050

 Predicted MDL:
 0.001418

 Predicted MQL:
 0.004726

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00000	000	.000	00050	.000	1
S1	.01000	.01149	.001	14.9	.00293	.000	1
S3	.62500	.64660	.022	3.46	.19268	.000	1
S4	1.2500	1.2558	.006	.462	.37463	.001	1
S5	2.5000	2.4632	037	-1.47	.73526	.001	1
S2	.20000	.20790	.008	3.95	.06162	.000	1



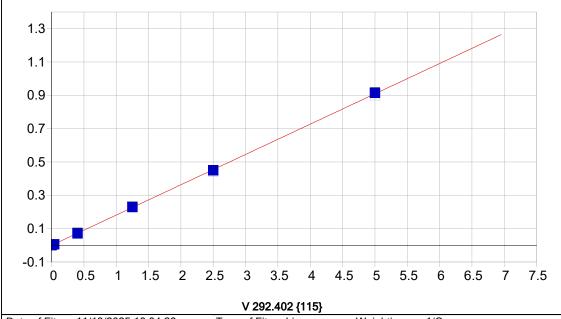
A0 (Offset): 0.009248 Re-Slope: 1.000000 Y-int: 0.000000 A1 (Gain): 0.009288

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

Correlation: 0.999850 OK. Status:

Std Error of Est: 0.000085 Predicted MDL: 0.058974 Predicted MQL: 0.196580

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00005	.000	.000	.00925	.000	1
S2	4.0000	3.8751	125	-3.12	.04524	.001	1
S3	12.500	12.792	.292	2.33	.12806	.000	1
S4	25.000	24.414	586	-2.34	.23601	.001	1
S5	50.000	50.420	.420	.841	.47755	.001	1
S1	2.0000	1.9986	001	069	.02781	.000	1



A0 (Offset): -0.000454 Re-Slope: 1.000000 A1 (Gain): 0.181903 Y-int: 0.000000

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

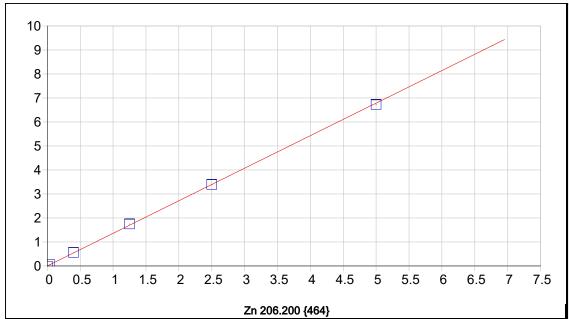
Correlation: 0.999932 Status: OK.

 Std Error of Est:
 0.000049

 Predicted MDL:
 0.006451

 Predicted MQL:
 0.021502

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00001	.000	.000	00045	.001	1
S1	.04000	.03536	005	-11.6	.00570	.001	1
S3	1.2500	1.2621	.012	.966	.22581	.001	1
S4	2.5000	2.4706	029	-1.18	.44232	.002	1
S5	5.0000	5.0269	.027	.537	.90068	.003	1
S2	.40000	.39502	005	-1.24	.07034	.002	1



A0 (Offset): 0.001890 Re-Slope: 1.000000 A1 (Gain): 1.356764 Y-int: 0.000000

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

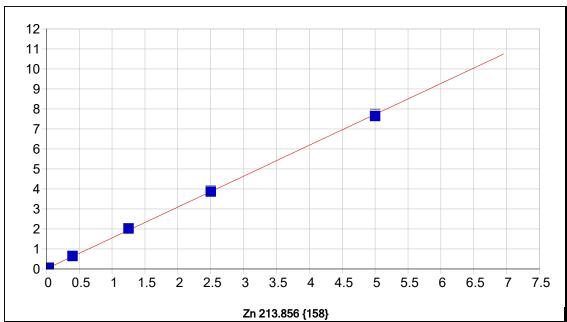
Correlation: 0.999909 Status: OK.

 Std Error of Est:
 0.000428

 Predicted MDL:
 0.000311

 Predicted MQL:
 0.001035

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00000	000	.000	.00189	.000	1
S1	.04000	.04002	.000	.045	.05619	.000	1
S3	1.2500	1.2853	.035	2.82	1.7457	.005	1
S4	2.5000	2.4998	000	008	3.3935	.003	1
S5	5.0000	4.9547	045	905	6.7243	.008	1
S2	.40000	.41019	.010	2.55	.55842	.002	1



A0 (Offset): 0.004199 Re-Slope: 1.000000 A1 (Gain): 1.545143 Y-int: 0.000000

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

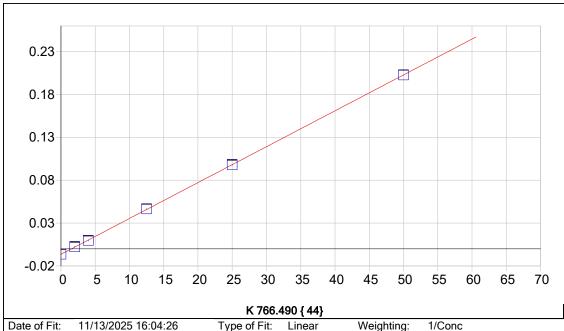
Correlation: 0.999827 Status: OK.

 Std Error of Est:
 0.000680

 Predicted MDL:
 0.000712

 Predicted MQL:
 0.002372

;	Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
;	S0	.00000	00000	000	.000	.00420	.001	1
:	S1	.04000	.03979	000	519	.06612	.000	1
;	S3	1.2500	1.3008	.051	4.07	2.0276	.008	1
1;	S4	2.5000	2.4959	004	163	3.8876	.014	1
;	S5	5.0000	4.9402	060	-1.20	7.6912	.054	1
;	S2	.40000	.41328	.013	3.32	.64707	.003	1



Weighting:

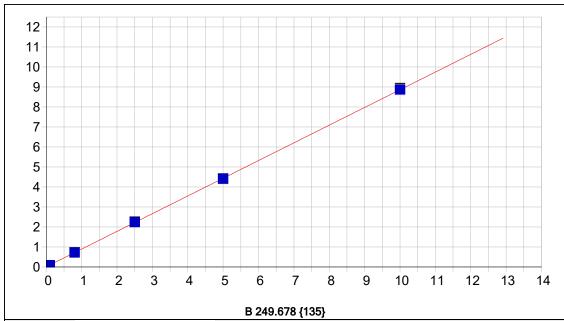
A0 (Offset): -0.006459 Re-Slope: 1.000000 Y-int: 0.000000 A1 (Gain): 0.004186

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

Correlation: 0.999932 OK. Status:

Std Error of Est: 0.000026 Predicted MDL: 0.131974 Predicted MQL: 0.439913

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00003	000	.000	00646	.000	1
S2	4.0000	3.8362	164	-4.10	.00960	.000	1
S3	12.500	12.642	.142	1.14	.04646	.000	1
S4	25.000	24.946	054	218	.09796	.001	1
S5	50.000	49.985	015	031	.20277	.000	1
S1	2.0000	2.0915	.091	4.57	.00230	.001	1



A0 (Offset): 0.009890 Re-Slope: 1.000000 A1 (Gain): V-int: 0.000000

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

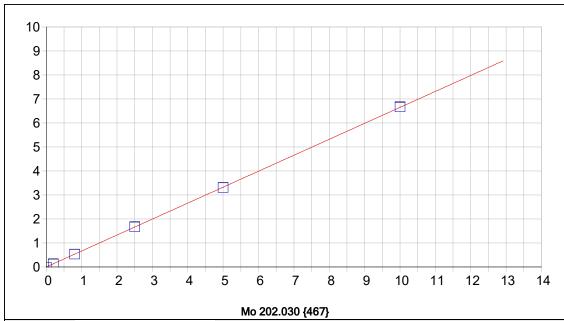
Correlation: 0.999989 Status: OK.

 Std Error of Est:
 0.000221

 Predicted MDL:
 0.001885

 Predicted MQL:
 0.006282

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00000	.000	.000	.00989	.000	1
S1	.10000	.09891	001	-1.09	.09693	.001	1
S3	2.5000	2.5203	.020	.813	2.2330	.021	1
S4	5.0000	4.9669	033	662	4.3909	.015	1
S5	10.000	10.013	.013	.128	8.8418	.077	1
S2	.80000	.80109	.001	.136	.71650	.009	1



A0 (Offset): 0.000888 Re-Slope: 1.000000 A1 (Gain): 0.664774 Y-int: 0.000000

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

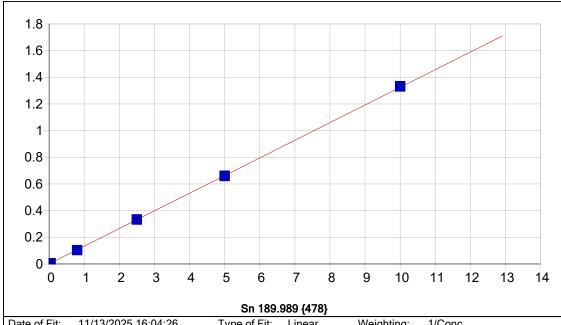
Correlation: 0.999980 Status: OK.

 Std Error of Est:
 0.000309

 Predicted MDL:
 0.000660

 Predicted MQL:
 0.002201

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00001	.000	.000	.00089	.000	1
S1	.20000	.19125	009	-4.38	.12802	.001	1
S3	2.5000	2.5159	.016	.638	1.6734	.004	1
S4	5.0000	4.9696	030	608	3.3046	.004	1
S5	10.000	10.023	.023	.231	6.6640	.008	1
S2	.80000	.80009	.000	.012	.53277	.003	1



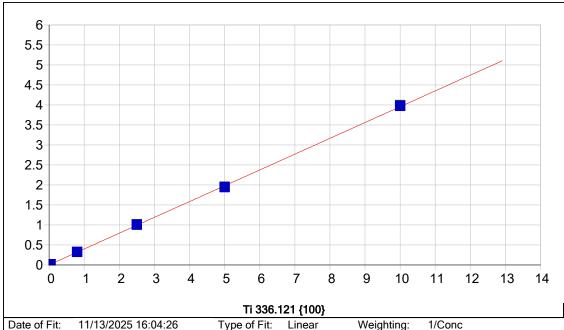
A0 (Offset): 0.000919 Re-Slope: 1.000000 Y-int: 0.000000 A1 (Gain): 0.132335

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

Correlation: 0.999960 OK. Status:

Std Error of Est: 0.000039 Predicted MDL: 0.001497 Predicted MQL: 0.004991

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00000	.000	.000	.00092	.000	1
S1	.04000	.03791	002	-5.22	.00593	.000	1
S3	2.5000	2.5045	.004	.178	.33201	.001	1
S4	5.0000	4.9724	028	552	.65826	.003	1
S5	10.000	10.052	.052	.525	1.3299	.002	1
S2	.80000	.77280	027	-3.40	.10308	.000	1



11/13/2025 16:04:26 Type of Fit: Linear Weighting: 1/Conc

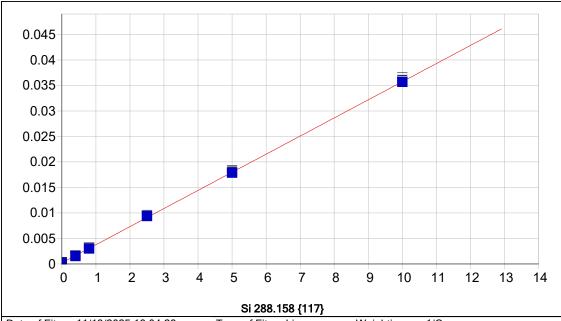
A0 (Offset): 0.004037 Re-Slope: 1.000000 Y-int: 0.000000 A1 (Gain): 0.395099

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

Correlation: 0.999921 OK. Status:

Std Error of Est: 0.000165 Predicted MDL: 0.003758 Predicted MQL: 0.012526

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00000	.000	.000	.00404	.000	1
S1	.04000	.03515	005	-12.1	.01791	.000	1
S3	2.5000	2.5353	.035	1.41	1.0054	.006	1
S4	5.0000	4.9133	087	-1.73	1.9446	.005	1
S5	10.000	10.049	.049	.490	3.9730	.020	1
S2	.80000	.80723	.007	.904	.32286	.001	1



A0 (Offset): 0.000215 Re-Slope: 1.000000 A1 (Gain): V-int: 0.000000

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

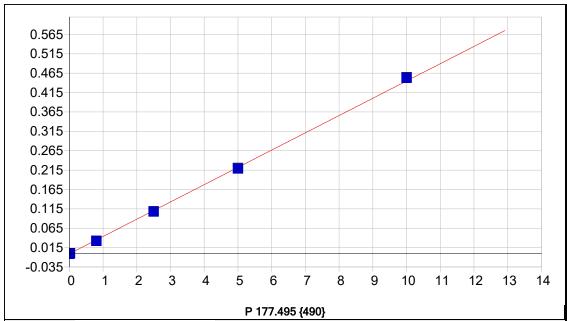
Correlation: 0.999869 Status: OK.

 Std Error of Est:
 0.000006

 Predicted MDL:
 0.038714

 Predicted MQL:
 0.129048

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00003	.000	.000	.00022	.000	1
S1	.40000	.37223	028	-6.94	.00154	.000	1
S3	2.5000	2.5810	.081	3.24	.00952	.000	1
S4	5.0000	4.9754	025	493	.01815	.000	1
S5	10.000	9.9874	013	126	.03622	.000	1
S2	.80000	.78362	016	-2.05	.00304	.000	1



A0 (Offset): -0.000984 Re-Slope: 1.000000 A1 (Gain): 0.044597 Y-int: 0.000000

A2 (Curvature): 0.000000

n (Exponent): 1.000000

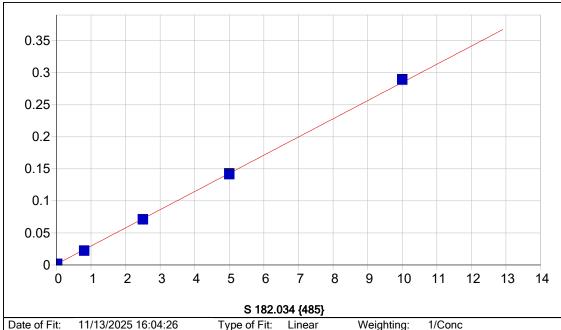
Correlation: 0.999728 Status: OK.

 Std Error of Est:
 0.000024

 Predicted MDL:
 0.003540

 Predicted MQL:
 0.011801

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00000	.000	.000	00098	.000	1
S1	.02000	.01692	003	-15.4	00023	.000	1
S3	2.5000	2.4376	062	-2.49	.10771	.000	1
S4	5.0000	4.9330	067	-1.34	.21898	.001	1
S5	10.000	10.186	.186	1.86	.45321	.001	1
S2	.80000	.74657	053	-6.68	.03231	.000	1



11/13/2025 16:04:26 Type of Fit: Linear Weighting:

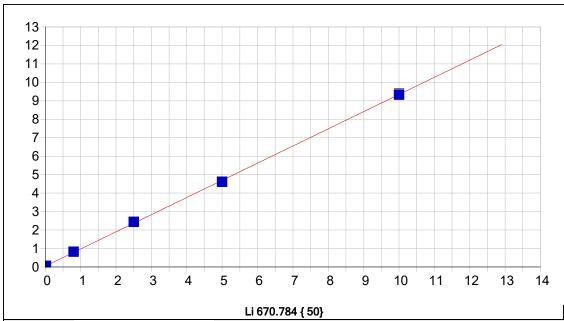
A0 (Offset): 0.001212 Re-Slope: 1.000000 Y-int: 0.000000 A1 (Gain): 0.028356

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

Correlation: 0.999750 OK. Status:

Std Error of Est: 0.000015 Predicted MDL: 0.006546 Predicted MQL: 0.021821

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00001	.000	.000	.00121	.000	1
S1	.02000	.01619	004	-19.1	.00165	.000	1
S3	2.5000	2.4659	034	-1.36	.07095	.000	1
S4	5.0000	4.9460	054	-1.08	.14109	.001	1
S5	10.000	10.155	.155	1.55	.28842	.001	1
S2	.80000	.73705	063	-7.87	.02205	.000	1



A0 (Offset): 0.044034 Re-Slope: 1.000000 A1 (Gain): 0.929748 Y-int: 0.000000

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

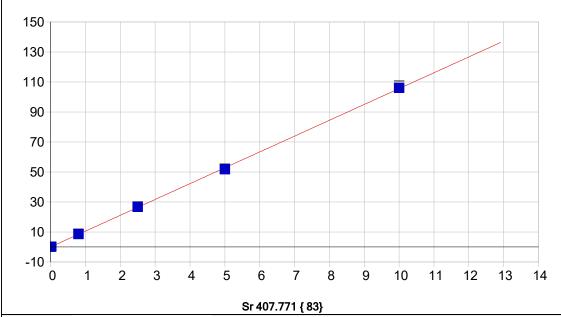
Correlation: 0.999859 Status: OK.

 Std Error of Est:
 0.000366

 Predicted MDL:
 0.004864

 Predicted MQL:
 0.016212

Std. Name	e Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00000	000	.000	.04403	.003	1
S5	10.000	9.9872	013	128	9.3371	.049	1
S4	5.0000	4.9085	091	-1.83	4.6114	.012	1
S3	2.5000	2.5675	.067	2.70	2.4330	.013	1
S1	.02000	.02136	.001	6.79	.06422	.003	1
S2	.80000	.83540	.035	4.42	.82134	.003	1



A0 (Offset): -0.001464 Re-Slope: 1.000000 A1 (Gain): 10.556620 Y-int: 0.000000

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

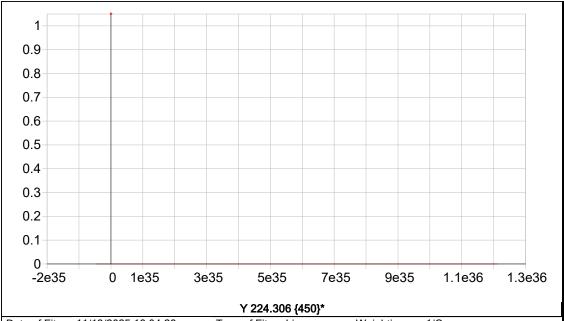
Correlation: 0.999931 Status: OK.

 Std Error of Est:
 0.002917

 Predicted MDL:
 0.000243

 Predicted MQL:
 0.000809

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	00000	000	.000	00148	.003	1
S1	.02000	.02115	.001	5.76	.22284	.006	1
S3	2.5000	2.5307	.031	1.23	26.740	.143	1
S4	5.0000	4.9082	092	-1.84	51.863	.179	1
S5	10.000	10.048	.048	.476	106.17	1.29	1
S2	.80000	.81239	.012	1.55	8.5828	.044	1



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

Found

A2 (Curvature): 0.000000

n (Exponent): 1.000000

Correlation: 0.000000 Status: Warning Zero Gain

Difference

Std Error of Est: 0.000000

Predicted MDL: n/a

Predicted MQL: n/a

Stated

Std. Name

0 -2e35	0	1e35	3e35	5 5	e35	7e	35	9e	35	1.1	e36	1.3	e3
0.1													
0.2													
0.3													
0.4													
0.5													
0.6													
0.7													
0.8													
0.9													
1													

% Diff.

(S)IR

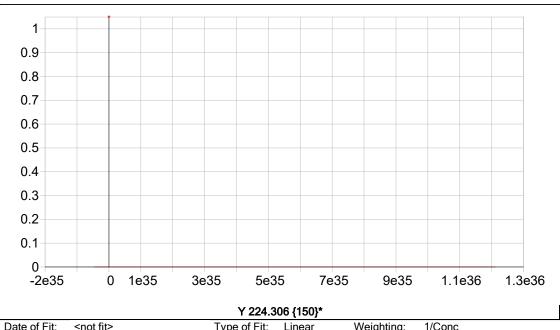
Std Dev

Emphasis

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 (Curva n (Expone Correlation Std Error of Predicted Predicted	ent): n: of Est: MDL:		0.000000 1.000000 0.000000 0.000000 n/a n/a		1.000000 0.000000 0.000000 n/a		000			Sta	tus:	٧	Varning		Zero G	ain		
Std. Name		ated onc.		Found Conc.	-	Diffe	rence	% [Oiff.	(S)IR		Std Dev	/	Emphas	sis		
1																		
0.9																		
0.8																		
0.7																		
0.6																		
0.5																		
0.4																		
0.3																		
0.2																		
0.1																		
0																		
-2e3	35	C	16	e35	3e	35	5e	35	7e	35	9e	35	1.1	e36	1.3e	36		
							Y 371.	030 {	91}*									
Date of Fit	t: <r< td=""><td>not fit></td><td></td><td></td><td></td><td>Туре</td><td>of Fit:</td><td>Line</td><td>ear</td><td>٧</td><td>Veightin</td><td>g:</td><td>1/Conc</td><td></td><td></td><td></td></r<>	not fit>				Туре	of Fit:	Line	ear	٧	Veightin	g:	1/Conc					
A0 (Offset A1 (Gain): A2 (Curva n (Expone	ture):			0.0000 0.0000 0.0000	000 000			F			000000. 000000.							
Correlation Std Error of Predicted Predicted	n: of Est: MDL:			0.0000 0.0000 n/a n/a	000			Sta	tus:	٧	Varning		Zero G	ain				
Std. Name		ated onc.		Found Conc.	I	Diffe	rence	% C	Diff.	(S)IR		Std Dev	,	Emphas	sis		



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

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

Found

A2 (Curvature): 0.000000

n (Exponent): 1.000000

Correlation: 0.000000 Status: Warning Zero Gain

Difference

0.000000 Std Error of Est: Predicted MDL: n/a Predicted MQL: n/a

Std. Name Stated

	Conc.	Conc.				(-)		
1								
0.9								
8.0								
0.7								
0.6								
0.5								
0.4								
0.3								
0.2								
0.1								
0								
-2e35	0	1e35	3e35	5e35	7e35	9e35	1.1e36	1.3e3

% Diff.

(S)IR

Std Dev

Emphasis

Date of Fit: <not fit> Type of Fit: Linear Weighting: 1/Conc A0 (Offset): 0.000000 Re-Slope: 1.000000 0.000000 Y-int: 0.000000 A1 (Gain):

In 230.606 {446}*

Reviewed By:mohan On:11/14/2025 4:13:03 PM Inst Id :P4 LB :LB137889

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

Temp: 96 °C



SOP ID:

M3050B-Digestion-20

SDG No:

Matrix:

N/A

SOIL

ICP A

Pippete ID: Balance ID:

M SC-2 N/A

Filter paper ID: pH Strip ID :

Hood ID: #3

Block ID:

N/A

1. HOT BLOCK #2

2. N/A

Start Digest Date:

End Digest Date:

11/13/2025

M6054

Time: 10:55

Temp: 96 °C

11/13/2025

Time: 12:55

Digestion tube ID:

Block thermometer ID:

MET-DIG. #2

Dig Technician Signature:

Supervisor Signature:

Temp:

1. 96°C

2. N/A

Standared Name	MLS USED	STD REF. # FROM LOG	
LFS-1	1.00	M6209	
LFS-2	1.00	M6201	
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	M6187
1:1 HNO3	10.00	MP86978
30% H2O2	3.00	M6170
Conc. HCL	10.00	M6151
PTFE Boiling Stones	N/A	M5581
N/A	N/A	N/A

Extraction Conformance/Non-Conformance Comments:

HOT BLOCK#2 CELL#35 96 C

Date / Time	Prepped Sample Relinquished By/Location	Received By/Location
11/13/25 13:51	57-43 mordis	Mata a lal
	Preparation Group	Analysis Group



Lab Sample ID	Client Sample ID	pi	Initial Weight (g)	Final Vol (ml)	Color Before	Color After	Texture	Artifact	Comment	Prep Pos
PB170522BL	PBS522	N/A	2.00	100	Colorless	Colorless	Fine	No	N/A	1
PB170522BS	LCS522	N/A	2.00	100	Colorless	Colorless	Fine	No	M6209,M6201	2
Q3609-01MS	AU-713-COMP-01MS	N/A	2.25	100	Brown	Yellow	Medium	No	M6209,M6201	5
Q3609-01MSD	AU-713-COMP-01MSD	N/A	2.30	100	Brown	Yellow	Medium	No	M6209,M6201	6
Q3609-01DUP	AU-713-COMP-01DUP	N/A	2.45	100	Brown	Yellow	Medium	No	N/A	4
Q3609-01	AU-713-COMP-01	N/A	2.22	100	Brown	Yellow	Medium	No	N/A	3
Q3609-04	AU-713-COMP-02	N/A	2.46	100	Brown	Yellow	Medium	No	N/A	7
Q3609-07	AU-713-COMP-03	N/A	2.20	100	Brown	Yellow	Medium	No	N/A	8
Q3609-10	AU-713-COMP-04	N/A	2.37	100	Brown	Yellow	Medium	No	N/A	
Q3609-13	AU-713-COMP-05	N/A	2.22	100	Brown	Yellow	Medium		N/A	9
Q3614-01	COMP-1	N/A	2.26	100	Brown	Yellow	Medium		N/A	10
Q3614-02	COMP-2	N/A	2.35	100	Brown	Yellow	Medium		N/A	11
23614-03	COMP-3	N/A	2.37	100	Brown	Yellow	Medium		N/A	12
(3615-01	EAST BATHHOUSE-	N/A	2.23	100	Brown	Yellow	Medium		N/A	13
3618-01	GONCRETE EME-TOP-SOIL	N/A	2.20	100	Brown					14
3618-02	EME-GENERAL-FILL	N/A	2.10	100		Yellow	Medium		N/A	15
3619-03	GP-B1(8-12)	N/A	2.36	100	Brown	Yellow	Medium	No I	N/A	16
3619-04	GP-B1(12-16)	N/A	2.40		Brown	Yellow	Medium	No I	N/A	17
3619-09	GP-B2(12-16)	N/A		100	Brown	Yellow	Medium	No I	N/A	18
3619-14	GP-B3(13.2)		2.34	100	Brown	Yellow	Medium	No N	I/A	19
		N/A	2.26	100	Brown	Yellow	Medium	No N	I/A	20
	GP-B4(8-12)	N/A	2.22	100	Brown	Yellow	Medium	No N	I/A	21
	GP-B4(13.2)	N/A	2.10	100	Brown	Yellow	Medium	No N	/A	22
	VNJ-231	N/A	2.08	100	Brown	Yellow	Medium	No N	/A	23
624-01	OK-02-11122025	N/A	2.20	100	Brown	Yellow	Medium	No N	/A	24

WORKLIST(Hardcopy Internal Chain)

WorkList Name: PB170522 WorkList ID: 193083 Department: Digestion Date: 11-13-2025 10:18:03

	Q3624-01	Q3621-02	Q3619-18		Q3619-17	Q3619-14	Q3619-09	1000	03619-04	Q3619-03	Q3618-02	2000	03618-01	Q3615-01	Q3614-03	2001102	03614-02	Q3614-01	Q3609-13	Q3609-10		Q3609-07	Q3609-04	CO-600cm		Sample
CZ 02-11122020	OK-02-11122025	VNJ-231	GP-B4(13.2)	01-04(0-12)	GD-RA(6 42)	GP-B3(13.2)	GP-B2(12-16)	Gr-B1(12-16)	00 04(45.45)	GP-B1(8-12)	EME-GENERAL-FILL	EME-TOP-SOIL		East Bathhouse- Concrete	COMP-3	COMP-2		COMP-1	AU-713-COMP-05	AU-713-COMP-04	TO-F IS-COMP-03	All 713 COMP 02	AU-713-COMP-02	AU-713-COMP-01		Customer Sample
Solid		Solid	Solid	Solid		o dia	Solid	Solid	Ollo		Solid	Solid			Solid	Solid	COILC	Collia Collia	Solid	Solid	Solid		Solid	Solid		Matrix
Metals ICP-TAL	Wetals ICF-IAL	Metals ICD TAI	Metals Groun 10	Metals Group10	Metals Group10	Matala Octobro	Metals Groun10	Metals Group10	Metals Group10	moration of TAL	Metals ICD TAI	Metals ICP-TAL	wetals ICP-IAL	Match 100 Hard	Metals ICP-Ground	Metals ICP-Group1	Metals ICP-Group1	Maria Cioupi	Metals Groups	Metals Ground	Metals Group4	Wetals Group4	Metals Cours	Metals Group4		Test
Cool 4 deg C	Cool 4 deg C	Cool # ded C	Cool A do-	Cool 4 deg C	Cool 4 deg C	Cool 4 deg C	Cool Adams	Cool 4 deg C	Cool 4 deg C	Cool 4 deg C		Cool 4 deg C	Cool 4 deg C	Cool 4 deg C		Cool 4 deg C	Cool 4 deg C	Cool 4 deg C	Cool 4 deg C	Cool A does	Cool 4 deg C	Cool 4 deg C		Cool 4 deg C		Preservative
PSEG05	PSEG03	AMBR01		AMBR01	AMBR01	AMBR01		AMBR01	AMBR01	ENTA05	[N.702	ENTAGE	CORE02	POWE02	. 044104	POWERS	POWE02	PSEG03	PSEG03		PSEG03	PSEG03	- 0000	PSEGOS		Customer
D41	D41	D31	2	D31	D31	D31	2	731	D31	D41	D47		J32	J21	120	3	J21	D41	D41	-	R1	D41	C#1		Location	Raw Sample Storage
44 40 0000	11/12/2025	11/12/2025	6202/21/11	- 1	11/12/2025	11/12/2025	6202/21/11	- 4	11/12/2025	11/12/2025	11/12/2025		11/12/2025	11/11/2025	11/11/2025		11/11/2025	11/11/2025	11/11/2025	5202/11/11	4446000	11/11/2025	11/11/2025			Collect Date Method
60405	6010D	6010D	60100		6010D	6010D	6010D		6010D	6010D	6010D		6010D	6010D	6010D		60100	6010D	6010D	6010D		6010D	6010D			Method

Date/Time 11/13/25 10:30
Raw Sample Received by: 5/3 met du 2 Raw Sample Relinquished by:

> Date/Time 22/12/12/25

Raw Sample Received by:

Raw Sample Relinquished by: Shymetas

Page 1 of 1



OVENTEMP IN Celsius (°C): 107

Weight Check 1.0g: 1.00

Weight Check 10g: 10.00

Time IN: 17:20

In Date: 11/13/2025

OvenID: M OVEN#1

PERCENT SOLID

Supervisor: Iwona
Analyst: JIGNESH
Date: 11/14/2025

OVENTEMP OUT Celsius (°C): 104

Time OUT: 08:27
Out Date: 11/14/2025

Weight Check 1.0g: 1.00

Weight Check 10g: 10.00 BalanceID: M SC-4

Thermometer ID: % SOLID-OVEN

qc:LB137887

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
Q3577-07	WC-1A	1	1.15	11.09	12.24	10.71	86.2	
Q3619-03	GP-B1(8-12)	2	1.11	10.32	11.43	9.87	84.9	
Q3619-04	GP-B1(12-16)	3	1.15	10.80	11.95	8.92	71.9	
Q3619-09	GP-B2(12-16)	4	1.17	10.40	11.57	9.33	78.5	
Q3619-14	GP-B3(13.2)	5	1.13	10.30	11.43	10.5	91.0	
Q3619-17	GP-B4(8-12)	6	1.19	10.63	11.82	8.58	69.5	
Q3619-18	GP-B4(13.2)	7	1.16	10.59	11.75	10.74	90.5	
Q3628-01	TP-5	8	1.18	10.52	11.7	10.48	88.4	
Q3628-02	ТР-5-ЕРН	9	1.15	10.30	11.45	10.18	87.7	
Q3628-03	TP-5-VOC	10	1.16	10.73	11.89	10.58	87.8	
Q3631-01	VNJ-202	11	1.15	10.21	11.36	9.92	85.9	
Q3631-02	VNJ-202-EPH-2	12	1.18	10.30	11.48	10.2	87.6	
Q3631-03	VNJ-208	13	1.13	10.63	11.76	10.42	87.4	
Q3631-04	VNJ-208-EPH-2	14	1.11	10.60	11.71	10.32	86.9	
Q3632-01	KMA880X-A	15	1.00	1.00	2.00	2.00	100.0	PILC
Q3632-02	KMA880X-B	16	1.00	1.00	2.00	2.00	100.0	PILC
Q3632-03	HEEZ283K-A	17	1.00	1.00	2.00	2.00	100.0	PILC
Q3632-04	HEEZ283K-B	18	1.00	1.00	2.00	2.00	100.0	PILC
Q3632-05	HEE488W-A	19	1.00	1.00	2.00	2.00	100.0	PILC
Q3632-06	HEE488W-B	20	1.00	1.00	2.00	2.00	100.0	PILC
Q3633-01	ETGI-369	21	1.15	11.03	12.18	10.22	82.2	
Q3633-02	ETGI-369-EPH-2	22	1.19	10.65	11.84	9.99	82.6	
Q3633-03	ETGI-342	23	1.18	10.37	11.55	10.61	90.9	
Q3633-03D	ETGI-342DUP	24	1.11	10.46	11.57	10.64	91.1	
Q3633-04	ETGI-342-EPH-2	25	1.19	10.42	11.61	10.6	90.3	
Q3633-05	ETGI-368	26	1.19	10.51	11.7	10.74	90.9	
Q3633-06	ETGI-368-EPH-2	27	1.13	10.50	11.63	10.63	90.5	
Q3634-01	245F32-A	28	1.00	1.00	2.00	2.00	100.0	PILC



PERCENT SOLID

Supervisor: Iwona
Analyst: JIGNESH

Date: 11/14/2025

OVENTEMP IN Celsius (°C): 107 OVENTEMP OUT Celsius (°C): 104

Time IN: 17:20 Time OUT: 08:27

In Date: 11/13/2025 Out Date: 11/14/2025

Weight Check 1.0g: 1.00 Weight Check 1.0g: 1.00 Weight Check 10g: 10.00 OvenID: M OVEN#1 BalanceID: M SC-4

Thermometer ID: % SOLID-OVEN

Qc:LB137887

Lab ID	Client SampleID	Dish #	Dish Wt(g) (A)	Wt(g)	Dish + Sample Wt(g)(B)	Dish+Dry Sample Wt(g)(C)		Comments
Q3634-02	245F32-B	29	1.00	1.00	2.00	2.00	100.0	PILC

1884 C) US

Department: Wet-Chemistry WORKLIST(Hardcopy Internal Chain) WorkList ID: 193093 WorkList Name: %1-111325

Sample					recondinately	Da	Date: 11-13-2	11-13-2025 08:22:33
	Customer Sample	Matrix	Test	Preservative	Customer	Raw Sample Storage	Collect Date	Method
Q3577-07	WC-1A	Pileo				Location		
Q3619-03	CD 04/0 00	Dilloc	Percent Solids	Cool 4 deg C	PSEG03	D41		ш
03840	GP-B1(8-12)	Solid	Percent Solids	Cool 4 deg C	AMBDO1		11/07/2025	Chemtech -SO
43019-04	GP-B1(12-16)	Solid	Percent Solids	Cool 4 dear		D31	11/12/2025	Chemtech -SO
Q3619-09	GP-B2(12-16)	Solid	Percent Solide	S S S S S S S S S S S S S S S S S S S	AMBR01	D31	11/12/2025	Chemtech -SO
Q3619-14	GP-B3(13.2)	Solid	Percent Colida	Cool 4 deg C	AMBR01	D31	11/12/2025	1
Q3619-17	GP-B4(8-12)	Pilos	Description of the second of t	Cool 4 deg C	AMBR01	D31	11/12/2025	1
Q3619-18	GP-B4(13.2)		Spilos illas	Cool 4 deg C	AMBR01	D31	11/12/2025	1
Q3628-01	TP-5		rercent Solids	Cool 4 deg C	AMBR01	D31	11/12/2025	
Q3628-02	TO A OF	Dilios	Percent Solids	Cool 4 deg C	PSEG03	D41	44,44	- 1
20 00000	######################################	Solid	Percent Solids	Cool 4 dea C	000000		11/13/2025	Chemtech -SO
U3628-03	TP-5-VOC	Solid	Percent Solids	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	PSEG03	D41	11/13/2025	Chemtech -SO
Q3631-01	VNJ-202	Solid	Percent Colldo	Cool 4 deg C	PSEG03	D41	11/13/2025	Chemtech -SO
Q3631-02	VNJ-202-EPH-2	rijou		Cool 4 deg C	PSEG03	D41	11/13/2025	Chemtech -SO
Q3631-03	VNJ-208		Percent Solids	Cool 4 deg C	PSEG03	D41	11/13/2025	Chemtech SO
Q3631-04	VNJ-208-EPH-2	Dillos Gilos	Percent Solids	Cool 4 deg C	PSEG03	D41	11/13/2025	Chemtech -00
Q3632-01	KMA880X-A	Dilos.	Percent Solids	Cool 4 deg C	PSEG03	D41	11/13/2025	Chemtech -SO
Q3632-02	KMA880X-B		Percent Solids	Cool 4 deg C	PSEG03	D41	11/13/2025	Chemtech -So
Q3632-03	HEEZ283K-A		Porcont Collds	Cool 4 deg C	PSEG03	D41	11/13/2025	Chemtech -SO
Q3632-04	HEEZ283K-B		Perceint Solids	Cool 4 deg C	PSEG03	D41	11/13/2025	Chemtech -So
Q3632-05	HEE488W-A		Percent Solids	Cool 4 deg C	PSEG03	D41	11/13/2025	Chemtech -SO
Q3632-06	HEE488W-B		Percent Solids	Cool 4 deg C	PSEG03	D41	11/13/2025	Chemtech -SO
Q3633-01	ETGI-369		Percent Solids	Cool 4 deg C	PSEG03	D41	11/13/2025	Chemtech -SO
ate/Time	11/2.25 15:10			Cool 4 deg C	PSEG03	D41	11/13/2025	Chemtech -SO

Raw Sample Received by: Date/Time 1143-25 15110

Raw Sample Relinquished by:

Date/Time

Raw Sample Relinquished by: Raw Sample Received by:

Page 1 of 2

WORKLIST(Hardcopy Internal Chain)

WorkList Name: %1-111325

WorkList ID: 193093

18844 W

				Department :	Wet-Chemistry	Dat	Date: 11-13-2025 08:22:33	25 08:22:33
Sample	Customer Sample	Matrix	Test	Preservative	Customer	효	Collect Date Method	Method
Q3633-02	FTG1-360-EBU 2					Location		
	Z-EL 13-50	Solid	Percent Solids	Cool 4 dea C	1000			
Q3633-03	ETGI-342	Splid	Doronot Calla	200	PSEG03	D41	11/13/2025	11/13/2025 Chemtech -SO
O3633-04			Spilos Lanceur	Cool 4 deg C	PSEG03	D41	14 (40 /000 -	
	E1GI-34Z-EPH-2	Solid	Percent Solids	0 14 4			11/13/2025	11/13/2025 Chemtech -SO
Q3633-05	ETC1 369			Cool 4 deg C	PSEG03	D41	11/13/2025	-
	1 01-300	Solid	Percent Solids	0 7 7 7 700			0.20230171	OS- CHEMIECH -SO
Q3633-06	ETGI-368-FPH-2	:		Cool 4 deg C	PSEG03	D41	11/13/2025	11/13/2025 Chemtech co
	Z-11 17 000 :- : -	Solid	Percent Solids	Cool 4 dea C	L			Oc- meninemo
Q3634-01	245F32-A	Piloo		8	PSEG03	D41	11/13/2025	Chemtech -SO
20,7000		Solid	Percent Solids	Cool 4 deg C	DSECOS	2		
U3634-02	245F32-B	Solid	Dorocat Calla		racens	D41	11/13/2025	11/13/2025 Chemtech -SO
			- cicent collas	Cool 4 deg C	PSEG03	D41	11/12/2025	
							0707/01/11	11/13/2025 Chemtech -SO

Date/Time (1-13-25

Raw Sample Received by:

Raw Sample Relinquished by:

Page 2 of 2

Date/Time 11:19:45 [5:10]

Raw Sample Relinquished by: Raw Sample Received by:



Instrument ID: P4

Review By	jaswal	Review On	11/14/2025 1:56:13 PM					
Supervise By	mohan	Supervise On	11/14/2025 4:13:03 PM					
STD. NAME	STD REF.#							
ICAL Standard	MP87637,MP87643,MP87640,MP87639,MP87638 MP87644,MP87643							
ICV Standard	MP87644,MP87643							
CCV Standard	MP87647							
ICSA Standard	MP87645,MP87646							
CRI Standard	MP87643							
LCS Standard								
Chk Standard	MP87668,MP87648,	MP87651,MP87649,MP87650						

Sr#	SampleId	ClientID	QcType	Date	Comment	Operator	Status
1	S0	S0	CAL1	11/13/25 12:46		Jaswal	ок
2	S1	S1	CAL2	11/13/25 12:51		Jaswal	ок
3	S2	S2	CAL3	11/13/25 12:55		Jaswal	ок
4	S3	S3	CAL4	11/13/25 12:59		Jaswal	ок
5	S4	S4	CAL5	11/13/25 13:03		Jaswal	ок
6	S5	S5	CAL6	11/13/25 13:07		Jaswal	ОК
7	ICV01	ICV01	ICV	11/13/25 13:12		Jaswal	ок
8	LLICV01	LLICV01	LLICV	11/13/25 13:16		Jaswal	ОК
9	ICB01	ICB01	ICB	11/13/25 13:21		Jaswal	ок
10	CRI01	CRI01	CRDL	11/13/25 13:25		Jaswal	ок
11	ICSA01	ICSA01	ICSA	11/13/25 13:29		Jaswal	ОК
12	ICSAB01	ICSAB01	ICSAB	11/13/25 13:33		Jaswal	ОК
13	ICSADL	ICSADL	ICSA	11/13/25 13:37		Jaswal	ОК
14	ICSABDL	ICSABDL	ICSAB	11/13/25 13:42		Jaswal	ОК
15	CCV01	CCV01	CCV	11/13/25 13:46		Jaswal	ок
16	CCB01	CCB01	ССВ	11/13/25 13:50		Jaswal	ОК
17	PB170522BL	PB170522BL	МВ	11/13/25 13:54		Jaswal	ОК
18	PB170522BS	PB170522BS	LCS	11/13/25 13:58		Jaswal	ОК



Instrument ID: P4

Review By	jaswa	al	Review On	11/14/2025 1:56:13 PM
Supervise By	moha	an	Supervise On	11/14/2025 4:13:03 PM
STD. NAME	5	STD REF.#		
ICAL Standard		MP87637,MP87643,MP	87641,MP87640,MP87639,MP87638	
ICV Standard		MP87644,MP87643		
CCV Standard		MP87647		
ICSA Standard		MP87645,MP87646		
CRI Standard		MP87643		
LCS Standard				
Chk Standard		MP87668,MP87648,MP	87651,MP87649,MP87650	

19	Q3615-01	East Bathhouse- Cond	SAM	11/13/25 14:03		Jaswal	OK
20	Q3609-01	AU-713-COMP-01	SAM	11/13/25 14:07		Jaswal	ок
21	Q3609-01DUP	AU-713-COMP-01DU	DUP	11/13/25 14:11		Jaswal	ок
22	Q3609-01L	AU-713-COMP-01L	SD	11/13/25 14:15		Jaswal	ок
23	Q3609-01MS	AU-713-COMP-01MS	MS	11/13/25 14:19		Jaswal	ок
24	Q3609-01MSD	AU-713-COMP-01MS	MSD	11/13/25 14:23		Jaswal	ОК
25	Q3609-01A	AU-713-COMP-01A	PS	11/13/25 14:27	0.1ML M6008,M6017-10ML SAMPLE	Jaswal	OK
26	Q3609-04	AU-713-COMP-02	SAM	11/13/25 14:31		Jaswal	ок
27	CCV02	CCV02	CCV	11/13/25 14:35		Jaswal	ок
28	CCB02	CCB02	ССВ	11/13/25 14:39		Jaswal	ок
29	LR-1	LR-1	HIGH STD	11/13/25 14:44		Jaswal	ок
30	LR-2	LR-2	HIGH STD	11/13/25 15:08		Jaswal	ОК
31	LR-3	LR-3	HIGH STD	11/13/25 15:15		Jaswal	ОК
32	Q3609-07	AU-713-COMP-03	SAM	11/13/25 15:19		Jaswal	ок
33	Q3609-10	AU-713-COMP-04	SAM	11/13/25 15:23		Jaswal	ОК
34	Q3609-13	AU-713-COMP-05	SAM	11/13/25 15:27		Jaswal	ОК
35	Q3614-01	COMP-1	SAM	11/13/25 15:31		Jaswal	ОК
36	Q3614-02	COMP-2	SAM	11/13/25 15:35		Jaswal	ок
37	Q3614-03	COMP-3	SAM	11/13/25 15:39		Jaswal	ОК
37	Q3614-03	COMP-3	SAM	11/13/25 15:39		Jasw	al



Instrument ID: P4

Review By	Review By jaswal		Review On	11/14/2025 1:56:13 PM
Supervise By	mol	han	Supervise On	11/14/2025 4:13:03 PM
STD. NAME STD REF.#				
ICAL Standard MP87637,MP87643,MP87641,		87641,MP87640,MP87639,MP87638		
ICV Standard		MP87644,MP87643		
CCV Standard		MP87647		
ICSA Standard		MP87645,MP87646		
CRI Standard MP87643				
LCS Standard				
Chk Standard MP87668,MP87648,MP87651,MP87649,MP87650			87651,MP87649,MP87650	

38	Q3618-01	EME-TOP-SOIL	SAM	11/13/25 15:43	Jaswal	ОК
39	CCV03	CCV03	CCV	11/13/25 15:48	Jaswal	ОК
40	CCB03	CCB03	ССВ	11/13/25 15:51	Jaswal	ОК
41	Q3618-02	EME-GENERAL-FILL	SAM	11/13/25 15:56	Jaswal	ОК
42	Q3619-03	GP-B1(8-12)	SAM	11/13/25 16:00	Jaswal	ОК
43	Q3619-04	GP-B1(12-16)	SAM	11/13/25 16:04	Jaswal	OK
44	Q3619-09	GP-B2(12-16)	SAM	11/13/25 16:08	Jaswal	ОК
45	Q3619-14	GP-B3(13.2)	SAM	11/13/25 16:12	Jaswal	ОК
46	Q3619-17	GP-B4(8-12)	SAM	11/13/25 16:16	Jaswal	ОК
47	Q3619-18	GP-B4(13.2)	SAM	11/13/25 16:20	Jaswal	ОК
48	Q3621-02	VNJ-231	SAM	11/13/25 16:24	Jaswal	ОК
49	Q3624-01	OK-02-11122025	SAM	11/13/25 16:28	Jaswal	ОК
50	PB170535BL	PB170535BL	MB	11/13/25 16:32	Jaswal	ок
51	CCV04	CCV04	CCV	11/13/25 16:36	Jaswal	ОК
52	CCB04	CCB04	ССВ	11/13/25 16:40	Jaswal	ОК
53	PB170535BS	PB170535BS	LCS	11/13/25 16:45	Jaswal	ОК
54	PB170517TB	PB170517TB	MB	11/13/25 16:49	Jaswal	ОК
55	Q3609-03	AU-713-COMP-01	SAM	11/13/25 16:53	Jaswal	ОК
56	Q3609-06	AU-713-COMP-02	SAM	11/13/25 16:57	Jaswal	ОК
57	Q3609-09	AU-713-COMP-03	SAM	11/13/25 17:02	Jaswal	OK



Instrument ID: P4

Review By	Review By jaswal		Review On	11/14/2025 1:56:13 PM
Supervise By	mo	han	Supervise On	11/14/2025 4:13:03 PM
STD. NAME STD REF.#				
ICAL Standard MP87637,MP87643,MP87		P87641,MP87640,MP87639,MP87638		
ICV Standard		MP87644,MP87643		
CCV Standard		MP87647		
ICSA Standard		MP87645,MP87646		
CRI Standard MP87643				
LCS Standard				
Chk Standard MP87668,MP87648,MP87651,MP87649,MP87650			P87651,MP87649,MP87650	

58	Q3609-12	AU-713-COMP-04	SAM	11/13/25 17:06		Jaswal	OK
59	Q3609-15	AU-713-COMP-05	SAM	11/13/25 17:10		Jaswal	OK
60	Q3622-01	RT3071-SOLID	SAM	11/13/25 17:14		Jaswal	OK
61	Q3623-01	RBR200007-SOIL	SAM	11/13/25 17:18		Jaswal	OK
62	Q3623-01DUP	RBR200007-SOILDU	DUP	11/13/25 17:23		Jaswal	OK
63	CCV05	CCV05	CCV	11/13/25 17:27		Jaswal	ОК
64	CCB05	CCB05	ССВ	11/13/25 17:31		Jaswal	OK
65	Q3623-01L	RBR200007-SOILL	SD	11/13/25 17:35		Jaswal	OK
66	Q3623-01MS	RBR200007-SOILMS	MS	11/13/25 17:39		Jaswal	OK
67	Q3623-01MSD	RBR200007-SOILMSI	MSD	11/13/25 17:43		Jaswal	OK
68	Q3623-01A	RBR200007-SOILA	PS	11/13/25 17:47	0.1ML M6008,M6017-10ML SAMPLE	Jaswal	OK
69	PB170531BL	PB170531BL	MB	11/13/25 17:51		Jaswal	OK
70	PB170531BS	PB170531BS	LCS	11/13/25 17:56		Jaswal	ОК
71	Q3616-05	Composite	SAM	11/13/25 18:00		Jaswal	ОК
72	Q3616-05DUP	Composite DUP	DUP	11/13/25 18:04		Jaswal	OK
73	Q3616-05L	Composite L	SD	11/13/25 18:08		Jaswal	OK
74	Q3616-05MS	Composite MS	MS	11/13/25 18:13		Jaswal	OK
75	CCV06	CCV06	CCV	11/13/25 18:17	CCV fail for K,Na	Jaswal	OK
76	CCB06	CCB06	ССВ	11/13/25 18:25	CCV fail for K,Na	Jaswal	ОК





Instrument ID: P4

Review By	Review By jaswal		11/14/2025 1:56:13 PM
Supervise By	mohan	Supervise On	11/14/2025 4:13:03 PM
STD. NAME STD REF.#			
ICAL Standard	MP87637,MP87643,M	P87641,MP87640,MP87639,MP	87638
ICV Standard	MP87644,MP87643		
CCV Standard	MP87647		
ICSA Standard	MP87645,MP87646		
CRI Standard MP87643			
LCS Standard			
Chk Standard MP87668,MP87648,MP87651,MP87649,MP87650			

77	Q3616-05A	Composite A	PS	11/13/25 18:29	0.1ML M6008,M6017-10ML SAMPLE		OK
78	Q3616-05MSD	Composite MSD	MSD	11/13/25 18:33		Jaswal	ок
79	CCV07	CCV07	CCV	11/13/25 18:38	CCV fail for K,Na	Jaswal	ок
80	CCB07	CCB07	ССВ	11/13/25 18:42	CCV fail for K,Na	Jaswal	ОК



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

8900, Fax: 908 789 8922

Prep Standard - Chemical Standard Summary

Order ID: Q3619

Test: Metals Group10

Prepbatch ID: PB170522,

Sequence ID/Qc Batch ID: LB137889,LB137889,LB137889,LB137889,

				_	
Sta	nd	25	4	ın	

MP86978, MP87637, MP87638, MP87639, MP87640, MP87641, MP87642, MP87643, MP87644, MP87645, MP87646, MP87644, MP87648, MP87649, MP87650, MP87651, MP87668,

Chemical ID:

M5467, M5581, M5658, M5697, M5748, M5798, M5799, M5800, M5801, M5814, M5820, M5962, M5969, M5971, M5979, M5985, M5998, M6021, M6023, M6026, M6027, M6028, M6030, M6032, M6058, M6077, M6086, M6128, M6137, M6140, M6142, M6144, M6145, M6151, M6159, M6160, M6162, M6163, M6164, M6165, M6170, M6171, M6174, M6176, M6177, M6178, M6179, M6182, M6184, M6187, M6200, M6201, M6209, W3112,





Metals STANDARD PREPARATION LOG

169 1:1HNO3 MP86978 08/28/2025 11/27/2025 Sagar Kanani None None	Recipe ID	NAME	<u>NO.</u>	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipetteID</u>	Supervised By Sarabjit Jaswal
	169	1:1HNO3	MP86978	08/28/2025	11/27/2025	Sagar Kanani	None	None	•
									08/28/2025

Recipe				Expiration	<u>Prepared</u>			Supervised By
<u>ID</u>	<u>NAME</u>	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Sarabjit Jaswal
902	ICP AES CAL BLK (SO/ICB/CCB)	MP87637	10/17/2025	11/17/2025	Janvi Patel	None	METALS_PIP	
							ETTE_1 (ICP	10/28/2025

FROM 125.00000ml of M6200 + 2350.00000ml of W3112 + 25.00000ml of M6187 = Final Quantity: 2500.000 ml



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Fax: 908 789 8922

Metals STANDARD PREPARATION LOG

Recipe ID	NAME_	NO.	Prep Date	Expiration Date	<u>Prepared</u> <u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Supervised By Sarabjit Jaswal
907	ICP AES STD S (S5)	MP87638	10/17/2025	11/17/2025	Janvi Patel		METALS_PIP ETTE_1 (ICP	
							A)	

FROM

5.00000ml of M5467 + 5.00000ml of M5820 + 5.00000ml of M5969 + 5.00000ml of M5971 + 5.00000ml of M6077 + 5.00000ml of M6160 + 5.00000ml of M6174 + 5.00000ml of M6176 + 455.00000ml of MP87637 = Final Quantity: 500.000 ml

Recipe				Expiration	Prepared			Supervised By	
<u>ID</u>	NAME	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Sarabjit Jaswal	
910	ICP AES STD S4	MP87639	10/17/2025	11/17/2025	Janvi Patel		METALS_PIP		
							ETTE_1 (ICP	10/28/2025	
	A)								

FROM 50.00000ml of MP87637 + 50.00000ml of MP87638 = Final Quantity: 100.000 ml



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Metals STANDARD PREPARATION LOG

Recipe ID	<u>NAME</u>	NO.	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipettelD</u>	Supervised By Sarabjit Jaswal	
909	ICP AES STD S3	MP87640	10/17/2025	11/17/2025	Janvi Patel		METALS_PIP ETTE_1 (ICP		
	A)								

FROM 25.00000ml of MP87638 + 75.00000ml of MP87637 = Final Quantity: 100.000 ml

Recipe ID	NAME	NO.	Prep Date	Expiration Date	Prepared By	ScaleID	PipetteID	Supervised By
3913			10/17/2025	11/17/2025	Janvi Patel	None	METALS_PIP	
							ETTE_1 (ICP	10/28/2025

16.00000ml of MP87638 + 184.00000ml of MP87637 = Final Quantity: 200.000 ml **FROM**



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Metals STANDARD PREPARATION LOG

Recipe				Expiration	<u>Prepared</u>			Supervised By
<u>ID</u>	NAME	NO.	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Sarabjit Jaswal
2950	ICP AES S1/CRI STOCK STD	MP87642	10/17/2025	11/17/2025	Janvi Patel		METALS_PIP	
							ETTE_1 (ICP	10/28/2025

FROM

 $0.03000ml\ of\ M5798+0.03000ml\ of\ M6028+0.05000ml\ of\ M5658+0.05000ml\ of\ M6030+0.05000ml\ of\ M6140+0.05000ml\ of\ M6159+0.06000ml\ of\ M6177+0.10000ml\ of\ M5697+0.10000ml\ of\ M5801+0.10000ml\ of\ M5820+0.10000ml\ of\ M5820+0.10000ml\ of\ M5962+0.10000ml\ of\ M5969+0.10000ml\ of\ M5971+0.10000ml\ of\ M6128+0.10000ml\ of\ M6176+0.15000ml\ of\ M5800+0.20000ml\ of\ M5799+0.20000ml\ of\ M5979+0.20000ml\ of\ M6021+0.20000ml\ of\ M6023+0.20000ml\ of\ M6027+0.20000ml\ of\ M6045+0.25000ml\ of\ M5467+0.25000ml\ of\ M6160+0.50000ml\ of\ M5814+0.50000ml\ of\ M6032+1.00000ml\ of\ M6086+1.00000ml\ of\ M6142+1.00000ml\ of\ M6144+1.00000ml\ of\ M6171+1.00000ml\ of\ M6178+2.00000ml\ of\ M6137+89.03000ml\ of\ MP87637=Final\ Quantity:\ 100.000\ ml$

Recipe ID	NAME_	NO.	Prep Date	Expiration Date	<u>Prepared</u> <u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Supervised By Sarabjit Jaswal
2951	ICP AES S1/CRI WORK STD	MP87643	10/17/2025	11/17/2025	Janvi Patel		METALS_PIP ETTE_1 (ICP	
							A)	

FROM 2.00000ml of MP87642 + 98.00000ml of MP87637 = Final Quantity: 100.000 ml



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Metals STANDARD PREPARATION LOG

Recipe ID	NAME_	NO.	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipetteID</u>	Supervised By Sarabjit Jaswal
4163	NEW ICV-060925	MP87644	10/17/2025	11/17/2025	Janvi Patel		METALS_PIP ETTE_1 (ICP	
							A)	

FROM 0.20000ml of M6058 + 0.40000ml of M6163 + 0.40000ml of M6164 + 0.40000ml of M6165 + 48.60000ml of MP87637 = Final Quantity: 50.000 ml

Recipe				Expiration	Prepared			Supervised By		
<u>ID</u>	<u>NAME</u>	NO.	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Sarabjit Jaswal		
904	ICP AES ICSA SOLN	MP87645	10/17/2025	11/17/2025	Janvi Patel	None	METALS_PIP	,		
							ETTE_1 (ICP	10/28/2025		
	A)									

FROM 25.00000ml of M6182 + 225.00000ml of MP87637 = Final Quantity: 250.000 ml



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Metals STANDARD PREPARATION LOG

Recipe ID	NAME	<u>NO.</u>	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipettelD</u>	Supervised By Sarabjit Jaswal	
3494	ICP AES ICSAB SOLN-1	MP87646	10/17/2025	11/17/2025	Janvi Patel		METALS_PIP ETTE_1 (ICP	•	
	A)								

FROM 0.10000ml of M6077 + 10.00000ml of M6182 + 10.00000ml of M6184 + 79.90000ml of MP87637 = Final Quantity: 100.000 ml

Recipe ID	<u>NAME</u>	NO.	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipetteID</u>	Supervised By Sarabjit Jaswal
911	ICP AES CCV SOLN	MP87647	10/17/2025	11/17/2025	Janvi Patel		METALS_PIP ETTE_1 (ICP	•

FROM 50.00000ml of MP87637 + 50.00000ml of MP87638 = Final Quantity: 100.000 ml



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Metals STANDARD PREPARATION LOG

Recipe ID	<u>NAME</u>	NO.	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipettelD</u>	Supervised By Sarabjit Jaswal		
903	ICP AES RINSE SOLN	MP87648	10/17/2025	11/17/2025	Janvi Patel		METALS_PIP ETTE_1 (ICP			
	A)									

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

Recipe ID	<u>NAME</u>	<u>NO.</u>	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipettelD</u>	Supervised By Sarabjit Jaswal
4226	LR-2	MP87649	10/17/2025	11/17/2025	Janvi Patel		METALS_PIP ETTE_1 (ICP	,

FROM 13.50000ml of M6140 + 9.00000ml of M6142 + 9.50000ml of M6159 + 18.00000ml of MP87637 = Final Quantity: 50.000 ml



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Metals STANDARD PREPARATION LOG

Recipe ID	<u>NAME</u>	NO.	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipettelD</u>	Supervised By Sarabjit Jaswal
4227	LR-3	MP87650	10/17/2025	11/17/2025	Janvi Patel		METALS_PIP ETTE_1 (ICP	
							A)	

FROM 1.15000ml of M6026 + 1.25000ml of M5658 + 1.25000ml of M5748 + 1.50000ml of M6145 + 2.50000ml of M5697 + 2.50000ml of M6128 + 39.85000ml of MP87637 = Final Quantity: 50.000 ml

Recipe ID	<u>NAME</u>	<u>NO.</u>	Prep Date	Expiration Date	<u>Prepared</u> <u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Supervised By Sarabiit Jaswal
4225	LR-1	MP87651	10/17/2025	11/17/2025	Janvi Patel	None	METALS_PIP ETTE_1 (ICP	,

FROM 11.50000ml of M6086 + 11.50000ml of M6144 + 11.50000ml of M6171 + 15.50000ml of MP87637 = Final Quantity: 50.000 ml



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Metals STANDARD PREPARATION LOG

Recipe ID 919	NAME ICP AES INTERNAL STD	NO. MP87668	Prep Date 10/17/2025	Expiration	Prepared By Janvi Patel	<u>ScaleID</u> None	PipetteID METALS_PIP ETTE_1 (ICP	
FROM	1.00000ml of M6179 + 10.00000ml o	f M5985 + 1	969.00000ml	of W3112 + 20	.00000ml of M6	187 = Final Qu	A) antity: 2000.00	00 ml



Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57058 / Cerium, 1000PPM, 100ML	020623	02/06/2026	03/06/2023 / bin	03/01/2023 / bin	M5467
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 #
Absolute Standards, Inc.	58024 / Chromium, Cr, 500 ml, 1000 PPM	060523	06/05/2026	08/28/2023 / jaswal	08/25/2023 / jaswal	M5658
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
					L	
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Supplier Absolute Standards, Inc.	/ Nickel (Ni) 1000PPM	Lot # 091223	-	-		
Absolute			Date	Opened By 01/02/2024 /	Received By 12/20/2023 /	Lot #



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
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57005 / B, 1000 PPM, 125 ml	071123	07/11/2026	03/26/2024 / Sohil	01/03/2024 / jaswal	M5814
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Supplier Absolute Standards, Inc.	ItemCode / ItemName 57015 / P, 1000 PPM, 125 ml	Lot # 091123	-	•		
Absolute	57015 / P, 1000 PPM, 125		Date	Opened By 05/01/2024 /	Received By 02/09/2024 /	Lot #



Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57016 / S, 1000 PPM, 125 ml	122923	03/31/2026	03/31/2025 / kareem	06/11/2024 / Jaswal	M5969
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57003 / Li, 1000 PPM, 125 ml	061224	06/21/2027	06/06/2025 / Janvi	07/01/2024 / Jaswal	M5971
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CGTI1-1 / TITANIUM 125mL 1000ug/mL	T2-TI719972	08/05/2026	08/06/2025 / Janvi	02/22/2024 / Jaswal	M5979
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CGIN10-5 / INDIUM 1 x 500 ml	U2-IN729349	02/21/2028	10/08/2024 / Jaswal	06/14/2024 / Jaswal	M5985
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CLPP-CAL-3 / CLP CAL SOLUTION #3, 125mL	T2-MEB727800	07/30/2026	07/30/2025 / Janvi	02/22/2024 / kareem	M5998
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.	57182 / Pb, 10000 PPM, 125 ml	110923	11/09/2026	12/05/2024 / janvi	08/05/2024 / Jaswal	M6026
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57028 / Ni, 1000 PPM, 125 ml	062024	06/20/2027	06/04/2025 / Janvi	08/05/2024 / Jaswal	M6027
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57048 / Cd, 1000 PPM, 125 ml	070124	07/01/2027	08/05/2024 / kareem	08/05/2024 / Jaswal	M6028
			Expiration	Date Opened /	Received Date /	Chemtech
Supplier	ItemCode / ItemName	Lot #	Date	Opened By	Received By	Lot #
Supplier Absolute Standards, Inc.	ItemCode / ItemName 57047 / Ag, 1000 PPM, 125 ml	Lot # 122823	1 -	-	Received By 08/05/2024 / Jaswal	Lot # M6030
Absolute	57047 / Ag, 1000 PPM,		Date	Opened By 08/05/2024 /	08/05/2024 /	



Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CHEM-QC-4 / CHEM-QC-4, Second Source, 1000 ug/ml, B, Mo, Si, Sn, Ti	V2-MEB746173	01/29/2026	01/29/2025 / JANVI	08/22/2024 / Jaswal	M6058
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	Z9651Q / CHEM-CLP-4/.25L	V2-MEB746762	09/06/2029	01/23/2025 / kareem	09/19/2024 / kareem	M6077
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / 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
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 /	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 #
			01/10/2028	06/25/2025 /	01/13/2025 /	



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.	58111 / Na, 10000 PPM, 500 ml	072424	07/24/2027	01/23/2025 / kareem	01/13/2025 / Jaswal	M6144
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58030 / Zinc, Zn, 500 ml, 1000 PPM	121724	12/17/2027	02/04/2025 /	01/13/2025 / Jaswal	M6145
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	BA-9530-33 / Hydrochloric Acid, Instra-Analyzed (cs/6x2.5L)	22G2862015	02/17/2026	02/18/2025 / Sagar	01/15/2025 / Sagar	M6151
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
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 /	Chemtech Lot #
Absolute Standards, Inc.	57051 / Sb, 1000 PPM, 125 ml	071724	07/17/2027	03/24/2025 / kareem	10/18/2024 / kareem	M6160



Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	BA-9598-34 / Nitric Acid, Instra-Analyzed (cs/4x2.5L)	24H0162012	11/27/2025	05/27/2025 / Sagar	04/27/2025 / Sagar	M6162
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	QCP-CICV-1-125ML / EPA CLP ICP Verification Standard1	V2-MEB744107	06/08/2026	06/09/2025 / jaswal	06/06/2025 / jaswal	M6163
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	QCP-CICV-2-125ML / EPA CLP ICP Verification Standard2	U2-MEB733713	06/08/2026	06/09/2025 / jaswal	06/09/2025 / jaswal	M6164
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	QCP-CICV-3-125ML / EPA CLP ICP Verification Standard3	V2-MEB749572	06/08/2026	06/09/2025 / jaswal	06/09/2025 / jaswal	M6165
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	11/24/2025	06/25/2025 /	05/20/2025 / Sagar	M6170
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
	58112 / Mg, 10000 PPM,	011525	01/15/2028	07/15/2025 /	02/13/2025 /	M6171



Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CLPP-CAL-1 / CLP CAL SOLUTION #1, 125mL	V2-MEB742428	07/31/2026	07/31/2025 / Janvi	05/05/2025 / Janvi	M6174
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57038 / Sr, 1000 PPM, 125 ml	092724	09/27/2027	08/06/2025 / Janvi	08/06/2025 / Janvi	M6176
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	/ Lead (Pb) 1000PPM	031525	03/15/2028	08/06/2025 / Janvi	08/06/2025 / Janvi	M6177
Supplier	ItemCode / ItemName		Expiration	Date Opened /	Received Date /	Chemtech
Cappilei	itemcode / itemname	Lot #	Date	Opened By	Received By	Lot #
Absolute Standards, Inc.	57042 / Mo, 1000 PPM, 125 ml	080528	_	-	Received By 08/06/2025 / Janvi	Lot # M6178
Absolute	57042 / Mo, 1000 PPM,		Date	Opened By 08/06/2025 /	08/06/2025 /	
Absolute Standards, Inc.	57042 / Mo, 1000 PPM, 125 ml	080528	Date 08/05/2028 Expiration	Opened By 08/06/2025 / Janvi Date Opened /	08/06/2025 / Janvi	M6178
Absolute Standards, Inc. Supplier Inorganic	57042 / Mo, 1000 PPM, 125 ml ItemCode / ItemName CGY10-1 / YTTRIUM	080528	Date 08/05/2028 Expiration Date	Opened By 08/06/2025 / Janvi Date Opened / Opened By 08/06/2025 /	08/06/2025 / Janvi Received Date / Received By 06/02/2024 /	M6178 Chemtech Lot #



Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
EPA	PART B / ICSAB (ICP) STOCK SOLN	ICSB-0710	02/05/2026	08/06/2025 / Janvi	03/06/2024 / Janvi	M6184
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	BA-9598-34 / Nitric Acid, Instra-Analyzed (cs/4x2.5L)	24H0162012	01/28/2026	08/29/2025 / Sagar	08/08/2025 / Sagar	M6187
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
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 #
1						
Inorganic Ventures	WW-LFS-2 / Laboratory Fortified Stock Solution 2, 125 ml	V2-MEB743480	10/15/2026	10/15/2025 /	07/20/2025 / janvi	M6201
_	Fortified Stock Solution 2,	V2-MEB743480 Lot #	10/15/2026 Expiration Date	Date Opened / Opened By		M6201 Chemtech Lot #
Ventures	Fortified Stock Solution 2, 125 ml		Expiration	Date Opened /	janvi Received Date /	Chemtech
Supplier Inorganic	ItemCode / ItemName WW-LFS-1 / Laboratory Fortified Stock Solution 1,	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By 07/20/2025 /	Chemtech Lot #



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

R1815/24

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

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

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Physical Characterization:

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

Certified by:

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- * Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated.
- * All Standards should be stored with caps tight and under appropriate laboratory conditions.

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

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Certified Reference Material CRM

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Revel = 10/14/2024 M 6085/M6086/M6087

CERTIFIED WEIGHT REPORT: Nominal Concentration (µg/mL): Recommended Storage: Weight shown below was diluted to (mL): **NIST Test Number: Expiration Date:** Part Number: Lot Number: Description: 10000 082324 **BTU9** 082327 58120 Ambient (20 °C) Calcium (Ca) ĕ 4000.1 Nominal 0.15 Flask Uncertainty 5E-05 Balance Uncertainty Purity Uncertainty Solvent: 24002546 Nitric Acid Assay 2% Lot # <u>a</u> 80.0 Target Nitric Acid Actual Actual Formulated By: Reviewed By: Uncertainty Expanded Thorana (Solvent Safety Info. On Attached pg.) Giovanni Esposito Pedro L. Rentas Broade **SDS Information** 082324 082324 NIST

RM#

Number

Conc. (µg/mL)

38

Purity (%)

8

Weight (g)

Weight (g)

Conc. (µg/ml.)

+/- (µg/mL)

CAS#

OSHA PEL (TWA)

LD50

SRM

~ z/m	5.0E4	1.065	20.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	5.OE4	7/2->	1.0E4	2.0⊞4	
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		190			90			
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Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

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(T) = Target analyte

Physical Characterization:

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

Certified by:

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

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

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Certified Reference Material CRM

R 815/24

Solvent:

24002546

Nitric Acid

Lot #

M6028

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

CERTIFIED WEIGHT REPORT:

Part Number:

57048 070124

Lot Number: Description:

Cadmium (Cd)

Nominal Concentration (µg/mL):

NIST Test Number:

6UTB

1000

Recommended Storage:

Expiration Date:

070127 Ambient (20 °C)

Weight shown below was dliuted to (mL):

2000.07

0.100 Flask Uncertainty 5E-05 Balance Uncertainty

2%

40.0 (mL) Nitric Acid

Formulated By:

Alban PROBAN

Aleah O'Brady

070124

Reviewed By:

Pedro L. Rentas

070124

Expanded

Weight (g) Conc. (µg/mL) Uncertainty

Cadmium nitrate tetrahydrate (Cd)

IN024 CDM092021A1

1000

99.999

0.10

36.5

5.4797

5.4804

1000.1

2.0

10022-68-1

0.01 mg/m3

orl-rat 60.2mg/kg

3108

RM#

Number Lot

Conc. (µg/mL)

8

8

Weight (g)

Target

Actual

Actual

Nominal

Purity

Uncertainty Assay Purity (%)

+/- (µg/mL)

CAS#

SDS Information

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

NIST SRM

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

1 of 2

Certified Reference Material CRM



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

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Physical Characterization:

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

Certified by:

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

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Certified Reference Material CRM

M6026

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R: 8/5/24

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

Description: Lot Number: 110923 Lead (Pb)

2%

Nitric Acid

Formulated By:

Lawence Barry

110923

Revenue

1 40.0

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

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

RW#

Nominal

Purity

Uncertainty Assay

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

Number Conc. (µg/mL) 38 Purity (%) 36

Weight (g) Target Weight (g) Conc. (µg/mL) Actual Actual +/- (µg/mL) Uncertainty CAS# # OSHA PEL (TWA) LD50 OSHA PEL (TWA) SDS information TSIN SRM

Pedro L. Rentas

110923

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

180

190

200

70

80

90

100

Part # 57182

1 of 2



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

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

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Physical Characterization:

(T)= Target analyte

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

Son I Mills

Certified by:

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

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R: 03/01/23(124)



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

Compound	RM#	Lot	Nominal Conc. (vg/mL)	Purity (%)	Purity Uncertainty Assay (%) Purity (%) (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Actual Uncertainty Weight (g) Conc. (ug/mt.) +/- (ug/mt.)	Uncertainty +/- (ug/mL)	SS	(Solvent Safety Info. On Attached pg.) CAS# OSHA PEL (TWA) LD50	ched pg.) LD50	NIST
Cerium nitrate hexahydrate (Ce)	1N146	IN146 Z512CEB1	1000	99.989	0.10	32.8	3.04919	3.04921 1000.0	1000.0	20	II ==	₹Z	ď Z	AN
[1] Spectrum N	lo.1 [43.472	sec]:58158.D#	[1] Spectrum No.1 [43.472 sec]:58158.D# [Count] [Linear]							Ш				$\ \cdot \ $
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- 1.4 m) 1														
5.0E8														
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250

240

220

210

Printed: 2/6/2023, 2:46:41 PM

Certified Reference Material CRM





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

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

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	£	Te	E	E	Tm	Sn	Π
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	S	S.	Ag	Na	Š	S	Ta
/mL)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
/в <i>п</i>) (à:	Re	뙲	Rb	Ru	Sm	S
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Physical Characterization:

(T)= Target analyte

Certified by:

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



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

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

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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).



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:U:J:CF:PCISCI:GOC-55118-BQI5021-061223

Absolute Standards, Inc. 800-368-1131

www.absolutestandards.com



Certified Reference Material CRM

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

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

Chromium(III) nitrate nonahydrate (Cr) 58124

071122

0.1000

200.0

0.084

1000

10000.1

1000.0

12

7789-02-8

0.5 mg(Cr)/m3

ori-rat 3250 mg/kg 3112a

Compound

Number

Number

Factor

Vol. (mL) Pipette (mL) Conc. (µg/mL)

Conc. (µg/mL) Conc. (µg/mL)

+/- (µg/mL)

CAS#

OSHA PEL (TWA)

LD50

TSIN SRM

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		N 0		100		

Part # 58024



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

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	<0.02	< 0.02	<0.02	<0.02	40.02	40.02	<0.02	SALES OF SALES		

(I)= larget analyte

Physical Characterization:

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

Certified by:

* The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
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Certified Reference Material CRM

M5697

Solvent:

Nitric Acid



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

CERTIFIED WEIGHT REPORT:

Part Number:

58029

Lot Number:

102523

Description:

Expiration Date:

NIST Test Number:

Copper (Cu)

2.0%

Lot #

24002546

40.0 Nitric Acid

(mL)

Formulated By:

Benson Chan

Pedro L. Rentas

102523

102523

Recommended Storage:

102526 Ambient (20 °C)

Nominal Concentration (µg/mL):

1000

6UTB

5E-05 Balance Uncertainty

Volume shown below was diluted to (mL):

2000.02

0.058 Flask Uncertainty

> Expanded Uncertainty

Reviewed By:

SDS Information (Solvent Safety Info. On Attached pg.)

Compound

Part Number Number Dilution Factor

Initial

Uncertainty

Nominal Pipette (mL) Conc. (µg/mL)

Initial Conc. (µg/mL) Conc. (µg/mL)

Final

+/- (µg/mL)

CAS# OSHA PEL (TWA)

LD50

NIST SRM

Lot

0.1000

0.084

1. Copper(II) nitrate trihydrate (Cu) 58129 100223 200.0 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] 1.0E6 5.0E5 10 $m/z \rightarrow$ 20 30 50 60 70 80 90 100 5.0E7 2.5E7 m/z->110 120 130 140 150 160 170 180 190 200 2.0E7 1.0E7 m/z-> 210 220 230 240 250 260

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

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

0.5			DOM: NO.				Trace M	etals	Verifica	tion	by ICP-M	S (µ	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	Тъ	<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	ΰ	<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	п	<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
Ве	<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
В	<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:

Box 1. 8/1

* 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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ırt # 58029

Lot # 102523

2 of 2

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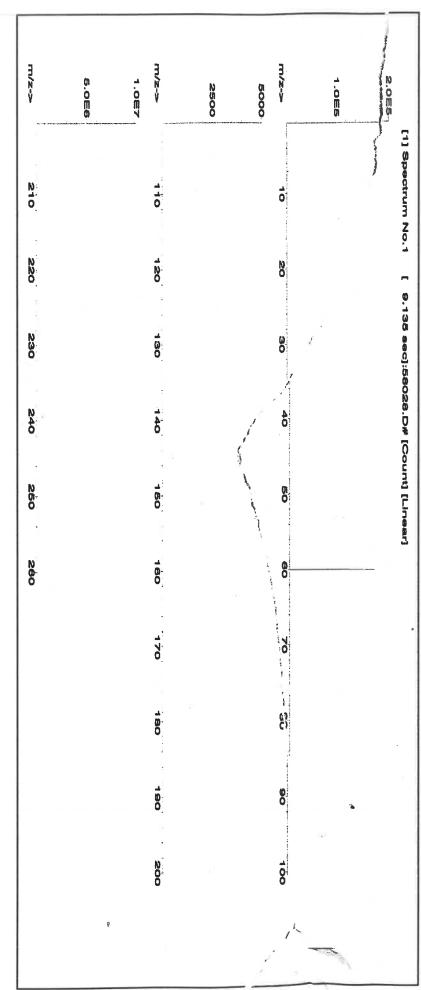


Certified Reference Material CRM

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

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

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



Part # 57028

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Absolute Standards, Inc.

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

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Physical Characterization:

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

Certified by:

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

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CERTIFIED WEIGHT REPORT:

02/09/24 Lot #

24002546

Nitric Acid Solvent:

Part Number: Lot Number: Description: 57004 102523

Beryllium (Be)

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

Expiration Date:

102526

BTU₉

Volume shown below was diluted to (mL): 2000.02

0.058

Flask Uncertainty Balance Uncertainty

5E-05

Number

Number Lot

Vol. (mL.)

Part

Dilution Factor

hitia

Uncertainty

Nominal

(IE) 40.0

2.0%

Nitric Acid

Benson Chan

102523

Formulated By:

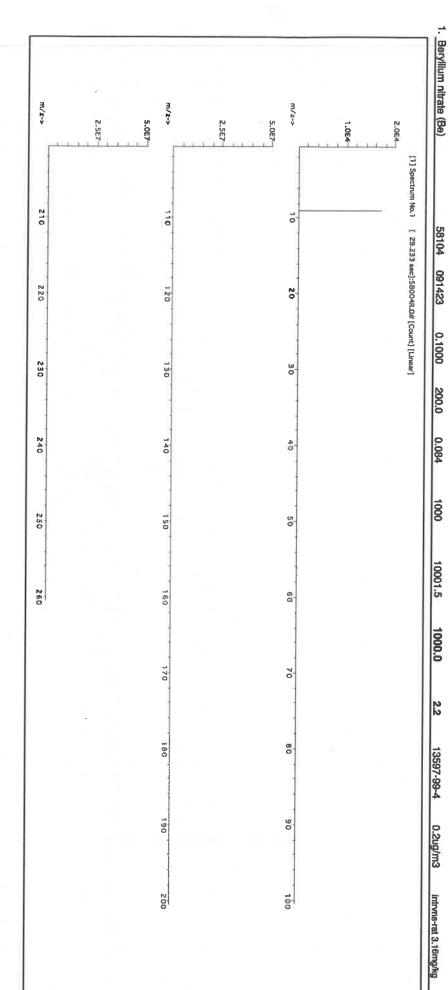
Pedro L. Rentas

102523

Reviewed By:

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

₹



Part # 57004





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

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

(T) = Target analyte

Physical Characterization:

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

Certified by:



All standard containers are meticulously cleaned prior to use.

2 of 2

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CERTIFIED WEIGHT REPORT:

Part Number:

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

22D0562008

Hydrochloric acid

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

Benson Chan

071123

Nominal Concentration (µg/mL):

1000

Ambient (20 °C) 071126

Recommended Storage:

Expiration Date:

Description: Lot Number:

Reviewed By: Pedro L. Rentas

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

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

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

1 of 2

Part # 57050

Lot # 071123



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

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

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	600 600 600 600 600	

(I) = larget analyte

Physical Characterization:

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

Certified by:

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

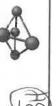
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CERTIFIED WEIGHT REPORT:						Fot#	Solvent:						
Part Number:		57027				24002546	Nitric Acid			2			
Lot Number: Description:		091923 Cobalt (Co)	ī						C fam) may	D.		
1						2.0%	40.0	Nitric Acid	Formulated By:	Lawr	Lawrence Barry	091923	
Expiration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

[1] Speatrum No.1									Sulfill too willing	0110
	[34.243 sec	34.243 sec]:58027.D# [Count] [Linear]	[Count] [Lit	Lagr						
5.0 Е5				70						
m/z-> 10 20		. 4	9	<u>.</u>	20	80	0		00	
5.0E7										
TVZ-> 110 120	130	140	150	100	170	180		0	500	
5.0E7										

1 of 2

260

280

240

230

220

010

W/z->

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Certified Reference Material CRM





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

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

							Trace M	etals	Verifical	tion	by ICP-M	4S (F	g/mL)						
1							STREET, STREET	No section lives	ALL DESCRIPTION OF THE PERSON	10.000	Market Mark	MINNSH.	Sanday Marine	NAME OF TAXABLE PARTY.	Service of the last	SECOND STATES		No.	A STATE OF STREET
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æ	<0.02	ට්	<0.02	Αn	<0.02	윤	Z0.0>	P	<0.02	м	40.2	S	₩	Fee Fee	40,02	Ħ	Ø.02	Z	Ø.02

(T)= Target analyte

Physical Characterization:

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



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



Lot # 091923

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

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

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

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02/00/24 Certified Reference Material CRM

W 580



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CERTIFIED WEIGHT REPORT: Nominal Concentration (µg/mL): Recommended Storage: NIST Test Number: Expiration Date: Part Number: Description: Lot Number: 57033 111323 Arsenic (As) **BTUB** 1000 111326 Ambient (20 °C) 5E-05 Balance Uncertainty 24002546 Lot# 2.0% Nitric Acid Solvent: 80.0 Nitric Acid Formulated By: Reviewed By: Therence Pedro L. Rentas Lawrence Barry

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

orl-rat 500 mg/kg 3103a

Number Part

Number Lot

Vol. (mL)

Pipette (mL) Conc. (µg/mL)

Conc. (µg/mL) Conc. (µg/mL)

+/- (µg/ml.) Uncertainty Expanded

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

LD50

NIST SRM

SDS Information

111323

111323

Dilution Factor

initial

Uncertainty

Nominal

Initial

Final

Compound

Volume shown below was diluted to (mL):

4000.0

0.06

Flask Uncertainty

-z/x->	500	m/z->	N IN IN	m/z-> 5.0≣4	1.0厘5	≥.005
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						Z 0.1
N N N O		120		N.		á
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		A second		es Alba de la casa de		90]:570
240		140		ò		33.D#
N 0				50		[Count]
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Part # 57033

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

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	40.02 40.02 40.02 40.02 40.02		

Physical Characterization:

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

Certified by:



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Part # 57033

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M.5814

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

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

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

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	Sen R.	-MS	
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	Z		
	4400 4400 4400 4400 4400 4400 4400 440		
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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:

> 57015 091123

Solvent: 24002546 Lot # Nitric Acid

Nitric Acid

Formulated By:

Lawrence Barry

091123

(JE) 40.0

2%

Nominal Concentration (µg/mL):

NIST Test Number:

BITUB 1000 Recommended Storage:

Expiration Date:

091126

Phosphorous (P)

Ambient (20 °C)

Weight shown below was diluted to (mL):

2000.02

0.058 Flask Uncertainty

5E-05 Balance Uncertainty

Lot

Nominal

Purity

Uncertainty Assay

Target

Actual

Uncertainty

Expanded

SDS information

Reviewed By:

Pedro L. Rentas

rento

091123

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

000

100

1000

500

Part # 57015



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

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

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M5962 R! 06/14/24



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

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

							I race M	1etals	Verifica	lion	oy ICP-M	S (H	g/mL)						
A	40.02	CQ.	<0.02	Dy	<0.02	HH	<0.02	11	<0.02	Z.	<0.02	Pr	<0.02	Se	H	-T	40.02	W	40,02
ЗЪ	<0.02	င္ဖ	<0.2	퍜	<0.02	н	<0.02	Į.	<0.02	₽	<0.02	Re	<0.02	S:	<0.02	Te	<0.02	U	<0.02
As	<0.2	ზ	<0.02	臣	<0.02	Ħ	<0.02	Mg	<0.01	°	<0.02	Rh	40.02	Ag	<0.02	∄	40.02	٧	<0.02
Ва	<0.02	Ç	<0.02	æ	<0.02	ŀ	<0.02	Mn	<0.02	Pd	40.02	₽.	<0.02	Na	<0.2	Ħ	<0.02	4	<0.02
Ве	<0.01	Ç	40.02	Ga	<0.02	F	<0.2	Ж	402	P	<0.02	R _I	<0.02	St	<0.02	Tm	<0.02	¥	<0.02
В:	40.02	င္ပ	<0.02	දූ	<0.02	Ľ	<0.02	Mo	<0.02	7	<0.02	Sm	40.02	S	<0.02	Sn	40.02	Zn	<0.02
В	<0.02	υ	<0.02	Au	<0.02	Рь	<0.02	M	<0.02	×	40.2	Sc	<0.02	Ta	<0.02	Ħ	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

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

Certified by:

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M5969 11/24

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CERTIFIED WEIGHT REPORT: Part Number:

57016 122923

Lot Number: Description:

Nominal Concentration (µg/mL):

NIST Test Number:

6UTB 1000

5E-05 Balance Uncertainty 0.06 Flask Uncertainty

Recommended Storage:

Expiration Date:

122926 Ambient (20 °C)

Sulfur (S)

Weight shown below was diluted to (mL):

4000.0

ğ

Nominal

Purity

Uncertainty Assay

Target

Actual

Actual

Uncertainty Expanded Solvent:

122923

Lot #

ASTM Type 1 Water

Formulated By:

Benson Chan

122923

rento

Pedro L. Rentas

Reviewed By: 122923

SDS Information

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

-Z/F 17/Z-> H/X-Y 1.0E8 2.5E5 2.5E8 5.0EB 5.0E7 5.0E5 [1] Spectrum No.1 110 210 0 120 220 N O [33.603 sec]:57016.D# [Count] [Linear] 130 00 230 140 240 40 150 1000 00 160 260 60 170 0 180 0 190 90 100 200

Part # 57016

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

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

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Part # 57003 Lot # 062124

1 of 2

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

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

(T) = Target analyte

Physical Characterization:

Al Sh As Ba Ba Bi

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

Certified by:

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

* All standard containers are meticulously cleaned prior to use.

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

* Standards are prepared gravimetrically using balances that are calibrated.

* 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

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

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

Part # 57003 Lot # 062124

Printed: 6/24/2024, 11:20:08 PM

2 of 2

Certificate of Analysis 6652M , 8782M

MORGANIC NE NE SE SEGENE YOU TREST

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

300 Technology Drive Christiansburg, VA 24073 USA inorganicventures.com



ACCREDITATION / REGISTRATION

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

PRODUCT DESCRIPTION

Catalog Number:

Single Analyte Custom Grade Solution Product Code:

CGTN

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

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

Starting Material Lot#: 2094 Starting Material: Ti Metal

Starting Material Purity: 99.9975%

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

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

Assay Information:

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

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

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

Characterization of CRM/RM by One Method

 $(x_0) \ (x_0) \ (x_0$ Certified Value, X_{CRM/RM}, where one method of characterization is used is the mosn of individual results:

Characterization of CRM/RM by Two or More Methods

4.0 TRACEABILITY TO NIST

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

7.7 Storage and Handling Recommendations

oM M 882000.0

0.000268 M K 0.000268 M K 0.000268 M K

0.000872 O Fe > 0.008586 M Ga <

O 892000.0

O S37000.0 M 882000.0

M 882000.0

M 603100.0

M 885800.0

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

INTENDED USE

W Et < O Cn <

O B <

IA O

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

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

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

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

Page 2 of 4

INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

> uR M 882000.0

> 9A M 886 0.000.0

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

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

> iN O 882000.0 > aO M 841200.0

> dN O 322500.0 > N M 862000.0

M - Checked by ICP-MS

Mn < Mg < Li <

> 0H

> 6H

ΉŁ

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

M 976800.0 > 8 | 34500.0 M 576800.0 > 8 M 782600.0

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

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

> 6T M 882000.0 > AT M 882000.0

sT M 034450.0 > dT M E70100.0

s 852000.0 M 882000.0

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O.043560 O

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

> II

JS

674000.0 228610.0

892000.0 892000.0

0.000268

699630.0

0.001341

892000.0

0.010560

960000'0

960000.0

73260.0 > nZ O 402100.0 038540.0 > nZ O 267400.0

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

Page 3 of 4

- Chemical Testing - Accredited / AZLA Certificate Number 863.01

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

- QSR Certificate Number QSR-1034

1.01 ISO 9001 Qualify Management System Registration

MOITATY STANDARD DOCUMENTATION 0.01

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

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

HOMOGENEITY

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

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

011110		o intormation (ICP-OFS n i	doseone
ss radial/axial view):	are given	Estimation (ICP-OES D.L.s	Technique/Line
Interferences (underlined in di	Order	idq 41	ICP-MS 48 amu
Interferences (underlined indicates severe) 32S16O, 32S14N,	A/N		
14N16O18O,			
14N17N2, 36Ar12C,			
40C3, [96X=2			
(where X = Zr, Mo,			021, CCE 830-92)
[(ns.	ν	Jm/gu Se000.0 \ 1500.0	ICP-OES 323.452 nm
Ce, Ar, Ni		0.0038 / 0.000008 µg/mL	ICE-OES 334:941 nm
Nb, Ta, Cr, U	i		ICP-0ES 336.121 nm
W, Mo, Co	L	In/by prepared or stored in	F Note: This standard short
	- 4	-: benote no beliedely su for on	

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

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

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

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

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

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

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

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

- Store between approximately 4° - 30° C while in sealed TCT bag.

Page 4 of 4

Chairman / Senior Technical Director

- Sealed TCT Bag Open Date:

NAMES AND SIGNATURES OF CERTIFYING OFFICERS

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

CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

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

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

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

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

Thomas Kozikowski Manager, Quality Control Certificate Approved By:

thibils Validity

- June 17, 2027 11.2 Lot Expiration Date

June 17, 2022 11.1 Certification Issue Date

Paul Gaines Certifying Officer:

0.Sr

0.11



Certificate of Analysis

300 Technology Drive Christiansburg, VA 24073 USA inorganicventures.com

M5985 R:6/14/24

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

1.0 ACCREDITATION / REGISTRATION

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



2.0 PRODUCT DESCRIPTION

Product Code:

Single Analyte Custom Grade Solution

Catalog Number:

CGIN10

Lot Number:

U2-IN729349

Matrix:

5% (v/v) HNO3

Value / Analyte(s):

10 000 μg/mL ea:

Indium

Starting Material:

Indium Metal

Starting Material Lot#:

2511

Starting Material Purity:

99.9995%

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Value:

 $10022 \pm 30 \mu g/mL$

Density:

1.044 g/mL (measured at 20 ± 4 °C)

Assay Information:

Assay Method #1

10021 ± 56 µg/mL

ICP Assay NIST SRM 3124a Lot Number: 110516

Assay Method #2

10035 ± 25 µg/mL

EDTA NIST SRM 928 Lot Number: 928

Assay Method #3

10001 ± 33 µg/mL

Calculated NIST SRM Lot Number: See Sec. 4.2

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

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

Characterization of CRM/RM by Two or More Methods

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

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

X_i = mean of Assay Method I with standard uncertainty uchar i

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

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

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

k = coverage factor = 2

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

ubb = bottle to bottle homogeneity standard uncertainty

uits = 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:

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

X_a = mean of Assay Method A with

ucher a = the standard uncertainty of characterization Method A

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

k = coverage factor = 2

uchar a = the errors from characterization

ubb = bottle to bottle homogeneity standard uncertainty

ults = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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 $0.3~\mu m$.

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

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference

n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

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

6.2 For products attaining traceability through Inorganic Ventures' Primary Certified Reference Materials (PCRM™) see the Limited License to Use PCRM™ in the Inorganic Ventures <u>Terms and Conditions of Sale.</u> 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 - 114.82 +3 6 In(H2O)6+3 Chemical Compatibility -Soluble in HCl, HNO3, and H2SO4. Avoid neutral and basic media. Stable with most metals and inorganic anions. The oxalate, sulfide, carbonate, hydroxide and phosphate are insoluble in water.

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

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

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

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

8.0 HAZARDOUS INFORMATION

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

9.0 HOMOGENEITY

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

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

QSR Certificate Number QSR-1034

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

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

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

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

February 21, 2023

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

11.2 Lot Expiration Date

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

11.3 Period of Validity

0 TOT D 0	n Data	
- Sealed TCT Bag Ope	en Date:	

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

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Thomas Kozikowski Manager, Quality Control

Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director

20178hi



Certificate of Analysis

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

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

1.0 ACCREDITATION / REGISTRATION

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



2.0 PRODUCT DESCRIPTION

Product Code: Multi Analyte Custom Grade Solution

Catalog Number: CLPP-CAL-3

Lot Number: T2-MEB727800

Matrix: 7% (v/v) HNO3

Value / Analyte(s):

1 000 μg/mL ea: Arsenic,

Arsenic, Lead, Selenium, Thallium,

500 µg/mL ea: Cadmium

3.0 CERTIFIED VALUES AND UNCERTAINTIES

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

Thallium, Ti 1 000 \pm 7 μ g/mL

Density: 1.042 g/mL (measured at 20 ± 4 °C)

Assay Information:

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

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

Characterization of CRM/RM by Two or More Methods

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

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

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

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

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

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

k = coverage factor = 2

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

ubb = bottle to bottle homogeneity standard uncertainty

ults = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

Characterization of CRM/RM by One Method

Certified Value, X_{CRIMRM}, where one method of characterization is used is the mean of individual results:

XCRM/RM = (Xa) (uchar a)

X_a = mean of Assay Method A with

uchar a = the standard uncertainty of characterization Method A

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

k = coverage factor = 2

uchar a = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

uits = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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

N/A

6.0 INTENDED USE

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

 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 $20^{\circ} \pm 4^{\circ}$ C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.
- For more information, visit www.inorganicventures.com/TCT

8.0 HAZARDOUS INFORMATION

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

9.0 HOMOGENEITY

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

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

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

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

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

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

December 21, 2022

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

11.2 Lot Expiration Date

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

11.3 Period of Validity

 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 DD9784.

Certifying Officer:

Paul Gaines Chairman / Senior Technical Director



Certificate of Analysis

300 Technology Drive Christiansburg, VA 24073 USA inorganicventures.com

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

ACCREDITATION / REGISTRATION 1.0

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



2.0 PRODUCT DESCRIPTION

Product Code:

Multi Analyte Custom Grade Solution

Catalog Number:

CHEM-CLP-4

Lot Number:

V2-MEB746172

Matrix:

3% (v/v) HNO3

3% (v/v) HF

Value / Analyte(s):

1 000 µg/mL ea:

Boron,

Molybdenum,

Silicon,

Tin,

Titanium

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

ANALYTE Boron, B

CERTIFIED VALUE

ANALYTE Molybdenum, Mo **CERTIFIED VALUE**

1 000 ± 5 µg/mL

Silicon, Si

1 000 ± 5 µg/mL 1 000 ± 7 µg/mL

Tin. Sn

1 000 ± 5 µg/ml.

Titanium, Ti

1 000 ± 6 μg/mL

Density:

1.032 g/mL (measured at 20 ± 4 °C)

Assav Information:

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

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

Characterization of CRM/RM by Two or More Methods

Certified Value, X_{CRWRM}, where two or more methods of characterization are used is the weighted mean of the results:

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

X_i = mean of Assay Method i with standard uncertainty uchar i

 \mathbf{w}_{i} = the weighting factors for each method calculated using the inverse square of the variance:

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

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

k = coverage factor = 2

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

ubb = bottle to bottle homogeneity standard uncertainty

utts = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

 $X_a = mean$ of Assay Method A with $u_{char} = the$ standard uncertainty of characterization Method A $CRM/RM = the standard uncertainty ($^{\pm}$) = U_{CRM/RM} = k \left(u^2_{char} + u^2_{bb} + u^2_{tts} + u^2_{ts}\right)^{\frac{1}{2}} \\ k = coverage factor = 2 \\ u_{char} = the errors from characterization \\ u_{bb} = bottle to bottle homogeneity standard uncertainty \\ u_{lts} = long term stability standard uncertainty (storage) \\ u_{tg} = transport stability standard uncertainty$

Characterization of CRM/RM by One Method

is used is the mean of individual results:

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

Certified Value, X_{CRM/RM}, where one method of characterization

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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

N/A

6.0 INTENDED USE

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

 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.lnorganicventures.com/TCT
 HF Note: This standard should not be prepared or stored in glass.

8.0 HAZARDOUS INFORMATION

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

9.0 HOMOGENEITY

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

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

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

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

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

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

August 12, 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 12, 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 F	ag Open Date:	

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

Paul R Sains

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Joseph Burns Custom VS Manager

Certifying Officer:

Paul Gaines Chairman / Senior Technical Director



300 Technology Drive Christiansburg, VA 24073 USA

inorganicventures.com

Certificate of Analysis

M6074

M6075 M6076 M6077

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EXP. 9/6/2029

1.0 ACCREDITATION / REGISTRATION

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



2.0 PRODUCT DESCRIPTION

Product Code:

Multi Analyte Custom Grade Solution

Catalog Number:

CHEM-CLP-4

Lot Number:

V2-MEB746762

Matrix:

3% (v/v) HNO3

3% (v/v) HF

Value / Analyte(s):

1 000 µg/mL ea:

Boron,

Molybdenum,

Silicon,

Tin,

Titanium

3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE Boron, B **CERTIFIED VALUE**

ANALYTE Molybdenum, Mo **CERTIFIED VALUE**

1 000 ± 5 μg/mL

Silicon, Si

1 000 ± 5 µg/mL

Tin, Sn

1 000 ± 5 µg/mL

Titanium, Ti

1 000 ± 7 μg/mL

1 000 I 5 pg/mL

1 000 ± 6 µg/mL

Density:

1.033 g/mL (measured at 20 \pm 4 °C)

Assay Information:

ANALYTE	METHOD	NIST SRM#	SRM LOT#
В	ICP Assay	3107	190605
В	Calculated		See Sec. 4.2
Мо	ICP Assay	traceable to 3134	U2-MO739068
Si	ICP Assay	Traceable to 3150	S2-SI702546
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_{CRM/RM}, where two or more methods of characterization are used is the weighted mean of the results:

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

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

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

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

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

k = coverage factor = 2

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

ubb = bottle to bottle homogeneity standard uncertainty

ults = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

Characterization of CRM/RM by One Method

Certified Value, X_{CRW/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

uchar a = the standard uncertainty of characterization Method A

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

k = coverage factor = 2

uchar a = the errors from characterization

ubb = bottle to bottle homogeneity standard uncertainty

uits = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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

INTENDED USE 6.0

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

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

September 06, 2024

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

11.2 Lot Expiration Date

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

11.3 Period of Validity

 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.

Paul R Sains

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Joseph Burns Custom VS Manager

Certifying Officer:

Paul Gaines Chairman / Senior Technical Director

www.absolutestandards.com

Part Number:

Lot Number:



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

CERTIFIED WEIGHT REPORT:

Formulated By: Diovannie Giovanni Esposito 2 Septe 101124

Pedro L. Rentas

101124

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

Manganese (Mn)

Ambient (20 °°)

Manganese (20 °°) 1000

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

RM#

Number

Conc. (µg/mL)

8

Purity (%)

8

Weight (g)

Weight (g) Conc. (µg/ml.)

+/- (µg/mL)

CAS#

OSHA PEL (TWA)

LD50

SRM NIST T SDS Information

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

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



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

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

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

(T) = Target analyte

Physical Characterization:

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

Certified by:

Jon T. Mills

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



Certificate of Analysis

300 Technology Drive Christiansburg, VA 24073 USA inorganicventures.com

M6137

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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:

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:

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

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

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

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

k = coverage factor = 2

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

ults = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

Characterization of CRM/RM by One Method

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

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

X, = mean of Assay Method A with

uchar a = the standard uncertainty of characterization Method A

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

k = coverage factor = 2

uchar a = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty ults = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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

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

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

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

6.0 **INTENDED USE**

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

6.2 For products attaining traceability through Inorganic Ventures' Primary Certified Reference Materials (PCRM™) see the Limited License to Use PCRM™ in the Inorganic Ventures <u>Terms and Conditions of Sale</u>, 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 $20^{\circ} \pm 4^{\circ}$ C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.

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

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

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

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

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

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

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

8.0 HAZARDOUS INFORMATION

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

9.0 HOMOGENEITY

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

QUALITY STANDARD DOCUMENTATION 10.0

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

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

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

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

Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

July 10, 2024

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

11.2 Lot Expiration Date

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

11.3 Period of Validity

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

NAMES AND SIGNATURES OF CERTIFYING OFFICERS 12.0 Certificate Prepared By:

Uyen Truong Custom Processing Supervisor

Mayyand Man
Paul R. Laine

Certificate Approved By:

Muzzammil Khan Stock Laboratory Supervisor

Certifying Officer:

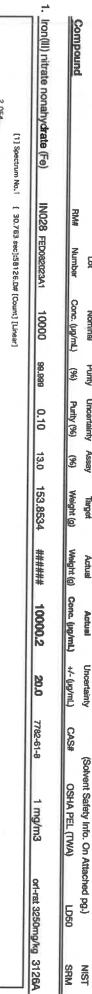
Paul Gaines Chairman / Senior Technical Director

Certified Reference Material CRM

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

CERTIFIED WEIGHT REPORT: Lot#

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



Q

Nominal

Purity

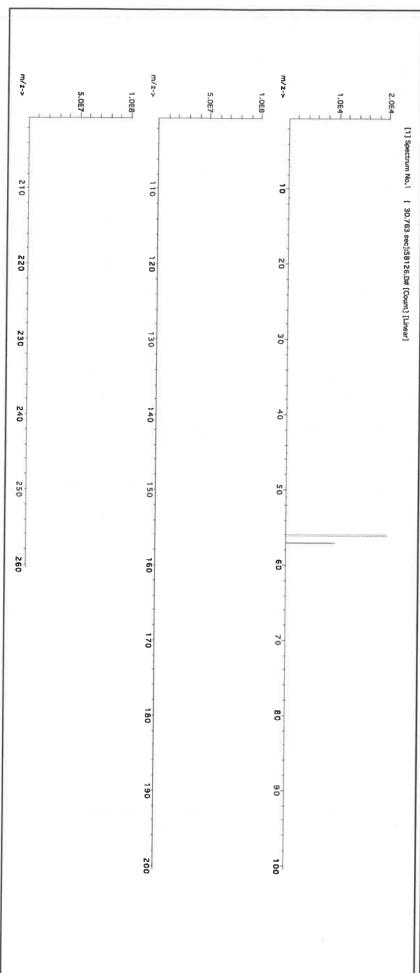
Uncertainty

Target

Actual

Actual

Uncertainty



Certified Reference Material CRM



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

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

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(T)= Target analyte

Physical Characterization:

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

Certified by:

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

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

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

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

Absolute Standards, Inc. 800-368-1131

www.absolutestandards.com



Certified Reference Material CRM

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

CERTIFIED WEIGHT REPORT: 1. Potassium nitrate (K) Compound Nominal Concentration (µg/mL): Weight shown below was diluted to (mL): Recommended Storage: **NIST Test Number: Expiration Date:** Part Number: Lot Number: Description: IN034 KD062022A1 BTU9 57119 103024 Potassium (K) M6141 10000 103027 Ambient (20 °C) Number 5 Conc. (µg/mL) 4000.1 10000 716142 Nominal R->1/13/25 0.15 Flask Uncertainty 99.999 5E-05 Balance Uncertainty Purity 8 Uncertainty Purity (%) 0.10 Solvent: 24002546 Assay 37.7 E 2% Weight (g) 106.1040 Target 80.0 Lot # Nitric Acid Nitric Acid ###### Weight (g) Conc. (µg/mL) Actual 10001.1 Actual Reviewed By: Formulated By: +/- (µg/mL) Uncertainty Expanded 20,0 Tieranie. 7757-79-1 CAS# (Solvent Safety Info. On Attached pg.) Pedro L. Rentas Giovanni Esposito からからかん OSHA PEL (TWA) **SDS Information** 5 mg/m3 orl-rat 3750 mg/kg 3141a LD50 103024 103024 SRM NIST

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

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

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	Ta	S	Sr	Na.	Ag	Si	Se	i		
	<0.02	40.02	<0.02	40.2	<0.02	A0.02	<0.2	- L		
	Ti	Sn	Im	H	1	Te	Тb			I
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	<0.02	∆0,02	<0.02	<0.02	<0.02	40.02	<0.02			

(i) = larget analyte

Physical Characterization:

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

Certified by:

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

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

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Certified Reference Material CRM



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

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

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1 of 2

www.absolutestandards.com



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

ĺ	B	<u>B</u>	Be	Ba	As	Sb	≥	9		
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l	Au	ဂ္ဂ	ନ୍ଥ	<u>ਨ</u>	Eu	E)	Дy			
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	×	7	Þ	Pd	0°	ğ	Z.		tion	
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	Ta	S	Sr	Z	Ag	S:	%			
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	Zr	Zn	۲	\$	<	C	W			
	40.02	40.02	<0.02	<0.02	<0.02	<0.02	<0.02	IIIO SCOTI		

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

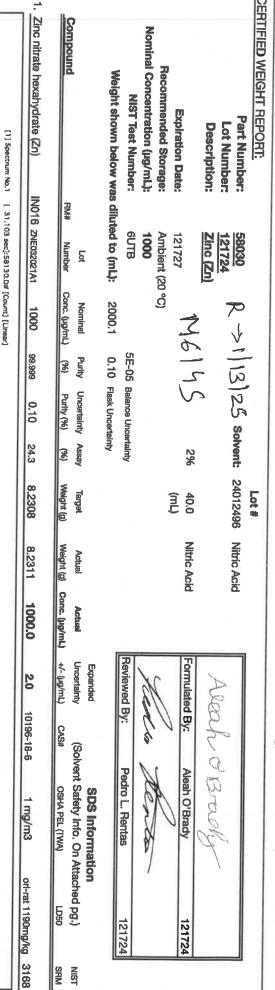
All Standards should be stored with caps tight and under appropriate laboratory conditions.

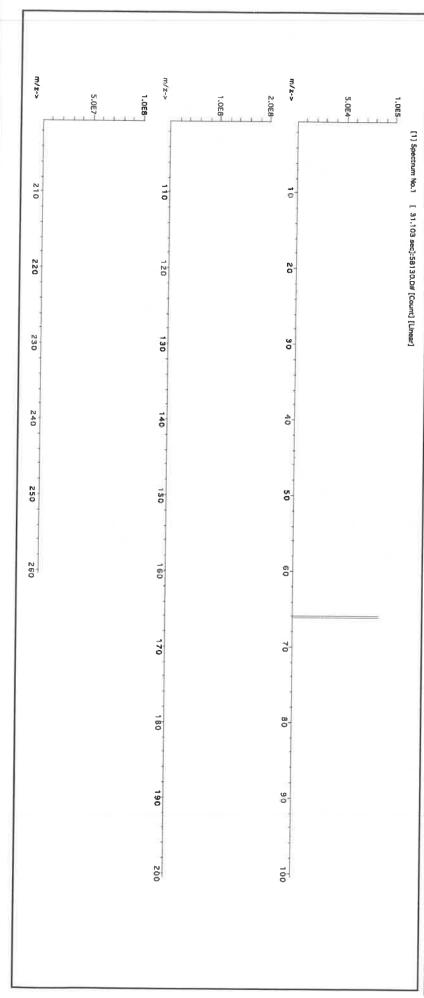
Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

Part # 58111

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

Www.absolutestandards.com CERTIFIED WEIGHT REPORT:





Part # 58030



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

			20.02	ra	20.02	30	702	7	40.02	Z	<0.02	P	№ 0.02	Au	40.02	5	40.02	00
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(T) = Target analyte

Physical Characterization:

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

Certified by:

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

Part # 58030

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





M6151

R-> 1/15/25

Material No.: 9530-33

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

Retest Date: 2027-06-14

Revision No.: 0

Certificate of Analysis

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

>>> Continued on page 2 >>>

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





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

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

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





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

Test

Specification

Result

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

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







M-6162

R. Date & 0412712025

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

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

Certificate of Analysis

Assay (HNOs) Appearance Passes Test Passes Test Passes Test Color (APHA) Residue after Ignition S 2 ppm Chloride (Cl) Choride (Cl) Choride (SOa) Sulfate (SOa) Sulfate (SOa) Arsenic and Antimony (as As) Trace Impurities - Barlum (Ba) Trace Impurities - Barlum (Ba) Trace Impurities - Barlum (Cd) Trace Impurities - Barlum (Cd) Trace Impurities - Coper (Cu) Trace Impurities - Coper (Cu) Trace Impurities - Coper (Cu) Trace Impurities - Cold (Au) Frace Impurities - Gold (Au) Frace Impurities - Iron (Fe) Trace Impurities - Iron (Fe) Trace Impurities - Lind must (Magnesia (Magnesia (Magnesia)) Frace Impurities - Lead (Pb) Trace Impurities - Lind (Fe) Trace Impurities - Coper (Cu) Trace Impurit	Test	Specification	Result
Appearance Color (APHA)	Assay (HNO3)	69.0 - 70.0 %	69.7 %
Color (APHA) ≤ 10 5 Residue after Ignition ≤ 2 ppm < 1 ppm	Appearance		
Residue after Ignition ≤ 2 ppm < 1 ppm	Color (APHA)	≤ 10	
Chloride (CI) ≤ 0.08 ppm 0.03 ppm Phosphate (PO4) ≤ 0.10 ppm < 0.03 ppm	Residue after Ignition	≤ 2 ppm	
Phosphate (PO₄) ≤ 0.10 ppm < 0.03 ppm	Chloride (CI)	≤ 0.08 ppm	
Sulfate (SO ₄) ≤ 0.2 ppm < 0.2 ppm	Phosphate (PO ₄)	≤ 0.10 ppm	• •
Trace Impurities - Aluminum (Al) ≤ 40.0 ppb < 1.0 ppb	Sulfate (SO ₄)	≤ 0.2 ppm	
Arsenic and Antimony (as As) \$\leq\$ 5.0 ppb	Trace Impurities - Aluminum (Al)	≤ 40.0 ppb	• •
Trace Impurities – Barium (Ba)	Arsenic and Antimony (as As)	≤ 5.0 ppb	
Trace Impurities – Beryllium (Be) Trace Impurities – Bismuth (Bi) Trace Impurities – Boron (B) Trace Impurities – Cadmium (Cd) Trace Impurities – Calcium (Ca) Trace Impurities – Calcium (Ca) Trace Impurities – Chromium (Cr) Trace Impurities – Cobalt (Co) Trace Impurities – Cobalt (Co) Trace Impurities – Copper (Cu) Trace Impurities – Copper (Cu) Trace Impurities – Callium (Ga) Trace Impurities – Gallium (Ga) Trace Impurities – Gallium (Ga) Trace Impurities – Germanium (Ge) Trace Impurities – Gold (Au) Heavy Metals (as Pb) Trace Impurities – Iron (Fe) Trace Impurities – Lead (Pb) Trace Impurities – Lead (Pb) Trace Impurities – Magnesium (Mg) Trace Impurities – Manganese (Mn) Trace Impurities – Mickel (Ni) ■ 20 ppb ■ 21.0 ppb ▼ 1.0 ppb	Trace Impurities - Barium (Ba)	≤ 10.0 ppb	
Trace Impurities – Bismuth (Bi) \$\leq 20.0 ppb	Trace Impurities - Beryllium (Be)	≤ 10.0 ppb	• •
Trace Impurities – Boron (B) ≤ 10.0 ppb 0.1 ppb Trace Impurities – Cadmium (Cd) ≤ 50 ppb < 1 ppb Trace Impurities – Calcium (Ca) ≤ 50.0 ppb 0.3 ppb Trace Impurities – Chromium (Cr) ≤ 30.0 ppb 0.1 ppb Trace Impurities – Cobalt (Co) ≤ 10.0 ppb	Trace Impurities - Bismuth (Bi)	≤ 20.0 ppb	• •
Trace Impurities - Cadmium (Cd) ≤ 50 ppb 0.3 ppb Trace Impurities - Calcium (Ca) ≤ 50.0 ppb 0.3 ppb Trace Impurities - Chromium (Cr) ≤ 30.0 ppb 0.1 ppb Trace Impurities - Cobalt (Co) ≤ 10.0 ppb < 1.0 ppb Trace Impurities - Copper (Cu) ≤ 10.0 ppb < 1.0 ppb Trace Impurities - Gallium (Ga) ≤ 10.0 ppb < 1.0 ppb Trace Impurities - Germanium (Ge) ≤ 20 ppb < 1 ppb Trace Impurities - Gold (Au) ≤ 20 ppb < 1 ppb Trace Impurities - Gold (Au) ≤ 20 ppb < 1.0 ppb Trace Impurities - Iron (Fe) ≤ 40.0 ppb < 1.0 ppb Trace Impurities - Lead (Pb) ≤ 20.0 ppb < 1.0 ppb Trace Impurities - Lithium (Li) ≤ 10.0 ppb < 1.0 ppb Trace Impurities - Magnesium (Mg) ≤ 20 ppb < 1.0 ppb Trace Impurities - Magnesee (Mn) ≤ 10.0 ppb < 1.0 ppb	Trace Impurities - Boron (B)	≤ 10.0 ppb	• •
Trace Impurities - Calcium (Ca) ≤ 50.0 ppb 0.3 ppb Trace Impurities - Chromium (Cr) ≤ 30.0 ppb 0.1 ppb Trace Impurities - Cobalt (Co) ≤ 10.0 ppb < 1.0 ppb Trace Impurities - Copper (Cu) ≤ 10.0 ppb < 1.0 ppb Trace Impurities - Gallium (Ga) ≤ 10.0 ppb < 1.0 ppb Trace Impurities - Germanium (Ge) ≤ 20 ppb < 1 ppb Trace Impurities - Gold (Au) ≤ 20 ppb < 1 ppb Trace Impurities - Iron (Fe) ≤ 40.0 ppb < 1.0 ppb Trace Impurities - Lead (Pb) ≤ 20.0 ppb < 1.0 ppb Trace Impurities - Lithium (Li) ≤ 10.0 ppb < 1.0 ppb Trace Impurities - Magnesium (Mg) ≤ 20 ppb < 1 ppb Trace Impurities - Magnesium (Mg) ≤ 20 ppb < 1.0 ppb	Trace Impurities - Cadmium (Cd)	≤ 50 ppb	
Trace Impurities - Chromium (Cr) ≤ 30.0 ppb 0.1 ppb Trace Impurities - Cobalt (Co) ≤ 10.0 ppb < 1.0 ppb Trace Impurities - Copper (Cu) ≤ 10.0 ppb < 1.0 ppb Trace Impurities - Gallium (Ga) ≤ 10.0 ppb < 1.0 ppb Trace Impurities - Germanium (Ge) ≤ 20 ppb < 1 ppb Trace Impurities - Gold (Au) ≤ 20 ppb < 1 ppb Heavy Metals (as Pb) ≤ 100 ppb < 50 ppb Trace Impurities - Iron (Fe) ≤ 40.0 ppb < 1.0 ppb Trace Impurities - Lead (Pb) ≤ 20.0 ppb < 1.0 ppb Trace Impurities - Lithium (Li) ≤ 10.0 ppb < 1.0 ppb Trace Impurities - Magnesium (Mg) ≤ 20 ppb < 1 ppb Trace Impurities - Magnesium (Mg) ≤ 20 ppb < 1.0 ppb Trace Impurities - Magnesium (Mg) ≤ 20 ppb < 1.0 ppb	Trace Impurities - Calcium (Ca)		• •
Trace Impurities - Cobalt (Co) ≤ 10.0 ppb < 1.0 ppb Trace Impurities - Copper (Cu) ≤ 10.0 ppb < 1.0 ppb Trace Impurities - Gallium (Ga) ≤ 10.0 ppb < 1.0 ppb Trace Impurities - Germanium (Ge) < 20 ppb < 1 ppb Trace Impurities - Gold (Au) ≤ 20 ppb < 1 ppb Heavy Metals (as Pb) ≤ 100 ppb < 50 ppb Trace Impurities - Iron (Fe) ≤ 40.0 ppb < 1.0 ppb Trace Impurities - Lead (Pb) < 20.0 ppb < 1.0 ppb Trace Impurities - Lithium (Li) ≤ 10.0 ppb < 1.0 ppb Trace Impurities - Magnesium (Mg) ≤ 20 ppb < 1 ppb Trace Impurities - Magnesee (Mn) ≤ 10.0 ppb < 1.0 ppb	Trace Impurities - Chromium (Cr)	≤ 30.0 ppb	
Trace Impurities - Copper (Cu) ≤ 10.0 ppb < 1.0 ppb Trace Impurities - Gallium (Ga) ≤ 10.0 ppb < 1.0 ppb Trace Impurities - Germanium (Ge) ≤ 20 ppb < 1 ppb Trace Impurities - Gold (Au) ≤ 20 ppb < 1 ppb Heavy Metals (as Pb) ≤ 100 ppb < 50 ppb Trace Impurities - Iron (Fe) ≤ 40.0 ppb < 1.0 ppb Trace Impurities - Lead (Pb) ≤ 20.0 ppb < 1.0 ppb Trace Impurities - Lithium (Li) ≤ 10.0 ppb < 1.0 ppb Trace Impurities - Magnesium (Mg) ≤ 20 ppb < 1 ppb Trace Impurities - Magnesium (Mg) ≤ 20 ppb < 1.0 ppb	Trace Impurities - Cobalt (Co)	≤ 10.0 ppb	
Trace Impurities – Gallium (Ga) ≤ 10.0 ppb < 1.0 ppb Trace Impurities – Germanium (Ge) ≤ 20 ppb < 1 ppb Trace Impurities – Gold (Au) ≤ 20 ppb < 1 ppb Heavy Metals (as Pb) ≤ 100 ppb < 50 ppb Trace Impurities – Iron (Fe) ≤ 40.0 ppb < 1.0 ppb Trace Impurities – Lead (Pb) ≤ 20.0 ppb < 1.0 ppb Trace Impurities – Lithium (Li) ≤ 10.0 ppb < 1.0 ppb Trace Impurities – Magnesium (Mg) ≤ 20 ppb < 1 ppb Trace Impurities – Magnesium (Mg) ≤ 20 ppb < 1 ppb Trace Impurities – Manganese (Mn) ≤ 10.0 ppb	Trace Impurities - Copper (Cu)	≤ 10.0 ppb	• •
Trace Impurities – Germanium (Ge) ≤ 20 ppb < 1 ppb Trace Impurities – Gold (Au) ≤ 20 ppb < 1 ppb Heavy Metals (as Pb) ≤ 100 ppb < 50 ppb Trace Impurities – Iron (Fe) ≤ 40.0 ppb < 1.0 ppb Trace Impurities – Lead (Pb) ≤ 20.0 ppb < 1.0 ppb Trace Impurities – Lithium (Li) ≤ 10.0 ppb < 1.0 ppb Trace Impurities – Magnesium (Mg) ≤ 20 ppb < 1 ppb Trace Impurities – Manganese (Mn) ≤ 10.0 ppb < 1.0 ppb	Trace Impurities - Gallium (Ga)	≤ 10.0 ppb	
Trace Impurities - Gold (Au) ≤ 20 ppb < 1 ppb	Trace Impurities - Germanium (Ge)	≤ 20 ppb	
Heavy Metals (as Pb) ≤ 100 ppb < 50 ppb Trace Impurities – Iron (Fe) ≤ 40.0 ppb < 1.0 ppb Trace Impurities – Lead (Pb) ≤ 20.0 ppb < 1.0 ppb Trace Impurities – Lithium (Li) ≤ 10.0 ppb < 1.0 ppb Trace Impurities – Magnesium (Mg) ≤ 20 ppb < 1 ppb Trace Impurities – Manganese (Mn) ≤ 10.0 ppb < 1.0 ppb	Trace Impurities - Gold (Au)	≤ 20 ppb	• •
Trace Impurities – Iron (Fe) ≤ 40.0 ppb < 1.0 ppb	Heavy Metals (as Pb)	≤ 100 ppb	
Trace Impurities – Lead (Pb) ≤ 20.0 ppb < 1.0 ppb	Trace Impurities - Iron (Fe)	≤ 40.0 ppb	
Trace Impurities – Lithium (Li) ≤ 10.0 ppb < 1.0 ppb Trace Impurities – Magnesium (Mg) ≤ 20 ppb < 1 ppb Trace Impurities – Manganese (Mn) ≤ 10.0 ppb < 1.0 ppb	Trace Impurities - Lead (Pb)	≤ 20.0 ppb	• • • • • • • • • • • • • • • • • • • •
Trace Impurities – Magnesium (Mg) ≤ 20 ppb < 1 ppb Trace Impurities – Manganese (Mn) ≤ 10.0 ppb < 1.0 ppb Trace Impurities – Mickel (Ni)	Trace Impurities - Lithium (Li)	≤ 10.0 ppb	. ,
Trace Impurities - Manganese (Mn) ≤ 10.0 ppb < 1.0 ppb	Trace Impurities – Magnesium (Mg)	≤ 20 ppb	• •
Trace Impurities Mickel (Ni)	Trace Impurities - Manganese (Mn)	≤ 10.0 ppb	
	Trace Impurities – Nickel (Ni)	≤ 20.0 ppb	< 1.0 ppb

>>> Continued on page 2 >>>





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

Test	Specification	Result
Trace Impurities - Niobium (Nb)	≤ 50.0 ppb	< 1.0 ppb
Trace Impurities - Potassium (K)	≤ 50 ppb	< i ppb
Trace Impurities - Silicon (Si)	≤ 50 ppb	1 ppb
Trace Impurities - Silver (Ag)	≤ 20.0 ppb	< 1.0 ppb
Trace Impurities – Sodium (Na)	≤ 150.0 ppb	< 1.0 ppb
Trace Impurities - Strontium (Sr)	≤ 30.0 ppb	< 1.0 ppb
Trace Impurities - Tantalum (Ta)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities - Thallium (TI)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Tin (Sn)	≤ 20.0 ppb	< 1.0 ppb
Trace Impurities - Titanium (Ti)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities - Vanadium (V)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities - Zinc (Zn)	≤ 20.0 ppb	< 1.0 ppb
Trace Impurities - Zirconium (Zr)	≤ 10.0 ppb	< 1.0 ppb
Particle Count – 0.5 µm and greater	≤ 60 par/ml	13 par/ml
Particle Count - 1.0 µm and greater	≤ 10 par/ml	5 par/ml

Nitric Acid 69% **CMOS**





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

Test Specification Result

For Microelectronic Use

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



Certificate of Analysis

300 Technology Drive Christiansburg, VA 24073 USA inorganicventures.com P: 800-669-6799/540-585-3030 F: 540-585-3012 info@inorganicventures.com

1.0 ACCREDITATION / REGISTRATION

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



2.0 PRODUCT DESCRIPTION

Product Code: Multi Analyte Custom Grade Solution

 Catalog Number:
 QCP-CICV-1

 Lot Number:
 V2-MEB744107

 Matrix:
 7% (v/v) HNO3

Value / Analyte(s): 2 500 μg/mL ea:

Calcium, Potassium,
Magnesium, Sodium,

1 000 µg/mL ea:

Aluminum, Barium,

500 μg/mL ea:

Iron,

250 μg/mL ea:

Nickel, Vanadium, Zinc, Cobalt,

Manganese,

125 μg/mL ea:

Silver, Copper,

100 μg/mL ea: Chromium, 25 μg/mL ea: Beryllium

Second Source: Whenever possible, this solution was manufactured from a second set of concentrates in our manufacturing facility.

3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE Aluminum, Al	CERTIFIED VALUE 1 000 ± 4 µg/mL	ANALYTE Barium, Ba	CERTIFIED VALUE 1 000 ± 6 μg/mL
Beryllium, Be	24.98 ± 0.12 μg/mL	Calcium, Ca	2 500 ± 8 μg/mL
Chromium, Cr	99.9 ± 0.6 μg/mL	Cobalt, Co	250.2 ± 1.2 μg/mL
Copper, Cu	125.0 ± 0.5 μg/mL	Iron, Fe	500.0 ± 2.2 μg/mL
Magnesium, Mg	2 500 ± 11 μg/mL	Manganese, Mn	249.9 ± 1.1 μg/mL
Nickel, Ni	250.0 ± 1.2 μg/mL	Potassium, K	2 500 ± 11 μg/mL
Silver, Ag	125.0 ± 0.6 μg/mL	Sodium, Na	2 500 ± 11 μg/mL
Vanadium, V	250.0 ± 1.1 μg/mL	Zinc, Zn	249.9 ± 1.1 μg/mL

Density: 1.081 g/mL (measured at 20 \pm 4 °C)

Assay Information:

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
	Ва	ICP Assay	3104a	140909
	Ва	Gravimetric		See Sec. 4.2
	Be	ICP Assay	3105a	090514
	Be	Calculated		See Sec. 4.2
	Ca	ICP Assay	3109a	130213
	Ca	EDTA	928	928
	Co	ICP Assay	3113	190630
	Co	EDTA	928	928
	Cr	ICP Assay	3112a	170630
	Cu	ICP Assay	3114	120618
	Cu	EDTA	928	928
	Fe	ICP Assay	3126a	140812
	Fe	EDTA	928	928
	K	ICP Assay	3141a	140813
	K	Gravimetric		See Sec. 4.2
	Mg	ICP Assay	3131a	140110
	Mg	EDTA	928	928
	Mn	ICP Assay	3132	050429
	Mn	EDTA	928	928
	Na	ICP Assay	3152a	200413
	Na	Gravimetric		See Sec. 4.2
	Ni	ICP Assay	3136	120619
	Ni	EDTA	928	928
	V	ICP Assay	3165	160906
	V	EDTA	928	928
	Zn	ICP Assay	3168a	120629
	Zn	EDTA	928	928

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

Characterization of CRM/RM by Two or More Methods

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

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

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

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

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

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

k = coverage factor = 2

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

 $egin{align*} \mathbf{u_{bb}} = \mathbf{bottle} \ \mathbf{to} \ \mathbf{bottle} \ \mathbf{homogeneity} \ \mathbf{standard} \ \mathbf{uncertainty} \ \mathbf{u_{lts}} = \mathbf{long} \ \mathbf{term} \ \mathbf{stability} \ \mathbf{standard} \ \mathbf{uncertainty} \ (\mathbf{storage}) \ \end{aligned}$

uts = transport stability standard uncertainty

Characterization of CRM/RM by One Method

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

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

Xa = mean of Assay Method A with

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

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

k = coverage factor = 2

u_{char a} = the errors from characterization

 $\mathbf{u_{bb}}$ = bottle to bottle homogeneity standard uncertainty $\mathbf{u_{lts}}$ = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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

N/A

6.0 INTENDED USE

- **6.1** This standard is intended for the calibration of analytical instruments and validation of analytical methods as appropriate. This CRM may be used in connection with EPA Methods 6010, 6020 (all versions), Standard Methods 3120 B and USP <232> / ICH Q3D.
- **6.2** For products attaining traceability through Inorganic Ventures' Primary Certified Reference Materials (PCRM™) see the Limited License to Use PCRM™ in the Inorganic Ventures <u>Terms and Conditions of Sale</u>, 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 $20^{\circ} \pm 4^{\circ}$ C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.
- For more information, visit www.inorganicventures.com/TCT

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:	

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

Justin Dirico Stock Processing Supervisor

Juster Dilies Juster Wall Parel R. Laines

Certificate Approved By:

Jodie Wall Stock VSM Coordinator

Certifying Officer:

Paul Gaines Chairman / Senior Technical Director

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



Certificate of Analysis

300 Technology Drive Christiansburg, VA 24073 USA inorganicventures.com P: 800-669-6799/540-585-3030 F: 540-585-3012 info@inorganicventures.com

1.0 ACCREDITATION / REGISTRATION

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



2.0 PRODUCT DESCRIPTION

Product Code: Multi Analyte Custom Grade Solution

Catalog Number: QCP-CICV-2 Lot Number: U2-MEB733713

Matrix: 3% (w/v) Tartaric acid

1% (v/v) HNO3

Value / Analyte(s): 500 µg/mL ea:

Antimony

Second Source: Whenever possible, this solution was manufactured from a second set of concentrates in our manufacturing facility.

3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE CERTIFIED VALUE ANALYTE CERTIFIED VALUE

Antimony, Sb 500.0 \pm 2.8 μ g/mL

Density: 1.017 g/mL (measured at 20 \pm 4 °C)

Assay Information:

 ANALYTE
 METHOD
 NIST SRM#
 SRM LOT#

 Sb
 ICP Assay
 3102a
 140911

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

Characterization of CRM/RM by Two or More Methods

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

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

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

 \mathbf{w}_i = the weighting factors for each method calculated using the inverse square of

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

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

 $\mathbf{u}_{\mathbf{char}} = [\Sigma((\mathbf{w}_i)^2 (\mathbf{u}_{\mathbf{char}})^2)]^{1/2}$ where $\mathbf{u}_{\mathbf{char}}$ are the errors from each characterization method

 $\mathbf{u_{bb}}$ = bottle to bottle homogeneity standard uncertainty $\mathbf{u_{lts}}$ = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

Characterization of CRM/RM by One Method

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

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

X_a = mean of Assay Method A with

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

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

k = coverage factor = 2

 $\mathbf{u}_{\mathbf{char}\;\mathbf{a}}$ = the errors from characterization

 $egin{align*} \mathbf{u_{bb}} &= \mathrm{bottle} \ \mathrm{to} \ \mathrm{bottle} \ \mathrm{homogeneity} \ \mathrm{standard} \ \mathrm{uncertainty} \ \mathbf{u_{lts}} &= \mathrm{long} \ \mathrm{term} \ \mathrm{stability} \ \mathrm{standard} \ \mathrm{uncertainty} \ (\mathrm{storage}) \ \end{aligned}$

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 <u>Terms and Conditions of Sale</u>, 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 $20^{\circ} \pm 4^{\circ}$ C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.
- For more information, visit www.inorganicventures.com/TCT

8.0 HAZARDOUS INFORMATION

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

9.0 HOMOGENEITY

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

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

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

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

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

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

June 01, 2023

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

11.2 Lot Expiration Date

- June 01, 2028
- The date after which this CRM/RM should not be used.
- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

11.3 Period of Validity

· Sealed TCT Bag Open Date:	
· Scalcu I C I Dau Obell Dale.	

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

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Thomas Kozikowski Manager, Quality Control

Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director

20178Ci.



Certificate of Analysis

300 Technology Drive Christiansburg, VA 24073 USA inorganicventures.com P: 800-669-6799/540-585-3030 F: 540-585-3012 info@inorganicventures.com

1.0 ACCREDITATION / REGISTRATION

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



2.0 PRODUCT DESCRIPTION

Product Code: Multi Analyte Custom Grade Solution

Catalog Number: QCP-CICV-3

Lot Number: V2-MEB749572

Matrix: 7% (v/v) HNO3

Value / Analyte(s):

500 μg/mL ea:

Arsenic, Lead, Selenium, Thallium,

250 μg/mL ea: Cadmium

Second Source: Whenever possible, this solution was manufactured from a second set of concentrates in our manufacturing facility.

3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE CERTIFIED VALUE ANALYTE CERTIFIED VALUE Arsenic, As 500.0 \pm 3.1 μ g/mL Cadmium, Cd 250.1 \pm 1.1 μ g/mL Lead, Pb 500.0 \pm 2.3 μ g/mL Selenium, Se 500.0 \pm 3.2 μ g/mL

Thallium, TI 500.0 \pm 3.0 μ g/mL

Density: 1.040 g/mL (measured at 20 \pm 4 °C)

Assay Information:

ANALYTE	METHOD	NIST SRM#	SRM LOT#
As	ICP Assay	3103a	100818
Cd	ICP Assay	3108	130116
Cd	EDTA	928	928
Pb	ICP Assay	3128	101026
Pb	EDTA	928	928
Se	ICP Assay	3149	100901
TI	ICP Assay	3158	151215

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

Characterization of CRM/RM by Two or More Methods

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

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

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

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

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

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

k = coverage factor = 2

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

 $egin{align*} \mathbf{u_{bb}} = \mathbf{bottle} \ \mathbf{to} \ \mathbf{bottle} \ \mathbf{homogeneity} \ \mathbf{standard} \ \mathbf{uncertainty} \ \mathbf{u_{lts}} = \mathbf{long} \ \mathbf{term} \ \mathbf{stability} \ \mathbf{standard} \ \mathbf{uncertainty} \ (\mathbf{storage}) \ \end{aligned}$

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:

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

Xa = mean of Assay Method A with

 $\mathbf{u}_{\mathbf{char}\ \mathbf{a}}$ = the standard uncertainty of characterization Method A

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

k = coverage factor = 2

u_{char a} = the errors from characterization

 $\mathbf{u_{bb}}$ = bottle to bottle homogeneity standard uncertainty $\mathbf{u_{lts}}$ = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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

N/A

6.0 INTENDED USE

- **6.1** This standard is intended for the calibration of analytical instruments and validation of analytical methods as appropriate. This CRM may be used in connection with EPA Methods 6010, 6020 (all versions), Standard Methods 3120 B and USP <232> / ICH Q3D.
- **6.2** For products attaining traceability through Inorganic Ventures' Primary Certified Reference Materials (PCRM™) see the Limited License to Use PCRM™ in the Inorganic Ventures <u>Terms and Conditions of Sale</u>, 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 $20^{\circ} \pm 4^{\circ}$ C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.
- For more information, visit

www.inorganicventures.com/TCT

8.0 HAZARDOUS INFORMATION

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

9.0 HOMOGENEITY

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

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

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

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

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

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

January 02, 2025

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

11.2 Lot Expiration Date

- January 02, 2030
- The date after which this CRM/RM should not be used.
- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

11.3 Period of Validity

Sealed TCT	Bag Open Date:	
Ocalca IOI	Day Open Date.	

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

Justin Dirico Stock Processing Supervisor

Juster Dilies Juster Wall Parel R. Laines

Certificate Approved By:

Jodie Wall Stock VSM Coordinator

Certifying Officer:

Paul Gaines Chairman / Senior Technical Director

⁻ 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.

Hydrogen Peroxide, 30% **CMOS** (Stabilized)





M-6170 R. Date. 8-05/2012025

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 (TI)	≤ 50.0 ppb	< 5.0 ppb
Trace Impurities – Tin (Sn)	190.0 - 500.0 ppb	• •
Trace Impurities – Titanium (Ti)	≤ 10.0 ppb	272.3 ppb
Trace Impurities – Vanadium (V)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities - Zinc (Zn)	≤ 50 ppb	< 1.0 ppb
Trace Impurities – Zirconium (Zr)	≤ 10.0 ppb	< 1 ppb
Particle Count - 0.2 µm and greater	= 10.0 pps ≤ 1175 par/ml	< 1.0 ppb
Particle Count - 0.5 µm and greater	≤ 100 par/ml	202 par/ml
	2 100 pai/III	33 par/ml

Hydrogen Peroxide, 30% **CMOS** (Stabilized)





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

Test

Specification

Result

For Microelectronic Use

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





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 (H2O2)	30.0 - 32.0 %	
Color (APHA)	50.0 - 52.0 % ≤ 10	31.6 %
Free Acid (µeq/g)	≤ 10 ≤ 0.2	< 5
Residue after Evaporation	≤ 10 ppm	0.1
Ammonium (NH ₄)	≤ 3 ppm	2 ppm
Chloride (CI)	≤ 0.2 ppm	< 3 ppm
Nitrate (NO₃)	— · ·	< 0.2 ppm
Phosphate (PO ₄)	≤ 2 ppm	< 2 ppm
Sulfate (SO ₄)	≤ 1 ppm	1 ppm
Trace Impurities - Aluminum (AI)	≤ 3 ppm	< 3 ppm
Arsenic and Antimony (as As)	≤ 70.0 ppb	< 5.0 ppb
Trace Impurities - Barium (Ba)	≤ 10.0 ppb	< 10.0 ppb
Trace Impurities - Beryllium (Be)	≤ 20.0 ppb	< 1.0 ppb
Trace Impurities – Bismuth (Bi)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Boron (B)	≤ 20.0 ppb	< 10.0 ppb
Trace Impurities – Cadmium (Cd)	≤ 10.0 ppb	< 5.0 ppb
Trace Impurities - Calcium (Ca)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities - Chromium (Cr)	≤ 50.0 ppb	< 1.0 ppb
	≤ 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
Frace Impurities – Iron (Fe)	≤ 50.0 ppb	4.6 ppb
race Impurities – Lead (Pb)	≤ 10.0 ppb	< 10.0 ppb
race Impurities – Lithium (Li)	≤ 10.0 ppb	< 1.0 ppb
race Impurities - Magnesium (Mg)	≤ 10.0 ppb	< 1.0 ppb

>>> Continued on page 2 >>>

Lot # 011525

R->2115124

Certified Reference Material CRM

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

CRM

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

CERTIFIED WEIGHT REPORT: 1. Magnesium nitrate hexahydrate (Mg) IN030 мgp05202341 Nominal Concentration (µg/mL): W/Z-> m/z-> m/z-> Recommended Storage: Weight shown below was diluted to (mL): 2.0€4 1.0E4 5.0E5 1.0E6 1000 2000 NIST Test Number: Expiration Date: Part Number: Description: Lot Number: [1] Spectrum No.1 210 110 10 RM# **BTU9** 58112 011525 10000 Ambient (20 °C) 011528 Magnesium (Mg) Number 120 ᅙ 220 20 [19.923 sec]:58112.D# [Count] [Linear] Conc. (µg/mL) 2000.07 10000 Nominal M 6171 130 230 30 0.100 Flask Uncertainty 99.999 Purity 5E-05 Balance Uncertainty 8 Uncertainty Assay Purity (%) 240 0.10 140 40 Solvent: 8.51 8 2% 250 24012496 150 234.9183 Weight (g) 50 Target Lot # (<u>m</u>L 40.0 234.9195 Nitric Acid Weight (g) Conc. (µg/mL) Nitric Acid Actual 260 160 60 10000.1 Actual 170 ò Reviewed By: Formulated By: +/- (µg/mL) Uncertainty Expanded 20.0 180 80 13446-18-9 CAS# (Solvent Safety Info. On Attached pg.)
S# OSHA PEL (TWA) LD50 Pedro L. Rentas Benson Chan 190 **SDS Information** ¥ 200 100 orl-rat 5440 mg/kg 3131a 011525 011525 SRM NIST



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

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

	Al Sb Ba Be Bi
	<0.02 <0.02 <0.02 <0.02 <0.01 <0.01 <0.02
	58585
	40.02 40.02 40.02 40.02 40.02 40.02
	Dy Er Gd Ga
	40.00 40.00 40.00 40.00 40.00 40.00
	Hf Ho In He La Pb
	4000 4000 4000 4000 4000 4000 4000 400
	etals Li Li Mg Mg Mo Nd
(T) = Target analyte	Verific:
get anal	Ation Ni Nb Os Pd Pt K
yte	\$\frac{\phi}{\phi}\$ CP-\$ \$\frac{\phi}{\phi}\$ 2
	Rh Rh Sm Sc
	9/mL) -0.02 -0.02 -0.02 -0.02 -0.02 -0.02
	Se Se Na Si S
	40.2 40.02 40.02 40.02 40.02 40.02
	Th Th Sn
	4000
	Z;

Physical Characterization:

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

Certified by:

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

* Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in

the preparation of all standards.

* All standard containers are meticulously cleaned prior to use.

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

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



Certificate of Analysis

300 Technology Drive Christiansburg, VA 24073 USA inorganicventures.com P: 800-669-6799/540-585-3030 F: 540-585-3012 info@inorganicventures.com

1.0 ACCREDITATION / REGISTRATION

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



2.0 PRODUCT DESCRIPTION

Product Code:

Multi Analyte Custom Grade Solution

Catalog Number:

CLPP-CAL-1

Lot Number:

V2-MEB742428

Matrix:

5% (v/v) HNO3

Value / Analyte(s):

5 000 µg/mL ea:

Calcium,

Potassium,

Magnesium,

Sodium,

2 000 µg/mL ea:

Aluminum,

Barium,

1 000 µg/mL ea:

Iron,

500 μg/mL ea:

Nickel,

Vanadium,

Zinc,

Cobalt,

Manganese,

250 µg/mL ea:

Silver,

Copper,

200 µg/mL ea: Chromium,

50 µg/mL ea:

Beryllium

3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE Aluminum, Al	CERTIFIED VALUE 2 000 ± 7 µg/mL	ANALYTE Barium, Ba	CERTIFIED VALUE 2 000 ± 9 µg/mL
Beryllium, Be	50.03 ± 0.30 μg/mL	Calcium, Ca	5 000 ± 16 μg/mL
Chromium, Cr	200.0 ± 1.1 μg/mL	Cobalt, Co	500.0 ± 2.3 μg/mL
Copper, Cu	250.0 ± 1.1 μg/mL	Iron, Fe	1 000 ± 4 μg/mL
Magnesium, Mg	5 000 ± 22 μg/mL	Manganese, Mn	499.9 ± 2.2 μg/mL
Nickel, NI	500.1 ± 2.3 μg/mL	Potassium, K	5 000 ± 22 μg/mL
Silver, Ag	250.0 ± 1.1 μg/mL	Sodium, Na	5 000 ± 22 µg/mL
Vanadium, V	500.0 ± 2.2 μg/ml.	Zinc, Zn	500.0 ± 2.2 μg/mL

Density:

1.117 g/mL (measured at 20 ± 4 °C)

Assay Information:

ssay imormation:			
ANALYTE	METHOD	NIST SRM#	SRM LOT#
Ag	ICP Assay	3151	160729
Ag	Volhard	999c	999c
Al	ICP Assay	3101a	140903
Al	EDTA	928	928
Ва	ICP Assay	3104a	140909
Ва	Gravimetric		See Sec. 4.2
Be	ICP Assay	3105a	090514
Ca	ICP Assay	3109a	130213
Ca	EDTA	928	928
Co	ICP Assay	3113	190630
Co	EDTA	928	928
Cr	ICP Assay	3112a	170630
Cu	ICP Assay	3114	120618
Cu	EDTA	928	928
Fe	ICP Assay	3126a	140812
Fe	EDTA	928	928
K	ICP Assay	3141a	140813
K	Gravimetric		See Sec. 4.2
Mg	ICP Assay	3131a	140110
Mg	EDTA	928	928
Mn	ICP Assay	3132	050429
Mn	EDTA	928	928
Na	ICP Assay	3152a	200413
Na	Gravimetric		See Sec. 4.2
Ni	ICP Assay	3136	120619
Ni	EDTA	928	928
V	ICP Assay	3165	160906
V	EDTA	928	928
Zn	ICP Assay	3168a	120629
Zn	EDTA	928	928

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

Characterization of CRM/RM by Two or More Methods

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

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

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

w; = the weighting factors for each method calculated using the inverse square of

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

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

k = coverage factor = 2

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

ubb = bottle to bottle homogeneity standard uncertainty ults = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

Characterization of CRM/RM by One Method

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

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

Xa = mean of Assay Method A with

uchar a = the standard uncertainty of characterization Method A

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

k = coverage factor = 2

uchar a = the errors from characterization

ubb = bottle to bottle homogeneity standard uncertainty

ults = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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

INTENDED USE 6.0

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

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

Note: This solution contains Silver (Ag), please refer to our Sample Preparation Guide for more information (https://www.inorganicventures.com/sample-preparation-guide/samples-containing-silver)

8.0 HAZARDOUS INFORMATION

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

9.0 HOMOGENEITY

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

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

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

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

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

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

March 22, 2024

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

11.2 Lot Expiration Date

- March 22, 2029
- The date after which this CRM/RM should not be used.
- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

11.3 Period of Validity

- Sealed TCT Bag Open Date:		
This CDM/DM should not be used	 	

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

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:

Uyen Truong Custom Processing Supervisor

Mega Truong

Certificate Approved By:

Jodie Wall Stock VSM Coordinator

Certifying Officer:

Paul Gaines Chairman / Senior Technical Director July Will
Paul R Laine



Certified Reference Material CRM

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

m/z->	22.55 Fin	s.oms	7)	1.000	2.5 Ee	8.0E6	1. Strontium nitrate (Sr)	Compound	Weight show	Nominal Concentration (µg/ml.): NIST Test Number:	Expiration Date: Recommended Storage:	De	Part
N.			2	10		[1] Spectrum No.1	INO17	RM#	Weight shown below was diluted to (mL):	centration (µg/mL): NIST Test Number:	Expiration Date: nended Storage:	Description:	Part Number:
0		9	Ď.	O		-	IN017 SRZ022018A1	Lot Number C		607B	092727 Ambient (20 °C)	Strontium (Sr)	57038 092724
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		180		80			10042-76-9	CAS#	9	P. C.		d By	
		190	, ,	0	athicists for facilities.			SDS Information (Solvent Safety Info. On Attached pg.) OSHA PEL (TWA) LC	a care at the land	Parim Bentas	A	Benson Chan	
		NOO		100			orl-rat >2000mg/kg 3153a	nation On Attached pg.) (A) LD50	77700	'	1	092724	

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

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(I) = larger analyre

Physical Characterization:

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

Certifled by:

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

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

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

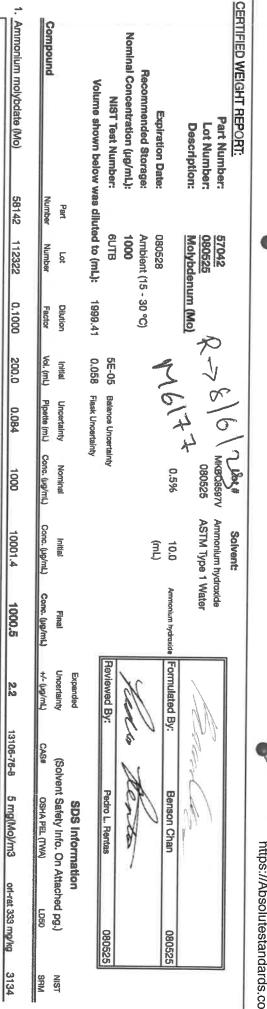
 * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).



Certified Reference Material CRM

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

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



772-2	1.000	N.OMG	1000	2000	1,0 0,5	N.OMO
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		170		70		
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Lot # 080525

Part # 57042

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

							Trace M	Metals	Verificat	ion by	ICP-MS	(hg/	(ImL)						
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0)	△0.02	5	\$0.02 20.02	2	A0.02	3	A,02	Nd	<0.02	~	<0.2	Sc	<0.02	Tie C	<0.02	7	<0.02	21	<0.02

(T) = Target analyte

Physical Characterization:

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

Certified by:

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

 * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware, and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
- Standards are prepared gravimetrically using balances that are calibrated by an ISO17025 certified organization with weights traceable through NIST to the SI kilogram (see above).
- * Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated.

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

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



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

1.0 000	7.0EG	O. O. M. 4	1.065	5.OM 4	1.025	1. Lead(II) nitrate (Pb)	Compound	Expiration Date: 031528 Recommended Storage: Ambient (20 Nominal Concentration (µg/mL): 1000 NIST Test Number: 6UTB Weight shown below was diluted to (mL):	CERTIFIED WEIGHT REPORT: Part N Lot N Desc
	110		Ö		[1] Spectrum No.1	INO	RM#	Expiration Date: nended Storage: ntration (µg/mL): ST Test Number: shown below was di	PORT: Part Number: Lot Number: Description:
í j	n O		N)		Z 0.1	IN029 PBD122016A1	Lot Number	031528 Ambient (2 1000 6UTB	57082 031525 Lead (Pb)
	4 0		ය 0			1000	Nominal Conc. (µg/mL)	2000.07	868
	ō		0		90]:080	99.999	Purity (%)	5E-05 Ba	6/2
	140		0		92. D*	0.10 6	Uncertainty Assay Purity (%) (%)	5E-05 Balance Uncertainty 0.10 Flask Uncertainty	Solvent:
	160		Ø.		14.144 sec]:58082.D# [Count] [Linear]	62.5 3.20015	vasay Target (%) Weight (g)	rty (mL)	Lot # ent: 24014457 2% 40.0
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	170		70			1000.2	Actual Conc. (µg/mL)		ā ā
	o					2.0	Expanded Uncertainty +/- (ug/mL)	Reviewed By:	Hievar Formulated By:
	6		a . O			10099-74-8	CAS#	By A	iovanne
	190		9			0.05 mg/m3	SDS Information (Solvent Safety Info. On Attached pg.) OSHA PEL (TWA) LE	Pedro L. Rentas	Siovanni Esposito
	200		100			intrvns-rat 93 mg/kg	nation In Attached pg.) A) LD50	031525	to 031525

www.absolutestandards.com

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

								lyte	et analyte	(T) = Target									
<0.02	Zr	40,02	Ħ	<0.02	Ta	<0.02	Sc	40.2	*	<0.02	Nd		Po	<0.02	Au	<0.02	රී	<0.02	œ
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									I		l								
						ug/mL)	VIS (by ICP-I	tion	Verifica	tals	Trace Me							
															I		I		1

Physical Characterization:

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

Certified by:

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



Certificate of Analysis

300 Technology Drive Christiansburg, VA 24073 USA inorganicventures.com

P: 800-669-6799/540-585-3030 F: 540-585-3012

info@inorganicventures.com

ACCREDITATION / REGISTRATION

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



2.0 **PRODUCT DESCRIPTION**

Product Code:

Single Analyte Custom Grade Solution

Catalog Number:

CGY10

Lot Number:

V2-Y740548

Matrix:

2% (v/v) HNO3

Value / Analyte(s):

10 000 µg/mL ea:

Yttrium

Starting Material:

Yttrium Oxide

Starting Material Lot#:

2661 and 06230520YL

Starting Material Purity:

99.9984%

CERTIFIED VALUES AND UNCERTAINTIES 3.0

Certifled Value:

 $10000 \pm 30 \mu g/mL$

Density:

1.032 g/mL (measured at 20 \pm 4 °C)

Assay Information:

Assay Method #1

10011 ± 25 µg/mL

EDTA NIST SRM 928 Lot Number: 928

Assay Method #2

9997 ± 50 µg/mL

ICP Assay NIST SRM 3167a Lot Number: 190730

Assay Method #3

9984 ± 31 µg/mL

Calculated NIST SRM Lot Number: See Sec. 4.2

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

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

Characterization of CRM/RM by Two or More Methods

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

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

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

w; = the weighting factors for each method calculated using the inverse square of the variance.

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

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

k = coverage factor = 2

 $u_{char} = [\Sigma((w_i)^2 (u_{char})^2)]^{1/4}$ where u_{char} i are the errors from each characterization method

u_{bb} = bottle to bottle homogeneity standard uncertainty u_{lts} = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

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

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:

ucher a = the standard uncertainty of characterization Method A

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

X_a = mean of Assay Method A with

u_{bb} = bottle to bottle homogeneity standard uncertainty

ults = long term stability standard uncertainty (storage)

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

uchar a = the errors from characterization

uts = transport stability standard uncertainty

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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

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

M	Ag	<	0.004600	М	Eu		0.009037	M	Na		0.086360	М	Se	<	0.005200	М	Zn		0.030125
М	ΑI		0.014862	0	Fe		0.002410	М	Nb	<	0.000570	0	Si		0.024100	0	Zr	<	0.002600
М	As	<	0.003500	М	Ga	<	0.000570	M	Nd		0.000923	M	Sm		0.000461				
М	Au	<	0.001700	M	Gd	<	0.003500	M	Ni	<	0.005700	М	Sn	<	0.002300				
0	В		0.002209	M	Ge	<	0.005200	М	Os	<	0.001200	M	Sr	<	0.004600				
0	Ba	<	0.002500	M	Hf	<	0.000570	n	Р	<		М	Ta	<	0.000570				
0	Ве	<	0.001400	M	Hg	<	0.000570	M	Pb		0.005020	М	Tb		0.001044				
M	Bi	<	0.003500	М	Но		0.009037	М	Pd	<	0.005100	М	Te	<	0.002300				
0	Ca		0.009841	М	in	<	0.002300	M	Pr	<	0.002300	М	Th	<	0.000570				
M	Cd	<	0.000570	М	lr	<	0.000570	М	Pt	<	0.000570	М	Ti	<	0.003500				
M	Ce	<	0.002300	0	K		0.018677	М	Rb	<	0.000570	М	TI	<	0.000570				
М	Co	<	0.000570	М	La		0.000461	M	Re	<	0.000570	M	Tm	<	0.003500				
M	Cr	<	0.004000	0	Li	<	0.009300	M	Rh	<	0.008000	М	U	<	0.000570				
М	Cs	<	0.000570	M	Lu		0.000582	М	Ru	<	0.000570	M	V		0.001265				
М	Cu		0.002610	0	Mg		0.001486	n	S	<		М	W	<	0.002300				
M	Dy		0.003815	М	Mn		0.000582	M	Sb		0.005422	s	Υ	<					
M	Er		0.003615	М	Мо	<	0.005700	M	Sc	<	0.001200	М	Yb		0.001827				

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

6.0 INTENDED USE

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

6.2 For products attaining traceability through Inorganic Ventures' Primary Certified Reference Materials (PCRM™) see the Limited License to Use PCRM™ in the Inorganic Ventures <u>Terms and Conditions of Sale.</u>

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 $20^{\circ} \pm 4^{\circ}$ C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.
- For more information, visit www.inorganicventures.com/TCT

Atomic Weight; Valence; Coordination Number; Chemical Form In Solution - 88.91 +3 6 Y(OH)(H2O)x+2 Chemical Compatibility -Soluble in HCl, H2SO4 and HNO3. Avoid HF, H3PO4 and neutral to basic media. Stable with most metals and inorganic anions forming an insoluble carbonate, oxide, oxalate, and fluoride. Avoid mixing with elements / solutions containing moderate amounts of fluoride.

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

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

Y Containing Samples (Preparation and Solution) - Metal (Soluble in acids); Oxide (Dissolve by heating in H2O/ HNO3); Ores (Carbonate fusion in Pt0 followed by HCl dissolution); Organic Matrices (Dry ash and dissolve in 1:1 H2O / HCl or HNO3).

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

Technique/Line	Estimated D.L.	Order	Interferences (underlined indicates severe)
ICP-MS 89 amu	0.8 ppt	N/A	73Ge16O, 178Hf+2
ICP-OES 360.073 nm	0.005 / 0.000036 μg/mL	1	Ce, Th
ICP-OES 371.030 nm	0.004 / 0.00007 μg/mL	1	Ce
ICP-OES 377.433 nm	0.005 / 0.0009 μg/mL	1	Ta, Th

8.0 HAZARDOUS INFORMATION

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

9.0 HOMOGENEITY

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

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

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

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

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

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

Inorganic Ventures, 300 Technology Drive, Christiansburg, Va. 24073, USA; Telephone: 800.669.6799; 540.685.3030, Fax: 540.585.3012; Inorganicventures.com; info@inorganicventures.com

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

11.1 Certification Issue Date

February 20, 2024

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

11.2 Lot Expiration Date

- February 20, 2029
- The date after which this CRM/RM should not be used.
- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

11.3 Period of Validity

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

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

Uyen Truong Custom Processing Supervisor Mayyand Man
Paul R Laine

Certificate Approved By:

Muzzammil Khan Stock Laboratory Supervisor

Certifying Officer:

Paul Gaines Chairman / Senior Technical Director



Instructions for QATS Reference Material: ICP-AES ICS

QATS LABORATORY INORGANIC REFERENCE MATERIAL INTERFERENCE CHECK SAMPLE SET FOR ICP-AES (ICSA WITH ICSB)

NOTE: These instructions are for advisory purposes only. If any apparent conflict exists between these instructions and the analytical protocol or your contract, disregard these instructions.

APPLICATION: For use with the CLP SFAM01.0 SOW and revisions.

CAUTION: Read instructions carefully before opening bottle(s) and proceeding with the

analyses,

Contains Heavy Metals
HAZARDOUS MATERIAL

Safety Data Sheets
Available Upon Request

M6182

(A) SAMPLE DESCRIPTION

Enclosed is a set of one (1) or more bottles of Aqueous Reference Material, each composed of metals at various concentrations and prepared with nitrate salts and oxy-acids of the respective elements in a 5% nitric acid matrix. For the reference material source in reporting ICSA and ICSAB mixture use "USEPA". For the reference material lot number for the ICSA use "ICSA-1211" and for the ICSAB mixture use "ICSA-1211+ICSB-0710".

<u>CAUTION:</u> The bottle(s) should be protected from light during storage to ensure the stability of silver which is contained in the ICSB solution. The bottle(s) should be stored at room temperature. **Do not allow the solution(s) to freeze.**

(B) BREAKAGE OR MISSING ITEMS

Check the contents of the shipment carefully for any broken, leaking, or missing items. Check that the seal is intact on each bottle. Refer to the enclosed chain of custody record. Report any problems to Mr. Keith Strout, APTIM Federal Services, LLC, at (702) 895-8722. If requested, return the chain-of-custody record with appropriate annotations and signatures to the address provided below.

QUALITY ASSURANCE TECHNICAL SUPPORT LABORATORY
APTIM Federal Services, LLC
2700 Chandler Avenue - Building C
Las Vegas, NV 89120

(C) ANALYSIS OF SAMPLES

The interference check sample set is to be used to verify inter-element and background correction factors of inductively-coupled plasma (ICP) spectrometers. This reference material set consists of two (2) concentrated solutions. The ICSA solution contains the four (4) interferent elements: Al, Ca, Fe, and Mg. The ICSB solution contains the analytes: Ag, As, Sb, Ba, Be,

Page 1 of 2











APTIM

Instructions for QATS Reference Material: ICP-AES ICS

Cd, Co, Cr, Cu, Mn, Ni, Pb, Tl, Se, V, and Zn. This instruction sheet provides the nominal values for ICP-AES Part A and Part B target analytes when diluted as directed.

Using Class "A" glassware, preparation and analysis must be performed according to the following instructions:

ICSA-1211, Interferents: Pipet 10 mL of the ICSA solution into a 100 mL volumetric flask and dilute to volume with 2% v/v HNO₃. Analyze this ICSA solution by ICP-AES.

ICSB-0710, Analytes, mixed with ICSA-1211, Interferents: Pipet 10 mL of the ICSA solution and 10 mL of the ICSB solution into a 100 mL volumetric flask and dilute to volume with 2% v/v HNO₃. Analyze this ICSAB solution by ICP-AES.

(D) "CERTIFIED VALUE" CONCENTRATIONS OF QATS ICP-AES ICS SOLUTION(S)

The "Certified Value" concentrations of the elements, listed in Table 1 below, were derived from statistically pooled analysis results from the following sources, if available: QATS Laboratory, CLP laboratories, Quarterly Blind (QB)/Proficiency Testing (PT) events, CLP pre-award events, and external referee laboratories.

Table 1.	'CERTIFIE			FERENCE CI IXED WITH I	HECK SAMPL CSB-0710	E ICP-AES I	CSA-1211
Element	CRQL	Part A (µg/L)	Low Limit (µg/L)	High Limit (µg/L)	Part A +Part B (µg/L)	Low Limit (µg/L)	High Limit (µg/L)
Al	200	255000	216000	294000	247000	209000	285000
Sb	60	(0.0)	-60.0	60.0	618	525	711
As	10	(0.0)	-10.0	10.0	104	88.4	120
Ва	200	(6.0)	-194	206	(537)	337	737
Ве	5.0	(0.0)	-5.0	5.0	495	420	570
Cd	5.0	(1.0)	-4.0	6.0	972	826	1120
Ca	5000	245000	208000	282000	235000	199000	271000
Cr	10	(52.0)	42.0	62.0	542	460	624
Co	50	(0.0)	-50.0	50.0	476	404	548
Cu	25	(2.0)	-23.0	27.0	511	434	588
Fe	100	101000	85600	116500	99300	84400	114500
Pb	10	(0.0)	-10.0	10.0	(49.0)	39.0	59.0
Mg	5000	255000	216000	294000	248000	210000	286000
Mn	15	(7.0)	-8.0	22.0	507	430	584
Ni	40	(2.0)	-38.0	42.0	954	810	1100
Se	35	(0.0)	-35.0	35.0	(46.0)	11.0	81.0
Ag	10	(0.0)	-10.0	10.0	201	170	232
TI	25	(0.0)	-25.0	25.0	(108)	83.0	133
V	50	(0.0)	-50.0	50.0	491	417	565
Zn	60	(0.0)	-60.0	60.0	952	809	1095

The acceptance ranges for all analytes in parentheses in the above table were determined using the listed certified value \pm 1 times the associated CLP SOW CRQL. The acceptance ranges for all other analytes were determined using the certified value \pm 15 percent of the listed certified value.



Instructions for QATS Reference Material: ICP-AES ICS

QATS LABORATORY INORGANIC REFERENCE MATERIAL INTERFERENCE CHECK SAMPLE SET FOR ICP-AES (ICSA WITH ICSB)

NOTE: These instructions are for advisory purposes only. If any apparent conflict exists between these instructions and the analytical protocol or your contract, disregard these instructions.

APPLICATION: For use with the CLP SFAM01.0 SOW and revisions.

CAUTION:

Read instructions carefully before opening bottle(s) and proceeding with the

analyses.

Contains Heavy Metals HAZARDOUS MATERIAL

Safety Data Sheets Available Upon Request M6184

(A) SAMPLE DESCRIPTION

Enclosed is a set of one (1) or more bottles of Aqueous Reference Material, each composed of metals at various concentrations and prepared with nitrate salts and oxy-acids of the respective elements in a 5% nitric acid matrix. For the reference material source in reporting ICSA and ICSAB mixture use "USEPA". For the reference material lot number for the ICSA use "ICSA-1211" and for the ICSAB mixture use "ICSA-1211+ICSB-0710".

CAUTION: The bottle(s) should be protected from light during storage to ensure the stability of silver which is contained in the ICSB solution. The bottle(s) should be stored at room temperature. Do not allow the solution(s) to freeze.

(B) BREAKAGE OR MISSING ITEMS

Check the contents of the shipment carefully for any broken, leaking, or missing items. Check that the seal is intact on each bottle. Refer to the enclosed chain of custody record. Report any problems to Mr. Keith Strout, APTIM Federal Services, LLC, at (702) 895-8722, If requested, return the chain-of-custody record with appropriate annotations and signatures to the address provided below.

> QUALITY ASSURANCE TECHNICAL SUPPORT LABORATORY **APTIM Federal Services, LLC** 2700 Chandler Avenue - Building C Las Vegas, NV 89120

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The interference check sample set is to be used to verify inter-element and background correction factors of inductively-coupled plasma (ICP) spectrometers. This reference material set consists of two (2) concentrated solutions. The ICSA solution contains the four (4) interferent elements: Al, Ca, Fe, and Mg. The ICSB solution contains the analytes: Ag, As, Sb, Ba, Be,

Page 1 of 2











APTIM

Instructions for QATS Reference Material: ICP-AES ICS

Cd, Co, Cr, Cu, Mn, Ni, Pb, Tl, Se, V, and Zn. This instruction sheet provides the nominal values for ICP-AES Part A and Part B target analytes when diluted as directed.

Using Class "A" glassware, preparation and analysis must be performed according to the following instructions:

ICSA-1211, Interferents: Pipet 10 mL of the ICSA solution into a 100 mL volumetric flask and dilute to volume with 2% v/v HNO₃. Analyze this ICSA solution by ICP-AES.

ICSB-0710, Analytes, mixed with ICSA-1211, Interferents: Pipet 10 mL of the ICSA solution and 10 mL of the ICSB solution into a 100 mL volumetric flask and dilute to volume with 2% v/v HNO₃. Analyze this ICSAB solution by ICP-AES.

(D) "CERTIFIED VALUE" CONCENTRATIONS OF QATS ICP-AES ICS SOLUTION(S)

The "Certified Value" concentrations of the elements, listed in Table 1 below, were derived from statistically pooled analysis results from the following sources, if available: QATS Laboratory, CLP laboratories, Quarterly Blind (QB)/Proficiency Testing (PT) events, CLP pre-award events, and external referee laboratories.

Table 1.	"CERTIFIE			FERENCE CI	HECK SAMPL CSB-0710	E ICP-AES I	CSA-1211,
Element	CRQL	Part A (µg/L)	Low Limit (µg/L)	High Limit (µg/L)	Part A +Part B (µg/L)	Low Limit (µg/L)	High Limit (µg/L)
Al	200	255000	216000	294000	247000	209000	285000
Sb	60	(0.0)	-60.0	60.0	618	525	711
As	10	(0.0)	-10.0	10.0	104	88.4	120
Ва	200	(6.0)	-194	206	(537)	337	737
Be	5.0	(0.0)	-5.0	5.0	495	420	570
Cd	5.0	(1.0)	-4.0	6.0	972	826	1120
Ca	5000	245000	208000	282000	235000	199000	271000
Cr	10	(52.0)	42.0	62.0	542	460	624
Co	50	(0.0)	-50.0	50.0	476	404	548
Cu	25	(2.0)	-23.0	27.0	511	434	588
Fe	100	101000	85600	116500	99300	84400	114500
Pb	10	(0.0)	-10.0	10.0	(49.0)	39.0	59.0
Mg	5000	255000	216000	294000	248000	210000	286000
Mn	15	(7.0)	-8.0	22.0	507	430	584
Ni	40	(2.0)	-38.0	42.0	954	810	1100
Se	35	(0.0)	-35.0	35.0	(46.0)	11.0	81.0
Ag	10	(0.0)	-10.0	10.0	201	170	232
Ti	25	(0.0)	-25.0	25.0	(108)	83.0	133
V	50	(0.0)	-50.0	50.0	491	417	565
Zn	60	(0.0)	-60.0	60.0	952	809	1095

The acceptance ranges for all analytes in parentheses in the above table were determined using the listed certified value \pm 1 times the associated CLP SOW CRQL. The acceptance ranges for all other analytes were determined using the certified value \pm 15 percent of the listed certified value.





M6187 R.D:-08108125

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

Manufactured Date: 2024-06-28 Retest Date: 2029-06-27

Revision No.: 0

Certificate of Analysis

Test	Specification	Result
Assay (HNO3)	69.0 – 70.0 %	69.7 %
Appearance	Passes Test	Passes Test
Color (APHA)	≤ 10	5
Residue after Ignition	≤ 2 ppm	< 1 ppm
Chloride (CI)	≤ 0.08 ppm	0.03 ppm
Phosphate (PO ₄)	≤ 0.10 ppm	< 0.03 ppm
Sulfate (SO ₄)	≤ 0.2 ppm	< 0.2 ppm
Trace Impurities - Aluminum (AI)	≤ 40.0 ppb	< 1.0 ppb
Arsenic and Antimony (as As)	≤ 5.0 ppb	< 2.0 ppb
Trace Impurities - Barium (Ba)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities - Beryllium (Be)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities - Bismuth (Bi)	≤ 20.0 ppb	< 1.0 ppb
Trace Impurities - Boron (B)	≤ 10.0 ppb	0.1 ppb
Trace Impurities – Cadmium (Cd)	≤ 50 ppb	< 1 ppb
Trace Impurities – Calcium (Ca)	≤ 50.0 ppb	0.3 ppb
Trace Impurities – Chromium (Cr)	≤ 30.0 ppb	0.1 ppb
Trace Impurities – Cobalt (Co)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Copper (Cu)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Gallium (Ga)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Germanium (Ge)	≤ 20 ppb	< 1 ppb
Trace Impurities – Gold (Au)	≤ 20 ppb	< 1 ppb
Heavy Metals (as Pb)	≤ 100 ppb	< 50 ppb
Trace Impurities – Iron (Fe)	≤ 40.0 ppb	< 1.0 ppb
Frace Impurities – Lead (Pb)	≤ 20.0 ppb	< 1.0 ppb
Frace Impurities – Lithium (Li)	≤ 10.0 ppb	< 1.0 ppb
Frace Impurities – Magnesium (Mg)	≤ 20 ppb	< 1 ppb
race Impurities – Manganese (Mn)	≤ 10.0 ppb	< 1.0 ppb
race Impurities - Nickel (Ni)	≤ 20.0 ppb	< 1.0 ppb

>>> Continued on page 2 >>>





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

Test	Specification	Result
Trace Impurities - Niobium (Nb)	≤ 50.0 ppb	< 1.0 ppb
Trace Impurities – Potassium (K)	≤ 50 ppb	< 1 ppb
Trace Impurities – Silicon (Si)	≤ 50 ppb	1 ppb
Trace Impurities – Silver (Ag)	≤ 20.0 ppb	< 1.0 ppb
Trace Impurities - Sodium (Na)	≤ 150.0 ppb	< 1.0 ppb
Trace Impurities - Strontium (Sr)	≤ 30.0 ppb	< 1.0 ppb
Trace Impurities – Tantalum (Ta)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Thallium (TI)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities ~ Tin (Sn)	≤ 20.0 ppb	< 1.0 ppb
Trace Impurities – Titanium (Ti)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Vanadium (V)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities - Zinc (Zn)	≤ 20.0 ppb	< 1.0 ppb
Trace Impurities - Zirconium (Zr)	≤ 10.0 ppb	< 1.0 ppb
Particle Count - 0.5 µm and greater	≤ 60 par/ml	13 par/ml
Particle Count - 1.0 µm and greater	≤ 10 par/ml	5 par/ml

Nitric Acid 69% CMOS





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

Test Specification Result

For Microelectronic Use

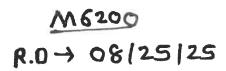
Country of Origin: USA

Packaging Site: Phillipsburg Mfg Ctr & DC

Jamie Croak

Director Quality Operations, Bioscience Production





Material No.: 9530-33 Batch No.: 24D1562005 Manufactured Date: 2024-03-18 Retest Date: 2029-03-17

Revision No.: 0

Certificate of Analysis

Test	Specification	Result
ACS - Assay (as HCI) (by acid-base titrn)	36.5 - 38.0 %	37.6 %
ACS – Color (APHA)	≤ 10	5
ACS – Residue after Ignition	≤ 3 ppm	< 1 ppm
ACS - Specific Gravity at 60°/60°F	1.185 - 1.192	1.192
ACS – Bromide (Br)	≤ 0.005 %	< 0.005 %
ACS – Extractable Organic Substances	≤ 5 ppm	< 1 ppm
ACS - Free Chlorine (as Cl2)	≤ 0.5 ppm	< 0.5 ppm
Phosphate (PO ₄)	≤ 0.05 ppm	0.03 ppm
Sulfate (SO ₄)	≤ 0.5 ppm	< 0.3 ppm
Sulfite (SO₃)	≤ 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 >>>





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

Test	Specification	Result
Trace Impurities - Lead (Pb)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Lithium (Li)	≤ 1.0 ppb	< 0.1 ppb
Trace Impurities - Magnesium (Mg)	≤ 10.0 ppb	2.2 ppb
Trace Impurities - Manganese (Mn)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities - Mercury (Hg)	≤ 0.5 ppb	< 0.1 ppb
Trace Impurities - Molybdenum (Mo)	≤ 10.0 ppb	< 5.0 ppb
Trace Impurities - Nickel (Ni)	≤ 4.0 ppb	0.2 ppb
Trace Impurities - Niobium (Nb)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Potassium (K)	≤ 9.0 ppb	< 1.0 ppb
Trace Impurities – Selenium (Se), For Information Only		< 1.0 ppb
Trace Impurities – Silicon (Si)	≤ 100.0 ppb	< 10.0 ppb
Trace Impurities – Silver (Ag)	≤ 1.0 ppb	< 0.3 ppb
Trace Impurities – Sodium (Na)	≤ 100.0 ppb	2.0 ppb
Trace Impurities – Strontium (Sr)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Tantalum (Ta)	≤ 1.0 ppb	< 0.9 ppb
Trace Impurities – Thallium (TI)	≤ 5.0 ppb	< 2.0 ppb
Trace Impurities - Tin (Sn)	≤ 5.0 ppb	< 0.4 ppb
Frace Impurities – Titanium (Ti)	≤ 1.0 ppb	0.2 ppb
Frace Impurities – Vanadium (V)	≤ 1.0 ppb	< 0.2 ppb
Frace Impurities – Zinc (Zn)	≤ 5.0 ppb	< 0.2 ppb
Frace Impurities – Zirconium (Zr)	≤ 1.0 ppb	< 0.1 ppb

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





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

Test Specification

Result

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

Country of Origin: USA

Packaging Site: Phillipsburg Mfg Ctr & DC

Jamie Croak

Director Quality Operations, Bioscience Production



Certificate of Analysis

300 Technology Drive Christiansburg, VA 24073 USA inorganicventures.com

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

1.0 ACCREDITATION / REGISTRATION

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



2.0 PRODUCT DESCRIPTION

Product Code:

Multi Analyte Custom Grade Solution

Catalog Number:

WW-LFS-2

Lot Number:

V2-MEB743480

Matrix:

5% (v/v) HNO3

tr. HF

Value / Analyte(s):

200 μg/mL ea:

Silica,

o.,....,

80 μg/mL ea: Antimony,

Anumony,

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, SiO2

200.3 ± 1.4 μg/mL

Tin. Sn

70.1 ± 0.4 µg/mL

M6203

M6264

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#
Мо	ICP Assay	3134	130418
Sb	ICP Assay	3102a	140911
SiO2	Calculated		See Sec. 4.2
Sn	ICP Assay	3161a	140917
Ti	ICP Assay	traceable to 3162a	T2-TI725816

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

Characterization of CRM/RM by Two or More Methods

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

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

X_i = mean of Assay Method i with standard uncertainty u_{char i} w_i = the weighting factors for each method calculated using the inverse square of the variance:

 $w_i = (1/u_{\rm char\,i})^2/(\Sigma(1/(u_{\rm char\,i})^2)$ CRM/RM Expanded Uncertainty (±) = $U_{CRM/RM} = k (u^2_{char} + u^2_{bb} + u^2_{its} + u^2_{ts})^{1/s}$

k = coverage factor = 2

 $\mathbf{u}_{char} = [\Sigma((\mathbf{w}_i)^2 (\mathbf{u}_{char})^2)]^{1/2}$ where \mathbf{u}_{char} i are the errors from each characterization method

ubb = bottle to bottle homogeneity standard uncertainty ults = long term stability standard uncertainty (storage)

ute = 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_e) (u_{char e})

X_n = mean of Assay Method A with

uchar a = the standard uncertainty of characterization Method A

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

k = coverage factor = 2

uchar a = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

ults = long term stability standard uncertainty (storage)

u_{Ls} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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

6.0 **INTENDED USE**

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

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

8.0 HAZARDOUS INFORMATION

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

9.0 HOMOGENEITY

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

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

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

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

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

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

May 07, 2024

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

11.2 Lot Expiration Date

- May 07, 2029
- The date after which this CRM/RM should not be used.
- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

11.3 Period of Validity

 Sealed TCT Bag Open Date: 	
---	--

NAMES AND SIGNATURES OF CERTIFYING OFFICERS 12.0 Certificate Prepared By:

Justin Dirico Stock Processing Supervisor

Certificate Approved By:

Thomas Kozikowski Stock VS Manager

2009781 Paul R Laine

Certifying Officer:

Paul Gaines Chairman / Senior Technical Director

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



Certificate of Analysis

300 Technology Drive Christiansburg, VA 24073 USA inorganicventures.com P: 800-669-6799/540-585-3030 F: 540-585-3012 info@inorganicventures.com

1.0 ACCREDITATION / REGISTRATION

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



2.0 PRODUCT DESCRIPTION

Product Code:

Multi Analyte Custom Grade Solution

Catalog Number:

WW-LFS-1

Lot Number:

W2-MEB752149

Matrix:

5% (v/v) HNO3

R-77/20/29

M6210 M6210 M6211 M6212 Value / Analyte(s):

1 000 µg/mL ea: Potassium, 600 µg/mL ea: Phosphorus, 300 µg/mL ea:

Sodium,

200 μg/mL ea:

Magnesium, Cerium,

Aluminum, Selenium,

Iron,

Thallium,

100 μg/mL ea:

Lead,

Calcium,

80 µg/mL ea: Arsenic, 70 μg/mL ea: Mercury, 50 μg/mL **e**a:

Nickel, 40 μg/mL ea:

Chromium, 30 µg/mL ea:

Copper, Vanadium, Boron,

20 µg/mL ea:

Zinc, Barium, Cadmium, Manganese,

Strontium, Beryllium, Cobalt, Lithium,

7.5 µg/mL ea:

Silver

CERTIFIED VALUES AND UNCERTAINTIES 3.0

ANALYTE Aluminum, Al	CERTIFIED VALUE 200.2 ± 0.7 μg/mL	ANALYTE Arsenic, As	CERTIFIED VALUE 80.1 ± 0.5 µg/mL
Barium, Ba	20.02 ± 0.12 μg/mL	Beryllium, Be	20.02 ± 0.11 μg/mL
Boron, B	30.02 ± 0.15 μg/mL	Cadmium, Cd	20.04 ± 0.09 μg/mL
Calcium, Ca	100.1 ± 0.3 μg/mL	Cerium, Ce	200.2 ± 1.0 μg/mL
Chromlum, 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	Strontlum, Sr	20.02 ± 0.10 μg/mL
Thallium, Ti	200.2 ± 1.0 μg/mL	Vanadium, V	30.02 ± 0.13 μg/mL

Zinc, Zn 20.05 ± 0.09 µg/mL

Density:

1.037 g/mL (measured at 20 \pm 5 °C)

Assay Information:

ANALYTE	METHOD	NIST SRM#	SRM LOT#
Ag	ICP Assay	3151	160729
Ag	Volhard	999c	999c
Al	ICP Assay	3101a	140903
Al	EDTA	928	928
As	ICP Assay	3103a	100818
В	ICP Assay	3107	190605
В	Calculated		See Sec. 4.2
Ва	ICP Assay	3104a	140909
Ва	Gravimetric		See Sec. 4.2
Ве	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
К	Gravimetric	0.400	See Sec. 4.2
Li	ICP Assay	3129a	100714
Li	Gravimetric	2424-	See Sec. 4.2
Mg	ICP Assay	3131a 928	140110 928
Mg Mn	EDTA ICP Assay	3132	050429
Mn	EDTA	928	928
Na	ICP Assay	3152a	200413
Na	Gravimetric	31324	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
TI	ICP Assay	3158	151215
V	ICP Assay	3165	160906
٧	EDTA	928	928
Zn	ICP Assay	3168a	120629
Zn	EDTA	928	928
	B	-47	

Page 4 of 7

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:

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

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.

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

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

k = coverage factor = 2

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

ubb = bottle to bottle homogeneity standard uncertainty

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

uts = transport stability standard uncertainty

Characterization of CRM/RM by One Method

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

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

Xa = mean of Assay Method A with

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

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

k = coverage factor = 2

uchar a = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

ults = long term stability standard uncertainty (storage)

uts = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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

N/A

6.0 INTENDED USE

- 6.1 This standard is intended for the calibration of analytical instruments and validation of analytical methods as appropriate. This CRM may be used in connection with EPA Methods 6010, 6020 (all versions), Standard Methods 3120 B and USP <232> / ICH Q3D.
- 6.2 For products attaining traceability through Inorganic Ventures' Primary Certified Reference Materials (PCRM™) see the Limited License to Use PCRM™ in the Inorganic Ventures <u>Terms and Conditions of Sale</u>, 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 $20^{\circ} \pm 5^{\circ}$ C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.
- For more information, visit www.inorganicventures.com/TCT

Note: This solution contains Silver (Ag), please refer to our Sample Preparation Guide for more information (https://www.inorganicventures.com/sample-preparation-guide/samples-containing-silver)

8.0 HAZARDOUS INFORMATION

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

9.0 HOMOGENEITY

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

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

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

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

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

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

April 08, 2025

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

11.2 Lot Expiration Date

- April 08, 2029
- The date after which this CRM/RM should not be used.
- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

11.3 Period of Validity

- 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 Justin Dilies Justin Dilies Justin Wall Paul R Lainea

Certificate Approved By:

Jodie Wall Stock VSM Coordinator

Certifying Officer:

Paul Gaines Chairman / Senior Technical Director

		9.4

Absolute Standards, Inc. 800-368-1131

www.absolutestandards.com



Certified Reference Material CRM

M6027

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

R1.8/5/24

CERTIFIED WEIGHT REPORT: Nominal Concentration (µg/mL): Recommended Storage: **Expiration Date:** Part Number: Lot Number: Description: 062027 57028 062024 Nickel (Ni) 1000 Ambient (20 °C) 24002546 2.0% Lot # Nitric Acid Solvent: 40.0 Nitric Acid Formulated By: Benson Chan

	Nickel(II) nitrate hexahydrate (Ni)	Compound	
	58128	Number	Part
	062023	Number	Lot
	0.1000	Factor	Dilution
	200.0	Vol. (mL)	Initial
	0.084	Pipette (mL)	Uncertainty
	1000	Conc. (µg/mL)	Nominal
	10000.4	Conc. (µg/mL)	Initial
	1000.0	Vol. (mL) Pipette (mL) Conc. (µg/mL) Conc. (µg/mL) Conc. (µg/mL) +/- (µg/mL)	Final
	2.2	+/- (µg/mL)	Uncertainty
	13478-00-7		(Solve
Ш	1000.0 2.2 13478-00-7 1 mg/m3	CAS# OSHA PEL (TWA)	(Solvent Safety Info. On Attached pg.)
	orl-rat 1620 mg/kg 3136	LD50	(ttached pg.)
	3136	SRM	TSIN

Volume shown below was diluted to (mL):

2000.07

0.100

Flask Uncertainty

5E-05 Balance Uncertainty

Reviewed By:

Pedro L. Rentas

062024

062024

Expanded

SDS Information

NIST Test Number:

BTUB

~-z/m	5.0E6	m/z->-	2500	m/z->	1.0E5	2.005
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						3 Z 0
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Part # 57028



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

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

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	=	Sn	Ħ	Ħ	∄	Te	4T			
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	27	Zn	×	¥	۷	a a	₩			
	40.02	∆ 0.02	A).02	40.02	<u>A</u>	∆ 0.02	△ 0.02			

Physical Characterization:

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

Certified by:

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

the preparation of all standards.

* All standard containers are meticulously cleaned prior to use.

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

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

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

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

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

Certified Reference Material CRM

M6030



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

CERTIFIED WEIGHT REPORT: Part Number: 57047 122823 R = 8 | 5 | 24 Lot #

Solvent: 24002546

Nitric Acid

Ambient (20 °C) Silver (Ag) 122826 2% <u>E</u> 80.0 Nitric Acid

Formulated By:

Benson Chan

122823

122823

Recommended Storage:

Expiration Date:

Lot Number:

Description:

Nominal Concentration (µg/mL): NIST Test Number: Weight shown below was diluted to (mL): 1000 **6UTB** 헏 4000.30 Nominal 0.058 Flask Uncertainty Purity Uncertainty Assay 5E-05 Balance Uncertainty Target Actual Actual Uncertainty Reviewed By: Expanded (Solvent Safety Info. On Attached pg.) Pedro L. Rentas SDS Information

1. Silver nitrate (Ag) Compound IN035 J0612AGA1 RM# Number Conc. (µg/mL) 1000.0 8 Purity (%) 0.10 63.7 38 Weight (g) 6.27992 Weight (g) Conc. (µg/mL) 6.27998 1000.0 +/- (µg/mL) 2.0 7761-88-B CAS# 10 ug/m3 Z 3151 NIST SRM

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

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							race Me	letals	Verificat	tion	by ICP-I	S	ug/mL)						
	The state of the s						A STATE OF STATE	, J											
A	<0.02	Ω	<0.02	Dy	<0.02	出	<0.02	Ľ	<0.02	Z	<0.02	7	<0.02	Se	<0.2	4	40.02	W	<0.02
4S	40.02	ဂ္ဂ	40.2	덬	40.02	Ж	40.02	Li	<0.02	3	40.02	₽ Re	40.02	S:	40.02	ď	A).02	a	\$0.02
As	40.2	Ç	<0.02	땹	<0.02	In	<0.02	Mg	<0.01	တ္တ	40.02	짜	<0.02	Agr	7	∄	<0.02	<	40.02
Ва	<0.02	రి	40,02	8	<0.02	듁	40.02	Mn	<0.02	Pd	<0.02	R.	40.02	N	40.2	∄	<u>\$</u>	상	<0.02
Ве	40.01	Ω	<0.02	හු	<0.02	ਲੋਂ	40.2	Hg	40.2	Þ	40.02	R	A0.02	Ž,	40,02	ď	♦ 0.02	<	40.02
쯨	<0.02	င္ပ	40.02	ନ	<0.02	5	< 0.02	Mo	<0.02	77	40.02	Sin	△ 0.02	c/a	40.02	S	A) (2)	Z _n	40.07
В	<0.02	δ	<0.02	Au	<0.02	광	<0.02	Z	<0.02	*	40.2	Sc	<0.02	ī	<0.02	Ħ	<0.02	2	<0.02

Physical Characterization:

(T)= Target analyte

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

Certified by:

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

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- 8			

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Certified Reference Material CRM

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



Number: 57051					071724				071724	
Number: 57051										
Number: 57051 24002546 Nitric Acid		1	いっての日子	}	Giovanni Esposito	2	The state of the s	Hends	Pedro L. Rentas	
Number: 57051 24002546 Nitric Acid		1,1	プルガルが	3	Formulated By:	7	1	Leston	Reviewed By:	
Number: 57051 24002546 24002546 271724 24002546 271724 24002546 2400256 24002546 2400256					Nitric Acid					
Number: 57051	Solvent:	Nitric Acid			40.0	(mL)				
Number: 57051	Fot #	24002546			2.0%				Inty	_
Number: 57051									Balance Uncerta	Flask Uncertaint
Number: 57051 Scription: 071724 Autimony ation Date: 071727 d Storage: Ambient (20 n (µg/mL): 6UTB nn below was diluted to (mL):	00								5E-05	0.058
Number: Number: Scription: ation Date: d Storage: n (µg/mL): rt Number:	10×			(QS)			့			
Part Number: Lot Number: Lot Number: Description: Expiration Date: ended Storage: tration (µg/mL): T Test Number: shown below was		57051	071724	Antimony		071727	Ambient (20	1000	6UTB	diluted to (mL):
E RECOMM IOMINAL CONCENT OMINAL CONCENT NIS	CERTIFIED WEIGHT REPORT:	Part Number:	Lot Number:	Description:		Expiration Date:	Recommended Storage:	Nominal Concentration (µg/mL):	NIST Test Number:	Volume shown below was

NIST SRM

LD50

(Solvent Safety Info. On Attached pg.)

OSHA PEL (TWA)

CAS#

+/- (µg/mL) Uncertainty Expanded

Conc. (µg/mL) Conc. (µg/mL)

Vol. (mL) Pipette (mL) Conc. (µg/mL)

Uncertainty

Initial

Dilution

Factor

Number Ľ

Number Part

Compound

SDS Information

1. Antimony (Sb)	58151	060324	0,1000	200.0	0.084	1000	10001.4	1000.0	2.2	7440-36-0	0.5 mg/m3	orl-rat 7000 mg/kg 3102a
5.0E5	[1] Spectrum No.1		17.964 se	9c]:5805	1.D# [C	[17.964 sec]:58051.D# [Count] [Linear]	eari					
2.68												
m/z->> 5.0E5 2.5E5	0	ON	08		0	Og	09	0		08	06	00
m/z->-	011	08 -	130		041	150	160	170		180	000	0 0 8
ν-z/ш	21,0	220	230		240	250	260					

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

							Trace M	letals	S Verifical	tion	by ICP-N	n) SV	a/mF)						
					200				STATE OF THE PARTY OF									ı	
Al	<0.02	25	<0.02	Dy	<0.02	HŁ	<0.02	ΙΞ	<0.02	ï	<0.02	본	<0.02	Se	<0.2	al l	<0.02	*	<0.02
Sb	Τ	ర	<0.2	臣	<0.02	Но	<0.02	2	<0.02	₽ R	<0.02	Re	<0.02	Si	<0.02	Тe	<0.02	n	<0.02
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Ba	<0.02	చ	<0.02	3	<0.02	Ir	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Za	<0.2	Th	<0.02	χp	<0.02
Be	<0.01	ڻ	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	Ь	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Ā	<0.02
Bi	<0.02	ပိ	<0.02	පී	<0.02	La	<0.02	Mo	<0.02	盂	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
В	<0.02	Çn	<0.02	Au	<0.02	Pb	<0.02	PN	<0.02	M	<0.2	Sc	<0.02	Та	<0.02	Ε	<0.02	Zr	<0.02

(T) = Target analyte

Certified by:

Physical Characterization:

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



All standard containers are meticulously cleaned prior to use. Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above). the preparation of all standards.

Lot # 071724

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

^{*} 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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M6023

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		Weight shown below was diluted to (mL):	NIST Test Number:	Nominal Concentration (µg/mL):	Recommended Storage:	Expiration Date:		Description:	Lot Number:	Part Number:	CERTIFIED WEIGHT REPORT:
Lot		ted to (mL):	8TUB	1000	Ambient (20 °C)	062727		Thalllum (TI)	062724	57081	
Nominal		2000.1			င္ပိ						
Purity Uncertainty Assay		0.10 Flask Uncertainty	5E-05 Balance Uncertainty				2%			Solvent:	
Target						(mL)	40.0			Solvent: 24002546	Lot #
Actual							Nitric Acid			Nitric Acid	
Actual											
Uncertainty	Expanded		Reviewed By:	Juna	1		Formulated By:	4	TO SE	>	
(Solvent Safety Info. On Attached pg.)	SDS Information		Pedro L. Rentas	" freshies	A A		Aleah O'Brady	0	San O Basin	7	
ched pg.) NIST			062724				062724			,	
7											

RW#

Number

Conc. (µg/mL) (%)

Purity (%) (%)

Weight (g) Weight (g) Conc. (µg/mL) +/- (µg/mL)

CAS#

OSHA PEL (TWA)

LD50

SRM

-z/m	5.0E5	1.0E6	m/z->	5000	1.0€4	1.0E6	2.OE6	
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220			120		N O			
							4 0	
230			130		9		[]4.044 sec]:57081.D# [Count] [Linear]	
240			<u> </u>		4		57081.	
ō			140		40		<u> </u>	
250			1		OI.			
N			160		60			
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			200		100			
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Part # 57081



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

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

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	40.02	40.02		A).02	20,02	8	A) (2)	70.02	3	<u>&</u>	THE RESIDENCE AND THE PERSON				

Physical Characterization:

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

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

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

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Certified Reference Material CRM

M6021

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

CERTIFIED WEIGHT REPORT: Part Number: Lot Number: 57023 062424 Solvent:

24002546 Nitric Acid

Expiration Date: Description: 062427 Vanadium (V) 2.0% (III) 40.0

Nitric Acid

Formulated By:

Aleah O'Brady

062424

062424

AND CORDA

Recommended Storage: **6UTB** 1000 Ambient (20 °C) 5E-05 **Balance Uncertainty**

Nominal Concentration (µg/mL): Volume shown below was diluted to (mL): **NIST Test Number:** 2000.3 0.06 Flask Uncertainty Reviewed By: Expanded Pedro L. Rentas **SDS Information**

orl-rat 58.1mg/kg 3165	2.2 7803-55-6 0.05 mg/m3	7803-55-6	2.2	1000.0	1 11	1000	0.084	0.1000 200.0	1 1	58123 021224	58123	Ammonium metavanadate (V)
	# OSHA PEL (TWA)	CAS#	+/- (ug/mL)	Conc. (ua/mL) +/- (ua/mL)	Conc. (ua/mL)	Vol. (mL) Pipette (mL) Conc. (ua/mL)	Pipette (mL)	Vol. (mL)	Factor	Number	Number	Compound
Attac	(Solvent Safety Info. On Attached pg.)	(Solver	Uncertainty	Final	Initial	Nominal	Uncertainty	Initial	Dilution	Lot	Part	

m/z->	2,588	5.0E8	1.007	m/z-> 2.0E7	1.006	2.006
0 10		110		ō		
220		200		20		
230		130		30		
240		140		a		
250		50		5		2
260		160		60		
		170		70		
		TEC		80		
		190		90		
		200		100		

Part # 57023

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

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(T) = Target analyte	40.02	40.02	402	40,02	10.0	40.02	40.02		Verifica	
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	6.65 6.65 6.65 6.65 6.65 6.65 6.65 6.65	3 5	3 6	3 ·	-) {	A 22	∆ 0.02	Service Company		

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



SHIPPING DOCUMENTS



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ALLIANCE PF	ROJECT NO. 03619	
QUOTE NO.	(13619	
COC Number	2047205	

CLIENT INFORMATION					CLIENT PROJECT INFORMATION									Ė	CLIENT BILLING INFORMATION					
COMPANY: A	Juhnic To	FOLLOSOFAL CO	rponultur	PROJ	PROJECT NAME: 6505 HAVER FORD AUE. BILL TO									Ō:	PO#:					
ADDRESS: 6505 HAVELTOND AUE.				PROJECT NO.: LOCATION:									ADDRESS:							
CITY PULADELDUA STATE: PA ZIP: 19139				PROJECT MANAGER:								CITY				STA	STATE: ; ZIP:			
ATTENTION: GARY MUSEL													ATTEN	NTION:				PHC	DNE:	
Man 4					73 (411)(6)3											ANAL YOU				
PHONE: 215 - 928 - 8430 FAX: DATA TURNAROUND INFORMATION					- 25"	DATA	DELIVE	RABLE IN		ATION		1881	ST III				اللب	.,		
FAX (RUSH) DAYS* HARDCOPY (DATA PACKAGE): DAYS* EDD: DAYS* *TO BE APPROVED BY CHEMTECH STANDARD HARDCOPY TURNAROUND TIME IS 10 BUSINESS				□ Lev	PHONE: FAX:: DATA DELIVERABLE INFORMATION															
ALLIANCE		PPO IECT		SAMPLE TYPE				SAMPLE COLLECTION		EI	1		PHE	SERVA	IIVES				COMMENTS ← Specify Preservatives	
SAMPLE ID	TE PROJECT		TION	MATRIX	-	GRAB	DATE	TIME	OF BOTTLES	E/F								A-HCI D-NaOH B-HN03 E-ICE		
1.	10	D. Lat wi	\	1	Ö	G		_	*	1	2	3	4	5	6	7 -	8	9	C-H2SO4 F-OTHER	
2.	GP-	B1-(0'-4')	5	-		11-12	0850		-		X							2-0-M94	
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		(12'-16)	<u> </u>	\vdash	+	X		0915	5	X	X								PPM-0-6	
5.	1	(16.2)	<u> </u>	\rightarrow	-			0922				X							PPM-0.8/Retish	
6.	GP-B		/	\vdash	-			0929				X							PPM- 0.0	
7.		(4'-8'						0938				X							PPM-0.0	
8.		(8'-12)					0944				X							PPM-0.0	
9.		(12'-16)				X		0951	5	X	X								PPM-1.5	
10.		(16.2	1	1			_	0958				X							PPM-0.0/estusal	
DELINOUIGUED EN	(OANDI ED	SAMPLE CUSTOD		UMENTE	D BEL	.OW														
RELINQUISHED BY	Y SAMPLER:	DATE/TIME: 200	1.				Condition	ons of bottles its:	or coolers	at receipt	1095	DMPLIANT	NON D	COMPLIA	or and	OOLER TE	MP 4.	<i>†</i> +	0= 4.7' 0	
11-12-25 1. RELINOUISHED BY SAMPLER: DATE/TIME: RECEIVED BY:						┪	nts: 😾 0	EXELA	COLL	5 0	sed !	-02	socs							
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3.						Page	of	2					_ 0					☐ YES ☐ NO		



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ALLIANCE PI		
QUOTE NO.	Q3619	
COC Number	2047206	

	CLIENT	INFORMATION					CLIENT PI	ROJECT IN	FORM	ATION		March	I by S	1.5	ni.	CLIEN	IT BILLI	NG INF	FORMATION		
COMPANY: AUDIC TECHNOLOGY CORPORATION					PROJECT.NAME: 6505 HAVELFORD AUE									BILL TO:					PO#:		
ADDRESS: 6505 HAVELAND AVE				PROJECT NO.: LOCATION:									ADDRESS:								
		STATE: PA		PRO.	PROJECT MANAGER: CITY									STATE: : ZIP:							
			, (),5	e-mai		7111710															
ATTENTION:	1.			G-IIIali											ALYSIS	PHONE:					
PHONE: 215				PHON				FAX:										III TOIC			
FAX (RUSH) HARDCOPY (DA EDD: *TO BE APPRO	ATA PACKAGE) VED BY CHEM		DAYS* DAYS* DAYS*	Le Le	evel 1 (Revel 2 (Re	esults (esults - esults - ta)	Only)	RABLE IN Level 4 (QC NJ Reduced NYS ASP A Other	+ Full I	ATION Raw Data B EPA Cl S ASP B	a) LP 3 10 1 2	Julia 3	14 Daly	Dentily 5	553	/	//8	/9			
ALLIANCE					I	/IPLE /PE	SAN	E7	1-0		PRE	SERVA	TIVES	_			COMMENTS				
SAMPLE	SAMPLE SAMPLE IDENTIFICATION		SAMPLE MATRIX		GRAB III	DATE	TIME	OF BOTTLES	E/F	2	3	4	5 6	6	7	8	9	A-HCI D-NaOH B-HN03 E-ICE C-H2SO4 F-OTHER			
1.	CD	B3-101-L	47	5.	+	Z	11-12	1005	啡	H	-	X	4	3	0	- 1	-	9	2000		
2.	71-	(4'-8		1	+	X	11 10					文						_	PPM-0.0		
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4.			1	\vdash	+	-	-	_		\ <u>\</u>	1	X				~~		_	PPM-0.0		
	00	(13.:	7	\vdash	+	X	-	157	5	X	X		-			_			PAM-0-0/REFUSAL		
5.	GP-I		12	\vdash	-		-	1034		_	-	X							PPM-0.0		
6.		4'-8		\vdash	-	Ш		1039				X							PPM-0.0		
7.		(8'-17	2')	\sqcup		X		1046	5	X	X								APM-13.5		
8.	上	(13.2	2')	1		X		1100	5	X	X								APM-8-1/EFFUSALX		
9.			~																		
10.																					
		SAMPLE CUSTOD		UMENT	ED BE	LOW	EACH TII	ME SAMP	LES C	HANGE	POSS	ESSIO	N INCL	UDING	COUR	IER DE	LIVER	Υ	The second		
RELINQUISHED BY	Y SAMPLER:	DATE/TIME: 1200					Condition	ons of bottles	or cooler	at receip	ot: D CC	OMPLIANT	□ NON	COMPLIA	NT DC	OOLER TE	MP	4.7	7.40=476		
1 11-12-25 1.					_	- J	SAM	16 6	SP-T	34-1	(13.2)	152	ACHE	d A	PAM	RSA	the	of 28.5 And			
RELINGUISHED BY SAMPLER: DATE/TIME: RECEIVED BY:						58	THE (0 8	.]			_			, , , .						
Z. RELINQUISHED AY	/ SAMPLER:	DATE/TIME: 1350	2. RECEIVED BY:					TEMPA													
3.	\	11-12-25	3.				Page	Z of	2	CLIEN	ı: u	Hand De	elivered	0	ther				Shipment Complete YES NO		

7.5 (Soupled) REFUSSA @(16) 16.2) 0.0 (2.70% 0.0 (21-8) (41-21)

0.0 (h-0

28-19

(4-8) 0.0

64-33 6-4-0.0 4-8-0.0 6-12 -0.0 63-12 5 purpted (02ED34)

64-34 (0-4) 0.0 (4-8) 0.0 (4-8) 0.0 (8-12) - 13.5 (suple) (3'12) - 8.1847 RECOSA (181) - 8.1847 RECOSA



Laboratory Certification

Certified By	License No.
Connecticut	PH-0830
DOD ELAP (ANAB)	L2219
Maine	2024021
Maryland	296
New Hampshire	255425
New Jersey	20012
New York	11376
Pennsylvania	68-00548
Soil Permit	525-24-234-08441
Texas	TX-C25-00189
Virginia	460312

QA Control Code: A2070148



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

Fax: 908 789 8922

LOGIN REPORT/SAMPLE TRANSFER

Order ID: Q3619

AMBR01

Order Date: 11/12/2025 2:37:47 PM

Project Mgr:

Client Name: Ambric Technology Corpora

Project Name: 5506 Haverford Ave

Report Type: Level 1

Client Contact: Gary Meisel

Receive DateTime: 11/12/2025 1:50:00 PM

EDD Type: EXCEL NOCLEANUP

Invoice Name: Ambric Technology Corpor

Purchase Order:

Hard Copy Date:

Invoice Contact: Gary Meisel

Date Signoff:

LAB ID	CLIENT ID	MATRIX SAM DA'		IPLE TEST ME	TEST GROUP	METHOD		FAX DATE	DUE DATES
Q3619-03	GP-B1(8-12)	Solid 11/12	2025 09	:07	4				
				VOCMS Group1	0	8260D	10 Bus. Days		
Q3619-04	GP-B1(12-16)	Solid 11/12	2025 09	:15					
				VOCMS Group1	0	8260D	10 Bus. Days		
Q3619-09	GP-B2(12-16)	Solid 11/12	2025 09	:51					
				VOCMS Group1	0	8260D	10 Bus. Days		
Q3619-14	GP-B3(13.2)	Solid 11/12	2025 10	27					
				VOCMS Group1	0	8260D	10 Bus. Days		
Q3619-17	GP-B4(8-12)	Solid 11/12/	2025 10:	46					
				VOCMS Group1	0	8260D	10 Bus. Days		
Q3619-18	GP-B4(13.2)	Solid 11/12)	2025 11:						
				VOCMS Group1	0 .	8260D	10 Bus. Days		



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

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Project Mgr:

Client Name: Ambric Technology Corpora

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EDD Type: EXCEL NOCLEANUP

Invoice Name: Ambric Technology Corpor.

Purchase Order:

Hard Copy Date:

Date Signoff:

LAB ID

CLIENT ID

MATRIX SAMPLE

SAMPLE

METHOD

FAX DATE

DUE

Invoice Contact: Gary Meisel

DATE

TIME

TEST

TEST GROUP

DATES

Relinguished By:

Date/Time: WISTST STANDED

WITH STANDED

Received By:

Date / Time:

Storage Area: VOA Refridgerator Room

Page 2 of 2