

Cover Page

- **Order ID :** P4699
- Project ID: 120-122 Liberty Ave BK
 - **Client :** EarthEfficient LLC

Lab Sample Number

P4699-01

Client Sample Number

MIXED-DEMO

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

Signature :

Date: 11/12/2024

NYDOH CERTIFICATION NO - 11376

NJDEP CERTIFICATION NO - 20012



DATA REPORTING QUALIFIERS- INORGANIC

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

J	Indicates the reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL), but greater than or equal to the Instrument Detection Limit (IDL).
U	Indicates the analyte was analyzed for, but not detected.
ND	Indicates the analyte was analyzed for, but not detected
Ε	Indicates the reported value is estimated because of the presence of interference
Μ	Indicates Duplicate injection precision not met.
Ν	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 "AV" for automated Cold Vapor AA "CA" for MIDI-Distillation Spectrophotometric "AS" for Semi – Automated Spectrophotometric "C" for Manual Spectrophotometric "T" for Titrimetric "NR" for analyte not required to be analyzed Indicates the analyte's concentration exceeds the calibrated range of the instrument for that specific analysis.
Q	Indicates the LCS did not meet the control limits requirements
Н	Sample Analysis Out Of Hold Time



APPENDIX A

QA REVIEW GENERAL DOCUMENTATION

Project #: P4699

Completed

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

QA Review Signature: PATEL VAISHALI



LAB CHRONICLE

OrderID: Client: Contact:	P4699 EarthEfficient LLC Environmental Team				11/4/2024 12:02:00 PM 120-122 Liberty Ave BK K21					
LabID	ClientID	Matrix	Test	Method	Sample Date	Prep Date	Anal Date	Received		
P4699-01	MIXED-DEMO	SOIL			11/04/24			11/04/24		
			Metals Group3	6010D		11/06/24	11/07/24			



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

Hit Summary Sheet SW-846

SDG No.:	P4699			Order ID:	P4699		
Client:	EarthEfficient LLC			Project ID:	120-122 Liberty Ave BK		
Sample ID Client ID :	Client ID MIXED-DEMO	Matrix	Parameter	Concentration C	C MDL	RDL	Units







Report of Analysis

Client:		Eartl	nEfficient LLC			Date Collected	: 11/04	4/24	
Project:		120-	122 Liberty Ave BK			Date Received:	11/04	4/24	
Client Sa	ample ID:	MIX	ED-DEMO			SDG No.:	P469	9	
Lab Sam	ple ID:	P469	9-01			Matrix:	SOII		
Level (lo	ow/med):	low				% Solid:	99.5		
Cas	Parameter	Conc.	Qua. DF MDL	LOQ / CRQL	Units(Dry V	Veigh P)rep Date	Date Ana.	Ana Met.	Prep Met.
7439-92-1	Lead	4.31	1 0.12	0.49	mg/Kg	11/06/24 10:00	11/07/24 22:34	SW6010	SW3050

Color Before:	Light Grey	Clarity Before:	Texture: Medium
Color After:	yellowish Green	Clarity After:	Artifacts: N/A
Comments:	Metals Group3		
U = Not Detec	cted		J = Estimated Value
LOQ = Limit	of Quantitation		B = Analyte Found in Associated Method Blank
MDL = Method	od Detection Limit		* = indicates the duplicate analysis is not within control limits.
LOD = Limit	of Detection		E = Indicates the reported value is estimated because of the presence
D = Dilution			of interference.
Q = indicates	LCS control criteria did not	meet requirements	OR = Over Range
			N =Spiked sample recovery not within control limits



<u>METAL</u> CALIBRATION DATA



- 2a -INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client:	EarthEfficient LLC				SDG No.:	P4699	_	
Contract:	EART12		Lab Code:	CHEM	Case No.:	P4699	SAS No.:	P4699
Initial Cali	bration Source:	EPA		_				
Continuing	g Calibration Source:	Inc	organic Ventures					

Sample ID	Analyte	Result ug/L	True Value	% Recovery	Acceptance Window (%R)	М	Analysis Date	Analysis Time	Run Number
ICV01	Lead	1020	1000	102	90 - 110	Р	11/07/2024	13:49	LB133344



- 2a -INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client:	EarthEfficient LLC				SDG No.:	P4699		
Contract:	EART12		Lab Code:	CHEM	Case No.:	P4699	SAS No.: P4699	_
Initial Cali	ibration Source:	EPA		_				
Continuin	g Calibration Source:	Inor	ganic Ventures					

Sample ID	Analyte	Result ug/L	True Value	% Recovery	Acceptance Window (%R)	М	Analysis Date	Analysis Time	Run Number
LLICV01	Lead	11.4	12.0	95	80 - 120	Р	11/07/2024	14:23	LB133344



- 2a -INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client:	EarthEfficient LLC				SDG No.:	P4699			
Contract:	EART12		Lab Code:	CHEM	Case No.:	P4699	SAS No.:	P4699	
Initial Cali	ibration Source:	EPA		-					
Continuing Calibration Source:		Inorga	nic Ventures						

		Result								
		ug/L	True Value	%	Acceptance			Analysis	Analysis	Run
Sample ID	Analyte			Recovery	Window (%R)		Μ	Date	Time	Number
~~~~		10.0.0				-				
CCV01	Lead	4920	5000	98	90 - 110	Р		11/07/2024	15:01	LB133344
CCV02	Lead	4800	5000	96	90 - 110	Р		11/07/2024	15:53	LB133344
CCV03	Lead	4970	5000	99	90 - 110	Р		11/07/2024	16:45	LB133344
CCV04	Lead	5010	5000	100	90 - 110	Р		11/07/2024	17:56	LB133344
CCV05	Lead	4880	5000	98	90 - 110	Р		11/07/2024	18:32	LB133344
CCV06	Lead	4930	5000	99	90 - 110	Р		11/07/2024	19:08	LB133344
CCV07	Lead	4850	5000	97	90 - 110	Р		11/07/2024	19:58	LB133344
CCV08	Lead	4840	5000	97	90 - 110	Р		11/07/2024	20:58	LB133344
CCV09	Lead	4780	5000	96	90 - 110	Р		11/07/2024	21:51	LB133344
CCV10	Lead	4710	5000	94	90 - 110	Р		11/07/2024	22:52	LB133344
CCV11	Lead	4800	5000	96	90 - 110	Р		11/07/2024	23:43	LB133344
CCV12	Lead	4820	5000	96	90 - 110	Р		11/08/2024	00:39	LB133344
CCV13	Lead	4870	5000	97	90 - 110	Р		11/08/2024	00:57	LB133344



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## Metals

## - 2b -CRDL STANDARD FOR AA & ICP

Client: Ea	arthEfficient LLC				SDG No.:	P4699			
Contract:	EART12		Lab Code:	CHEM	Case No.:	P4699	S	AS No.: P40	599
Initial Calibr	ration Source:			_					
Continuing C	Calibration Source:								
Continuing C Sample ID	Calibration Source: Analyte	Result ug/L	True Value ug/L	% Recovery	Acceptance Window (%R)	М	Analysis Date	Analysis Time	Run Number



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# Metals

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

Client:	EarthEfficient LLC		_		<b>SDG No.:</b> P469	9				
Contract:	EART12 Lab Code:		CHEM		Case No.: P4699		SAS No.: P4699			
Sample ID	Analyte	Result ug/L	Acceptance Limit	Conc Qual	CRQL	М	Analysis Date	Analysis Time	Run Number	
ICB01	Lead	12.0	+/-12.0	U	12.0	Р	11/07/2024	14:38	LB133344	



# - 3a -INITIAL AND CONTINUING CALIBRATION BLANK SUMMARY

Client:	EarthEfficient LLC		_		SDG No.: P46	99			
Contract:	EART12	Lab Code:	CHEM		Case No.: P46	P4699 SA		AS No.: <u>P4699</u>	
Sample ID	Analyte	Result ug/L	Acceptance Limit	Conc Qual	CRQL	М	Analysis Date	Analysis Time	Run Number
CCB01	Lead	12.0	+/-12.0	U	12.0	Р	11/07/2024	15:05	LB133344
CCB02	Lead	12.0	+/-12.0	U	12.0	Р	11/07/2024	15:58	LB133344
CCB03	Lead	12.0	+/-12.0	U	12.0	Р	11/07/2024	16:49	LB133344
CCB04	Lead	12.0	+/-12.0	U	12.0	Р	11/07/2024	18:04	LB133344
CCB05	Lead	12.0	+/-12.0	U	12.0	Р	11/07/2024	18:37	LB133344
CCB06	Lead	12.0	+/-12.0	U	12.0	Р	11/07/2024	19:12	LB133344
<b>CCB07</b>	Lead	12.0	+/-12.0	U	12.0	Р	11/07/2024	20:02	LB133344
CCB08	Lead	12.0	+/-12.0	U	12.0	Р	11/07/2024	21:02	LB133344
CCB09	Lead	12.0	+/-12.0	U	12.0	Р	11/07/2024	21:55	LB133344
CCB10	Lead	12.0	+/-12.0	U	12.0	Р	11/07/2024	22:56	LB133344
CCB11	Lead	12.0	+/-12.0	U	12.0	Р	11/07/2024	23:47	LB133344
CCB12	Lead	12.0	+/-12.0	U	12.0	Р	11/08/2024	00:43	LB133344
CCB13	Lead	12.0	+/-12.0	U	12.0	Р	11/08/2024	01:01	LB133344



- 3a -

## INITIAL AND CONTINUING CALIBRATION BLANK SUMMARY

Sample ID	Analyte	Result ug/L	Acceptance Limit	Conc Qual	CR	QL M	Analysis Date	Analysis Time	Run Number
Contract:	EART12	Lab Code:	CHEM		Case No.:	P4699	S	AS No.: <u>P46</u>	99
Client:	EarthEfficient LLC		_		SDG No.:	P4699			



## Metals - 3b -PREPARATION BLANK SUMMARY

Client: EarthEfficient LLC SDG No.: P4699

Instrument: P4

Sample ID	Analyte	Result (mg/Kg)	Acceptance Limit	Conc Qual	CRQL mg/Kg	М	Analysis Date	Analysis Time	Run
PB164708BL		SOLID		Batch Number:	PB164708		Prep Date:	11/06/20	24
	Lead	0.53	< 0.53	U	0.53	Р	11/07/2024	23:38	LB133344



### Metals - 4 -INTERFERENCE CHECK SAMPLE

Client: Ea	rthEfficient LLC				SDG No.:	P4699			
Contract:	EART12	Lab Co	de: <u>CHEM</u>		Case No.:	P4699	SAS N	o.: P4699	
ICS Source:	EPA				Instrume	<b>nt ID:</b> <u>P4</u>			
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
sumple 12	7 thaty te	ug/L	ug/L	Recovery	(ug/L)	(ug/L)	Date	Time	Tumber
ICSA01 ICSAB01	Lead	8.91 56.6	49.0	116	-12 37	12 61	11/07/2024 11/07/2024	14:47 14:51	LB133344



# <u>METAL</u> <u>QC</u> <u>DATA</u>



### metals - 5a -MATRIX SPIKE SUMMARY

client:	EarthEfficient LLC	3	level:	low		sdg no.:	P4699		_	
contract:	EART12		lab co	de: <u>CHEN</u>	1	case no.:	P4699	sa	s no.: P4699	
matrix:	Solid		sample id:	P4699-01		client id:	MIXED-DEM	MOMS	_	
Percent S	olids for Sample:	99.5	Spiked ID:	P4699-01	MS	Percent Solid	ls for Spike Sa	mple:	99.5	
Analyte	Units	Acceptance Limit %R	Spiked Result	Sample C Result	С	Spike Added	% Recovery	Qual	М	
Lead	mg/Kg	75 - 125	42.1	4.31		42.8	88		Р	



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

client:	EarthEfficient LLC	C	lev	el:	low		sdg no.:	P4699		_	
contract:	EART12		lab	code	: CHEM		case no.:	P4699	sa	s no.:	P4699
matrix:	Solid		sample	id:	P4699-01		client id:	MIXED-DE	MOMSD		
Percent S	olids for Sample:	99.5	Spiked 1	ID:	P4699-01N	ASD	Percent Solid	ls for Spike Sa	mple:	99.	.5
Analyte	Units	Acceptance Limit %R	MSD Result	С	Sample Result	С	Spike Added	% Recovery	Qual	М	
Lead	mg/Kg	75 - 125	45.2		4.31		45.9	89		Р	



### Metals - 5b -

Client:	EarthEffici	ent LLC						SDG No.:	P4699			
Contract:	EART1	2		Lab Coc	le:	CHEM		Case No.:	P4699	SA	AS No.:	P4699
Matrix:				Level:	LO	W		Client ID:				
Sample ID:	:			Spiked ID:								
			Acceptance		Sar	mple		Spike	%			
Analyte	Uni	its	Limit %R	С	Res	sult	С	Added	Recovery	Qual	Μ	



# Metals - 6 -DUPLICATE SAMPLE SUMMARY

Client: Ear	thEfficient LLC		Level:	LOW	SDG No.	: P4699		
Contract:	EART12		Lab Code	e: CHEM	Case No.	: P4699	S.	AS No.: P4699
Matrix:	Solid		Sample ID:	P4699-01	Client ID:	MIXED-DE	MODUP	_
Percent Solids	for Sample:	99.5	Duplicate ID	P4699-01DUP	Percent Soli	ds for Spike S	ample:	99.5
Analyte	Units	Acceptance Limit	Sample Result	С	Duplicate Result C	RPD	Qual	М
Lead	mg/Kg	20	4.31		4.87	12		Р



# Metals - 6 -DUPLICATE SAMPLE SUMMARY

Client: EarthE	fficient LLC		Level: I	LOW	SDG N	No.:	P4699		_	
Contract: <u>EA</u>	RT12		Lab Code:	CHEM	Case N	No.: _	P4699	SA	AS No.:	P4699
Matrix: <u>S</u>	olid		Sample ID: H	24699-01MS	Client ID	: M	IIXED-DE	MOMSD		
Percent Solids for	Sample:	99.5	Duplicate ID	24699-01MSD	Percent S	olids fo	or Spike Sa	ample:	99.	5
Analyte	Units	Acceptance Limit	Sample Result	С	Duplicate Result	С	RPD	Qual	М	
Lead	mg/Kg	20	42.1		45.2		7		Р	

"A control limit of +20% RPD for each matrix applies for sample values greater than 10 times Detection Limit"



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### LABORATORY CONTROL SAMPLE SUMMARY

Client: <u>Ea</u> Contract:	erthEfficient LLC		Lab Code:	CHEM	SDG No.: Case No.:	P4699 P4699	SAS No.: P4699
Analyte	Units	True Value	Result	С	% Recovery	Acceptanc Limits	e M
PB164708BS Lead	mg/Kg	43.9	41.2		94	80 - 120	Р



#### -9 -

### **ICP SERIAL DILUTIONS**

				SAMPLE	NO.	
				MIXED-D	EMOL	
Lab Name: Chem	tech Consulting Group	Contract:	EART1	2		
Lab Code: CHEM	Lb No.: 1b133344	Lab Sample ID : P4699-01	L	<b>SDG No.:</b> P4699		
Matrix (soil/water):	Solid	Level (low/med):	I	LOW		
	<b>Concentration Units:</b>	mg/Kg				
Analyte	Initial Sample Result (I) C	Serial Dilution Result (S)	С	% Differ- ence	Q	м
Lead	4.31		4.37	1		Р



# <u>METAL</u> <u>PREPARATION &</u> <u>INSTRUMENT</u> <u>DATA</u>



Client:	EarthEfficient LLC			SDG No.:	P4699			
Contract:	EART12	Lab Code:	CHEM	Case No.:	P4699	SAS No.:	P4699	
Instrument	ID:			Date:				
Interelement	Correction Factors (apparent ppb ana	lyte/ppm interferent )						

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



Client:	EarthEfficient LLC			SDG No.:	P4699		
Contract:	EART12	Lab Code:	CHEM	Case No.:	P4699	SAS No.:	P4699
Instrument	ID:			Date:			
Interelement	Correction Factors (apparent ppb analyte/ppn	n interferent )					

	Wave-	ICP Interelement Correction Factors For:					
Analyte	Length (nm)	As	Ba	Be	Cd	Со	
Lead	220.353	0.0000000	0.0003170	0.0000000	0.0000000	0.0000000	



Client:	EarthEfficient LLC			SDG No.:	P4699			
Contract:	EART12	Lab Code:	CHEM	Case No.:	P4699	SAS No.:	P4699	
Instrument	ID:			Date:				
Interelement	Correction Factors (apparent ppb ana	lyte/ppm interferent )						

Wave-**ICP Interelement Correction Factors For:** Length  $\mathbf{Cr}$ Cu K Mn Mo Analyte (nm) 0.0000000 0.0000000 220.353 0.0000000 0.0001400 -0.0008600 Lead



Client:	EarthEfficient LLC			SDG No.:	P4699		
Contract:	EART12	Lab Code:	CHEM	Case No.:	P4699	SAS No.:	P4699
Instrument	ID:			Date:			
Interelement	Correction Factors (annarent nnh analyte/nn	m interferent )					

nterelement Correction Factors (apparent ppb analyte/ppm interferent )

	Wave-	ICP Int	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			



Client:	EarthEfficient LLC			SDG No.:	P4699		
Contract:	EART12	Lab Code:	CHEM	Case No.:	P4699	SAS No.:	P4699
Instrument	ID:			Date:			
Interelement	Correction Factors (apparent ppb analyte	/ppm interferent )					

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



# <u>METAL</u> <u>PREPARATION &</u> <u>ANALYICAL</u> <u>SUMMARY</u>



### Metals - 13 -SAMPLE PREPARATION SUMMARY

Client:	EarthEfficient LLC			SDG No.:	P4699		
Contract:	EART12	Lab Code:	CHEM	Method:			
				Case No.:	P4699	SAS No.:	P4699

						Final	
					Initial	Sample	
		Sample			Sample	Volume	Percent
Sample ID	Client ID	Туре	Matrix	Prep Date	Size(g)	(mL)	Solids
Batch Number	: PB164708						
P4699-01	MIXED-DEMO	SAM	SOLID	11/06/2024	2.44	100.0	99.50
P4699-01DUP	MIXED-DEMODUP	DUP	SOLID	11/06/2024	2.24	100.0	99.50
P4699-01MS	MIXED-DEMOMS	MS	SOLID	11/06/2024	2.35	100.0	99.50
P4699-01MSD	MIXED-DEMOMSD	MSD	SOLID	11/06/2024	2.19	100.0	99.50
PB164708BL	PB164708BL	MB	SOLID	11/06/2024	2.28	100.0	100.00
PB164708BS	PB164708BS	LCS	SOLID	11/06/2024	2.28	100.0	100.00



### metals - 14 -ANALYSIS RUN LOG

Client: EarthEff	ficient LLC				Contract: EART12
ab code: CHEM	Case no.: P4699		Sası	10.: P4699	<b>Sdg no.:</b> P4699
nstrument id numbe	er: Metl	10d:			Run number: LB133344
tart date:	11/07/2024 End d	ate:	1	1/08/2024	
Lab sample id.	Client Sample Id	d/f	Time		Parameter list
S0	S0	1	1323	Pb	
S1	S1	1	1328	Pb	
S2	S2	1	1332	Pb	
S3	\$3	1	1336	Pb	
S4	S4	1	1340	Pb	
S5	85	1	1345	Pb	
ICV01	ICV01	1	1349	Pb	
LLICV01	LLICV01	1	1423	Pb	
ICB01	ICB01	1	1438	Pb	
CRI01	CRI01	1	1442	Pb	
ICSA01	ICSA01	1	1447	Pb	
ICSAB01	ICSAB01	1	1451	Pb	
CCV01	CCV01	1	1501	Pb	
CCB01	CCB01	1	1505	Pb	
CCV02	CCV02	1	1553	Pb	
CCB02	CCB02	1	1558	Pb	
CCV03	CCV03	1	1645	Pb	
CCB03	CCB03	1	1649	Pb	
CCV04	CCV04	1	1756	Pb	
CCB04	CCB04	1	1804	Pb	
CCV05	CCV05	1	1832	Pb	
CCB05	CCB05	1	1837	Pb	
CCV06	CCV06	1	1908	Pb	
CCB06	CCB06	1	1912	Pb	
CCV07	CCV07	1	1958	Pb	
CCB07	CCB07	1	2002	Pb	
CCV08	CCV08	1	2058	Pb	
CCB08	CCB08	1	2102	Pb	
CCV09	CCV09	1	2151	Pb	
CCB09	CCB09	1	2155	Pb	
P4699-01	MIXED-DEMO	1	2234	Pb	
P4699-01DUP	MIXED-DEMODUP	1	2239	Pb	
P4699-01L	MIXED-DEMOL	5	2243	Pb	
P4699-01MS	MIXED-DEMOMS	1	2247	Pb	
CCV10	CCV10	1	2252	Pb	
CCB10	CCB10	1	2256	Pb	
P4699-01MSD	MIXED-DEMOMSD	1	2300	Pb	
PB164708BL	PB164708BL	1	2338	Pb	
CCV11	CCV11	1	2343	Pb	
CCB11	CCB11	1	2347	Pb	
PB164708BS	PB164708BS	1	2351	Pb	

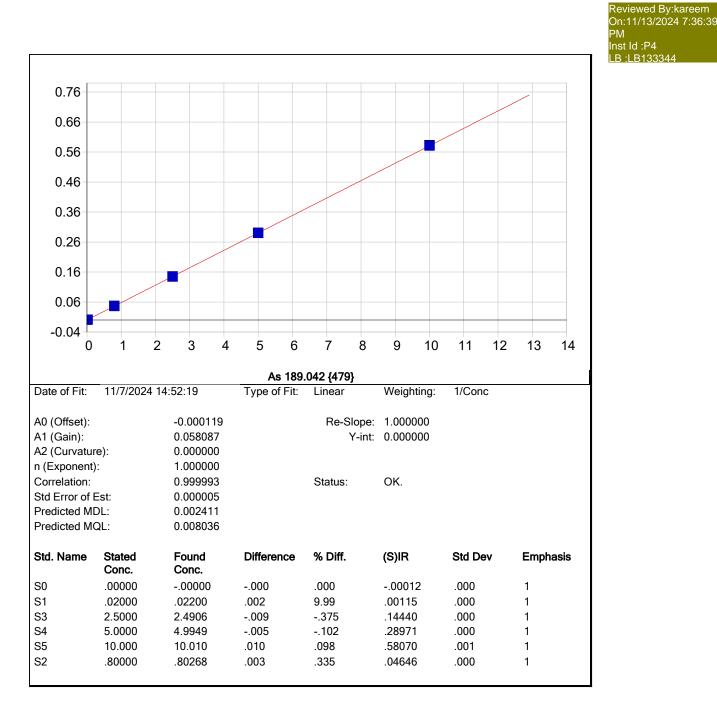


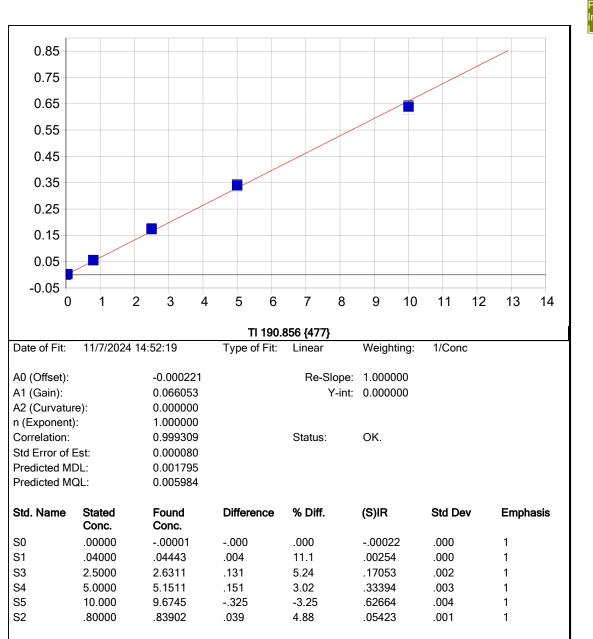
### metals - 14 -ANALYSIS RUN LOG

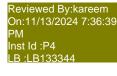
Client:	EarthEffic	EarthEfficient LLC					Contract: EART12
Lab code:	CHEM	Case no.:	P4699		Sas 1	ю.: <u>Р4699</u>	<b>Sdg no.:</b> P4699
Instrument id number: M			Metho	od:			Run number: LB133344
Start date: <u>11/07/2024</u> End			End dat	date: <u>11/08/2024</u>			
Lab sa	mple id.	Client Sample Id		d/f	Time		Parameter list
CCV12		CCV12	1	1	0039	Pb	
CCB12		CCB12	1	1	0043	Pb	
CCV13		CCV13	]	1	0057	Pb	
CCB13		CCB13	1	1	0101	Pb	

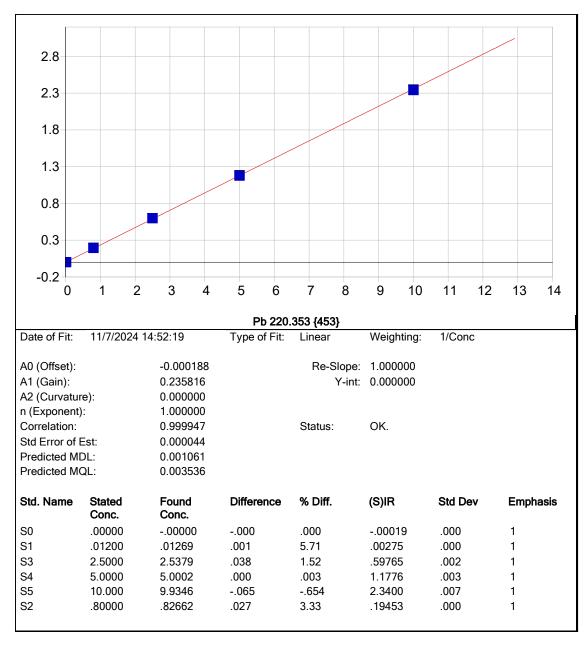


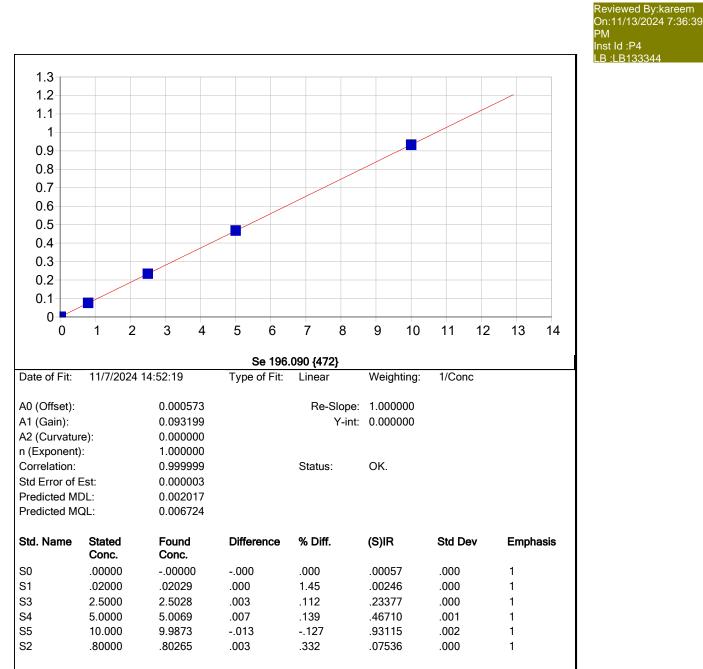
# <u>METAL</u> RAW DATA

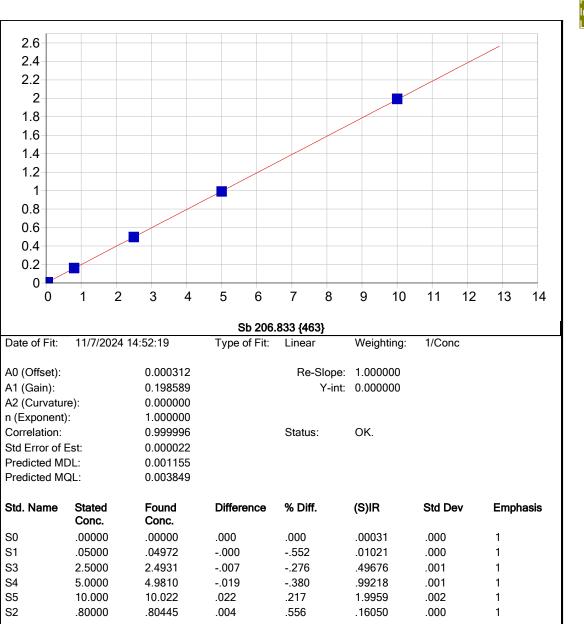


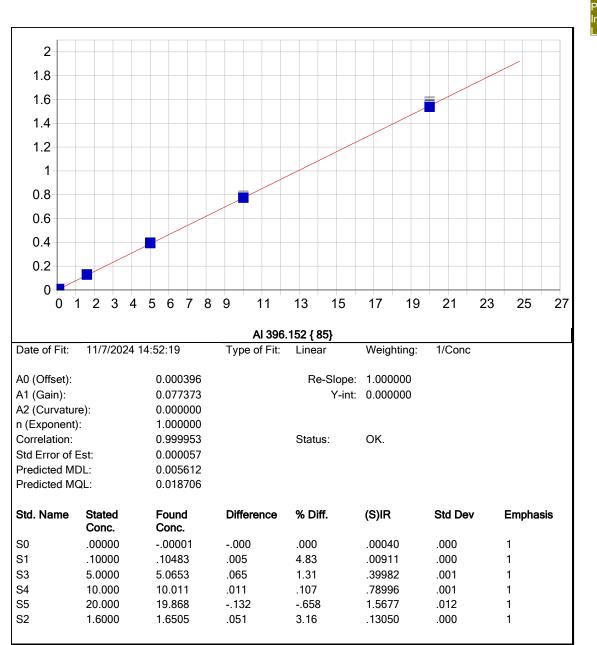


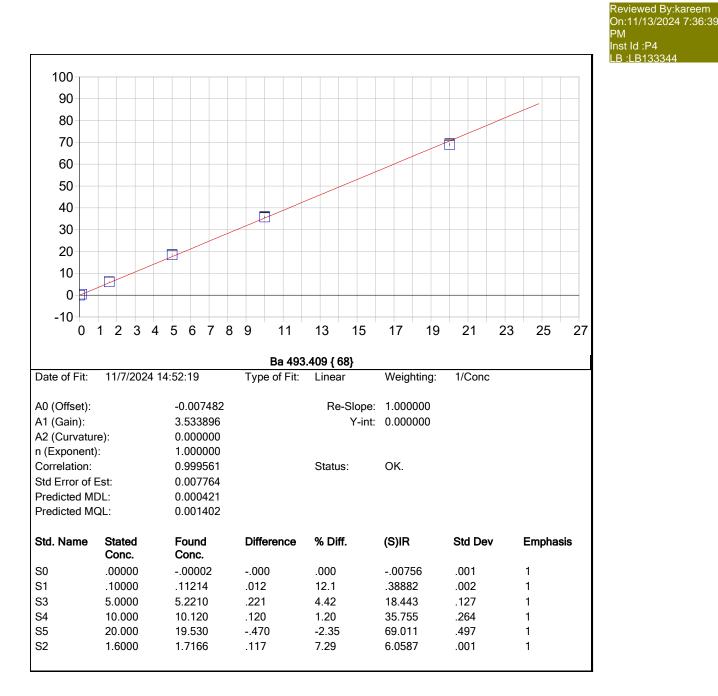


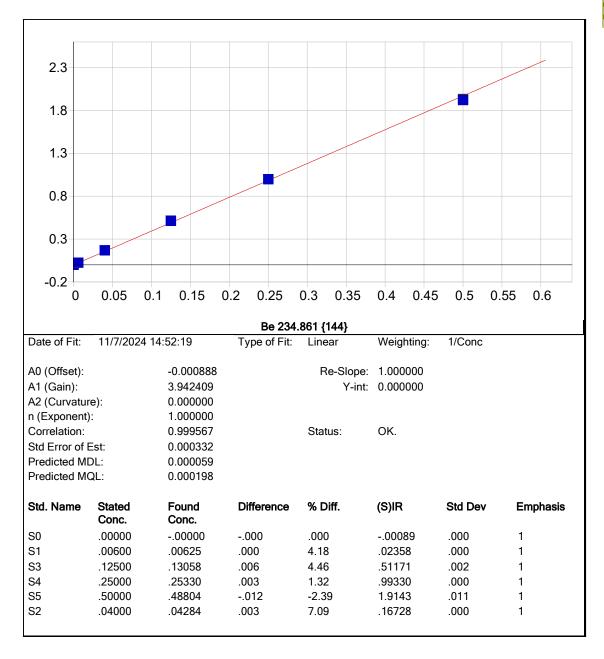


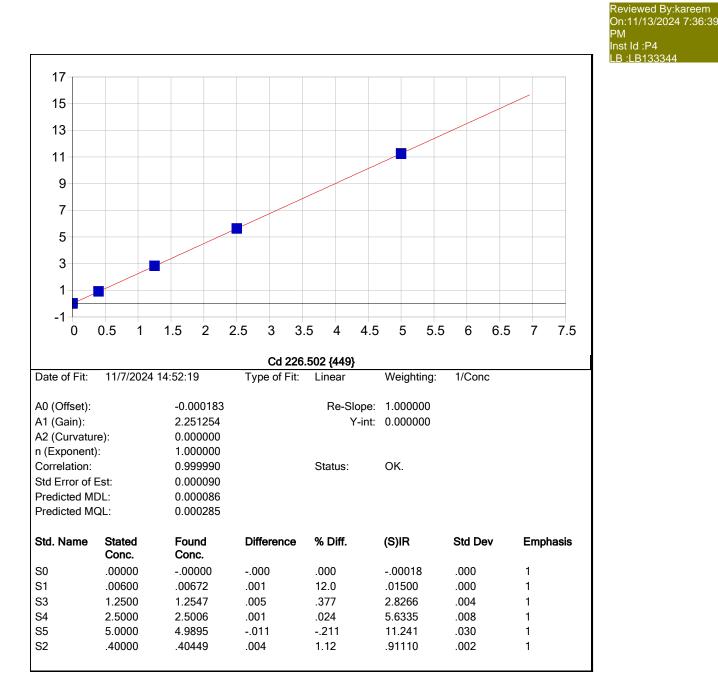




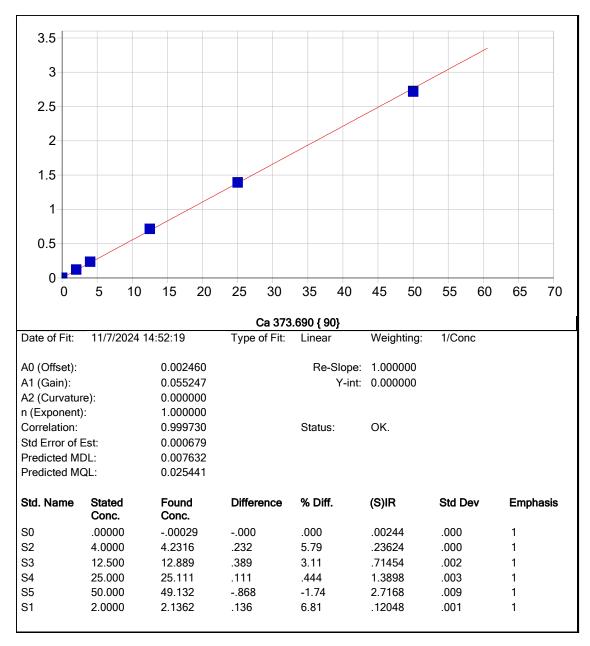


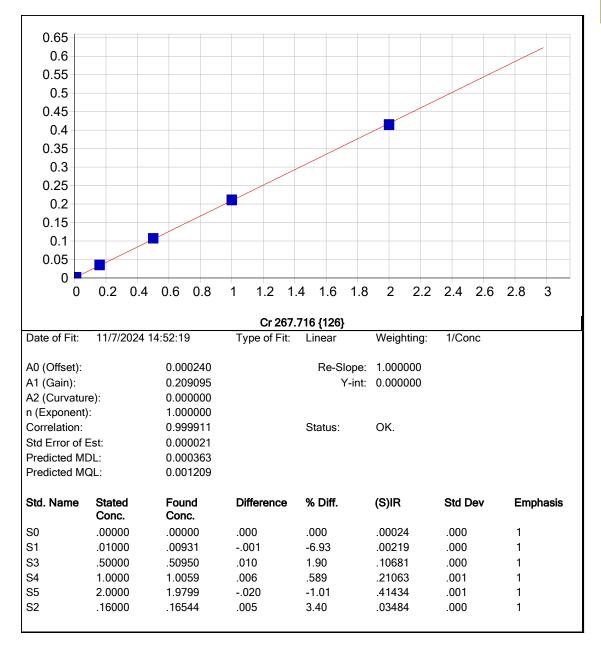


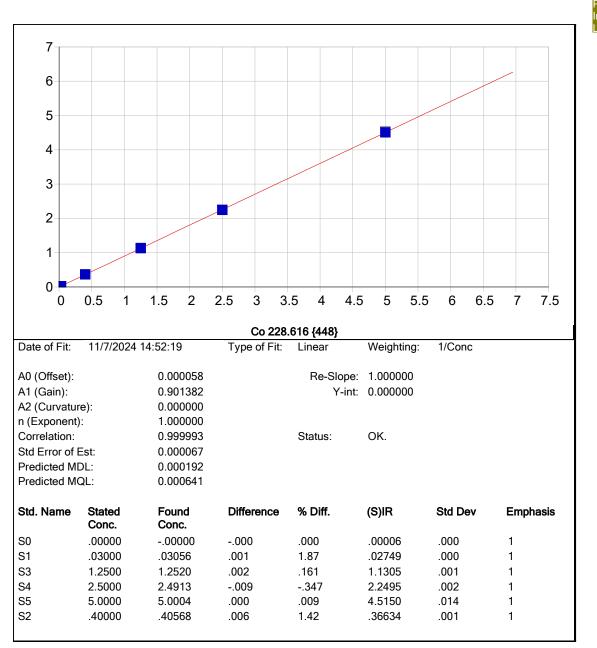


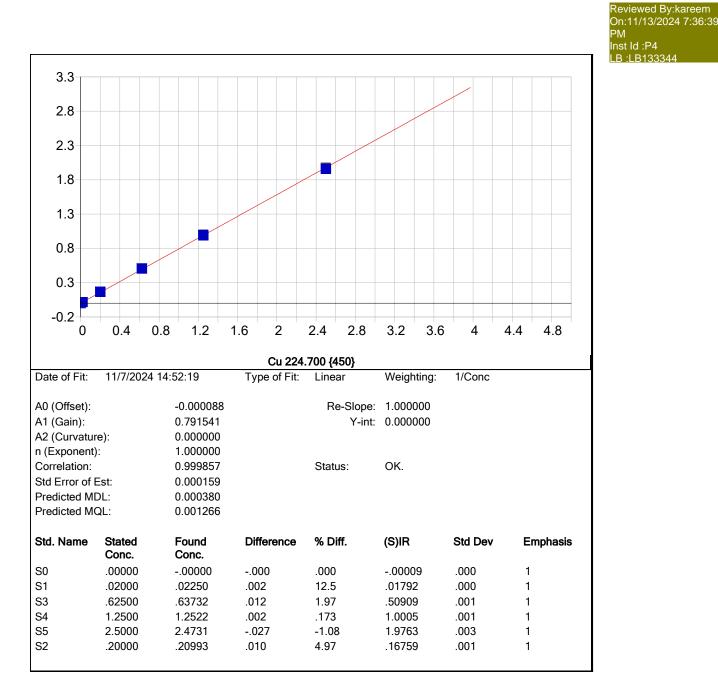




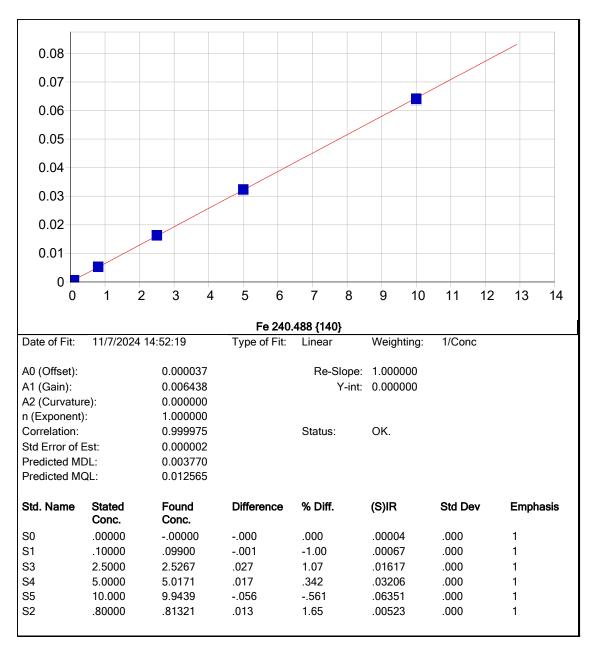


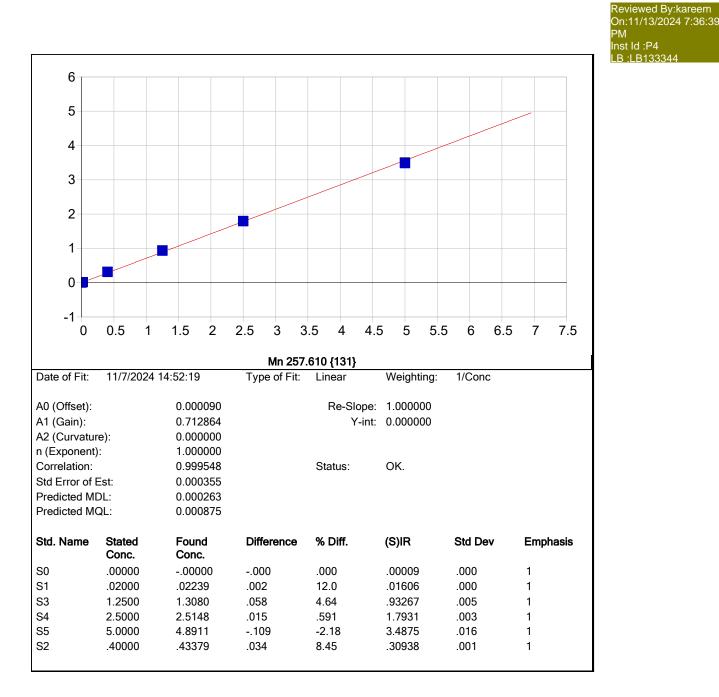


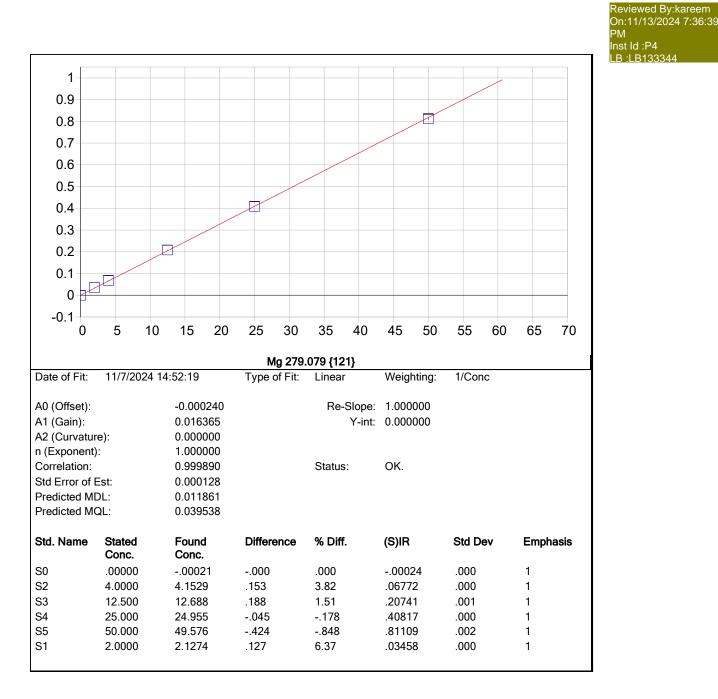


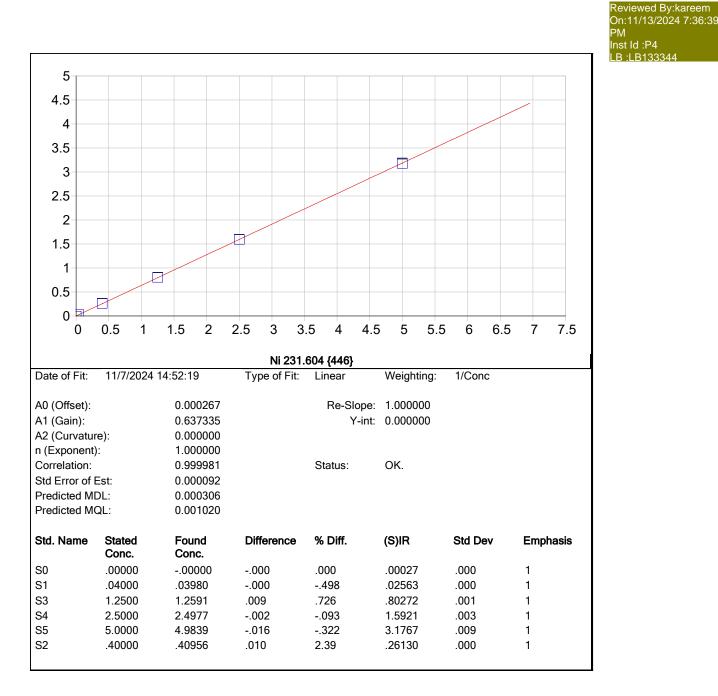


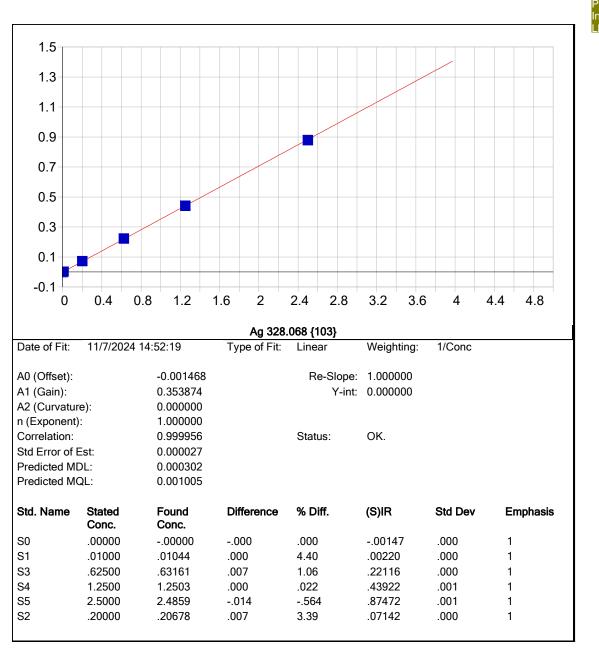


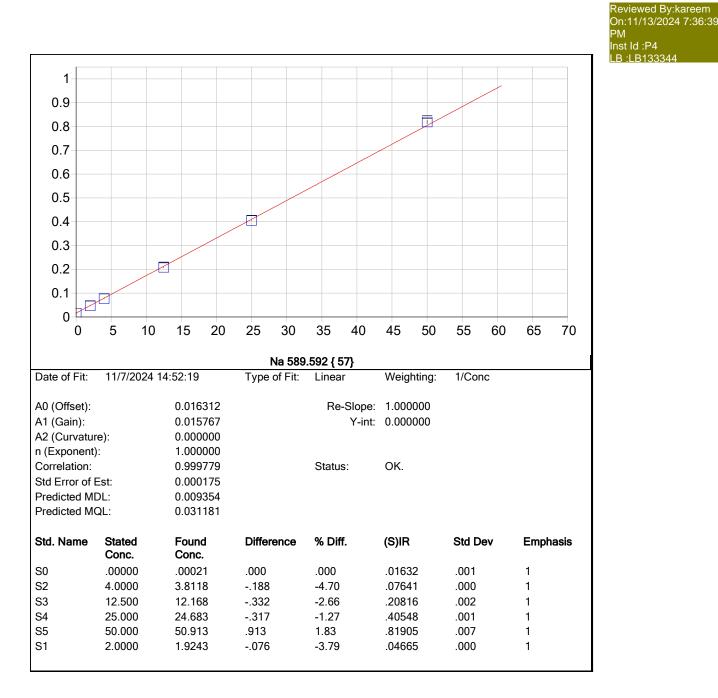


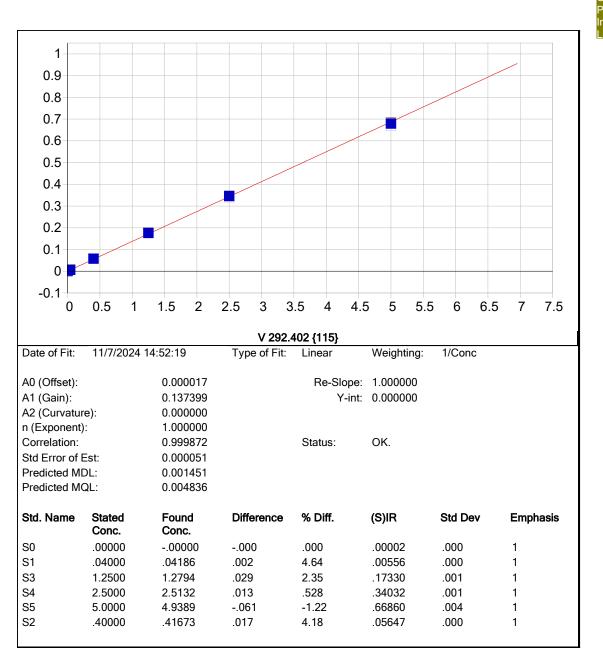


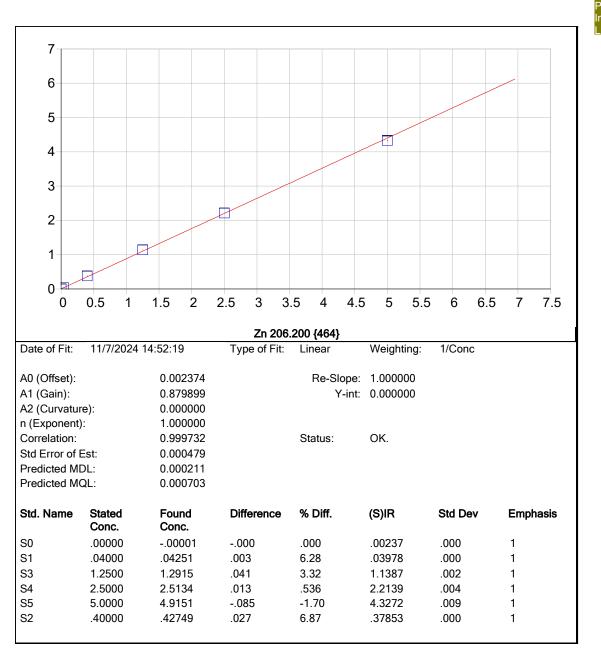


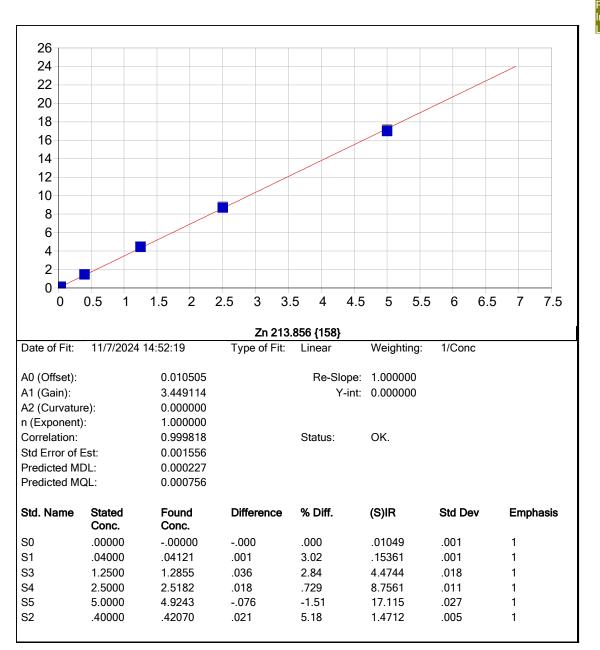


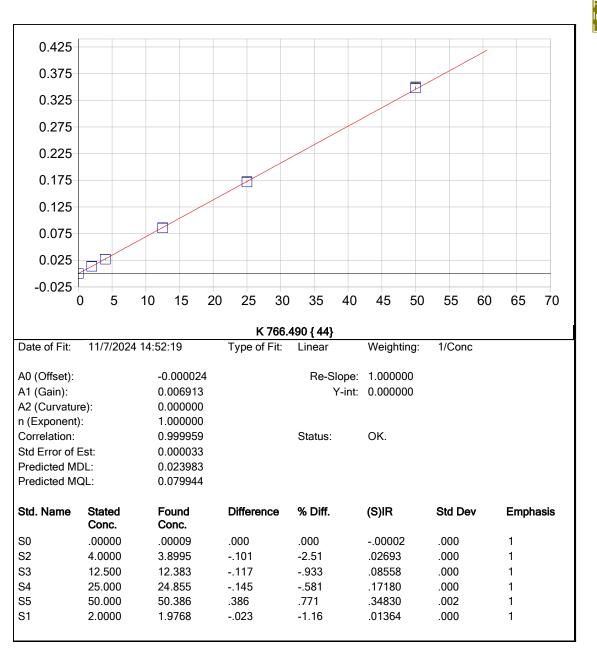


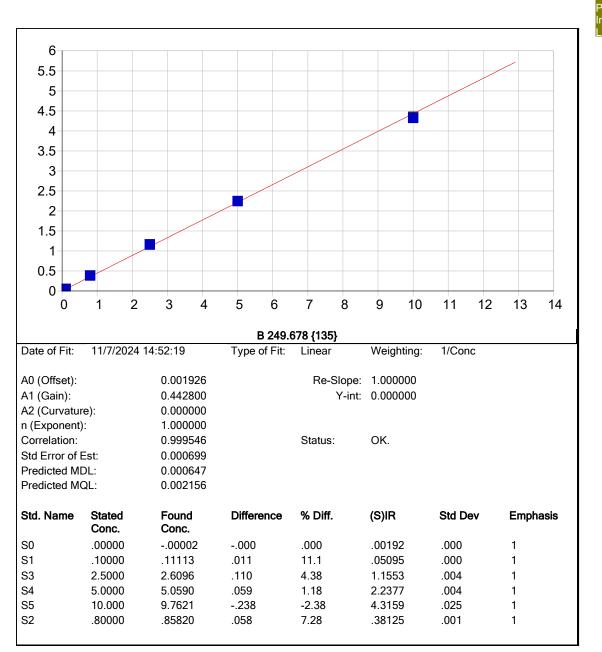


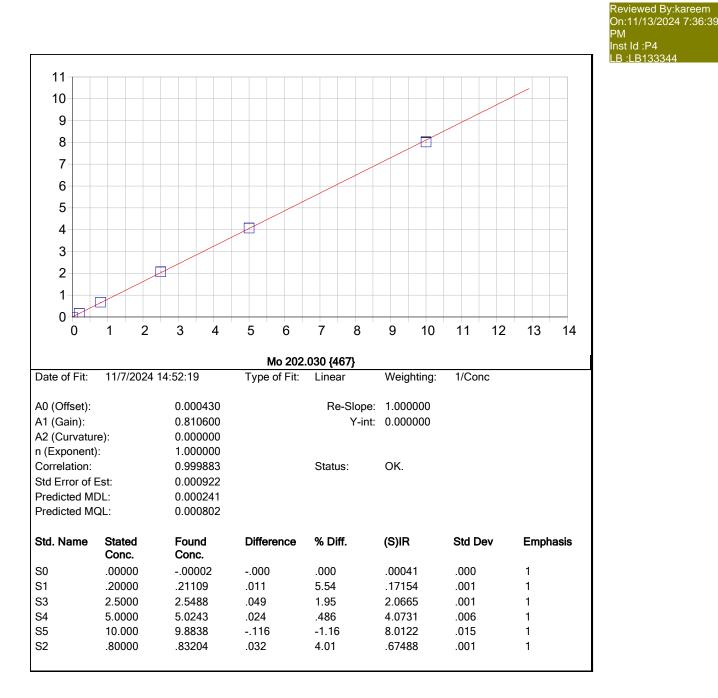


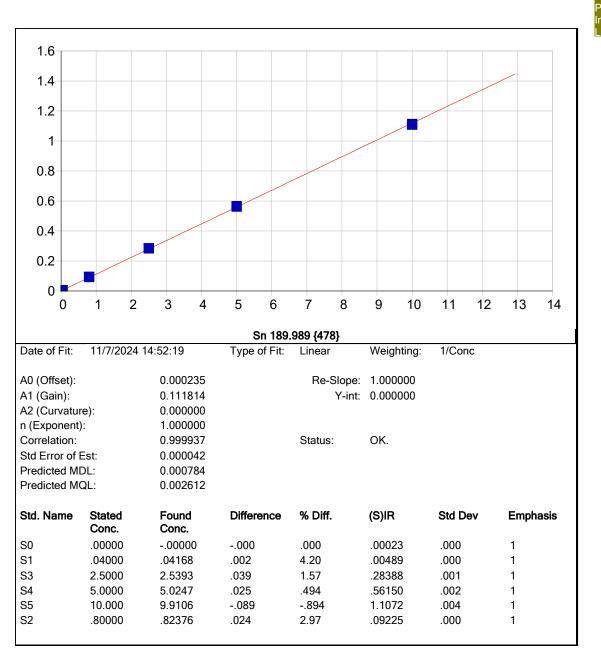


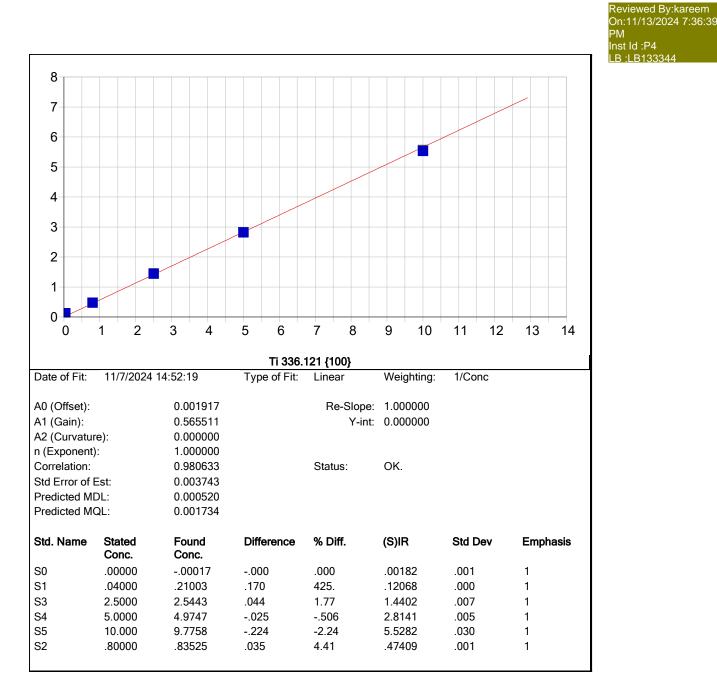


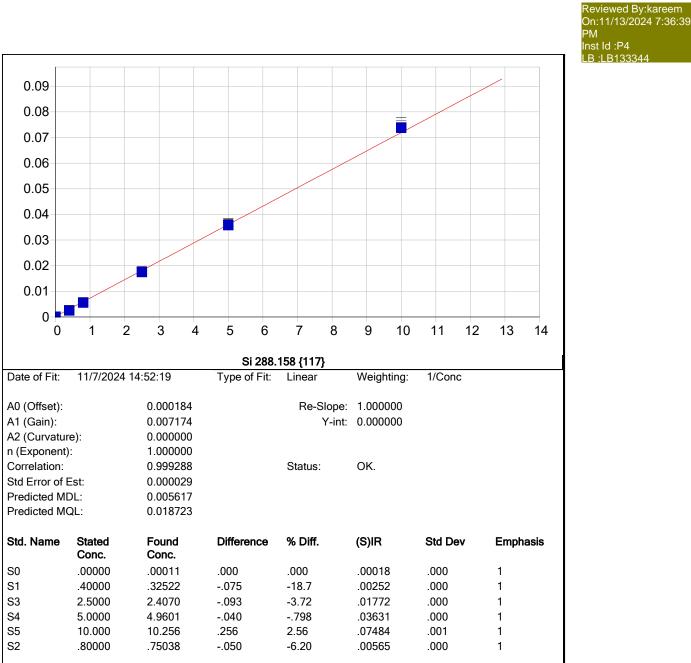


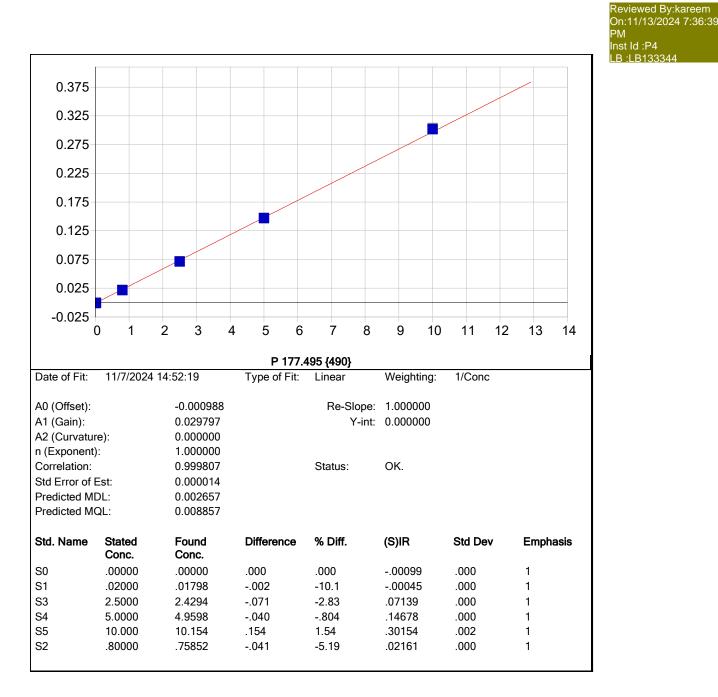


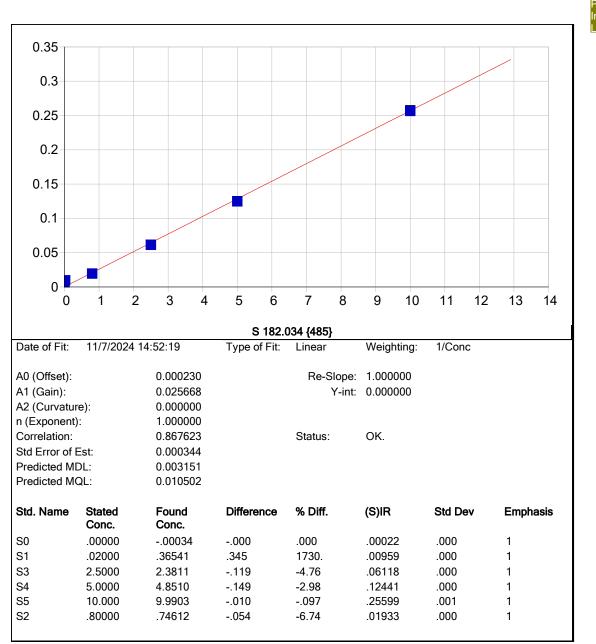


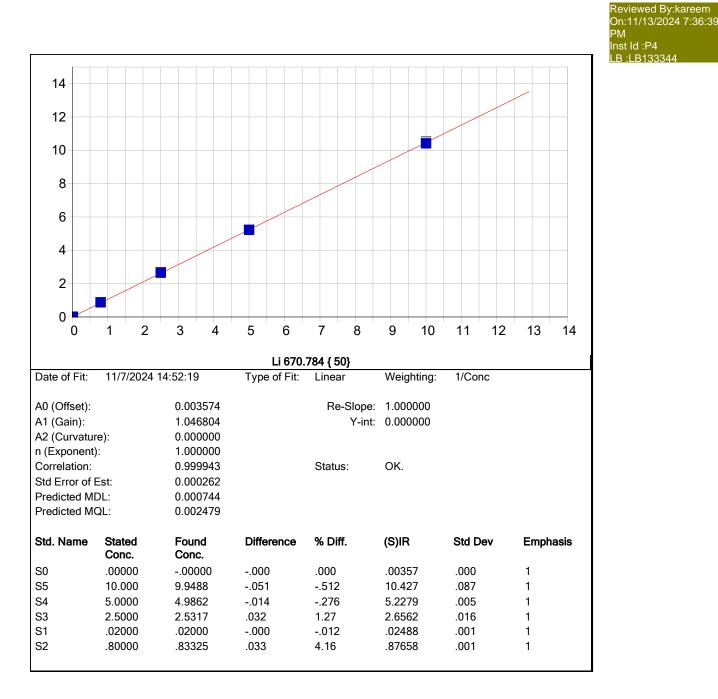


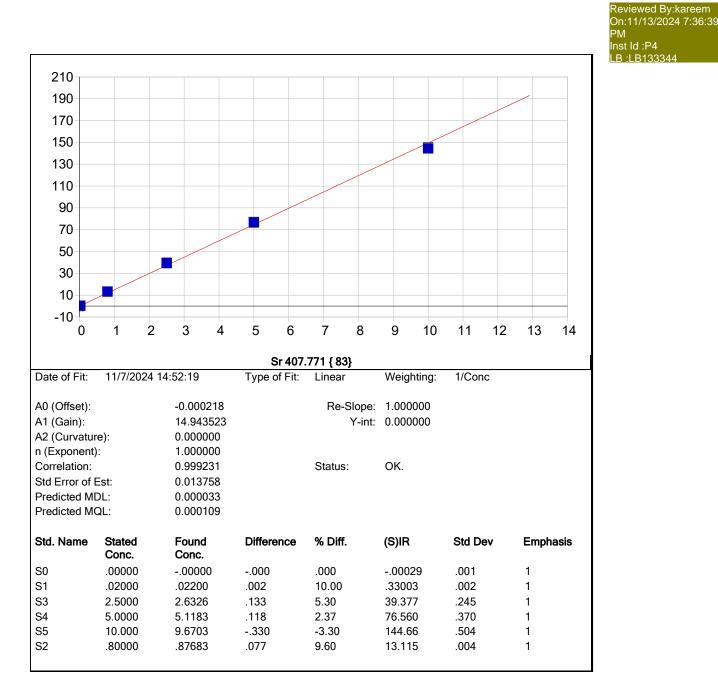


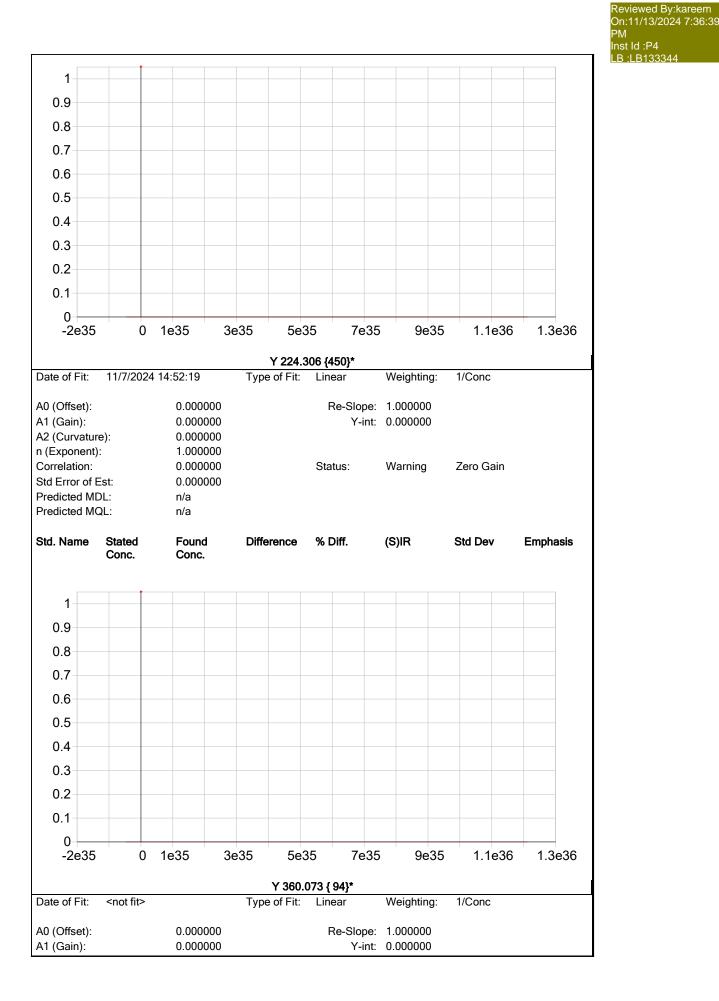








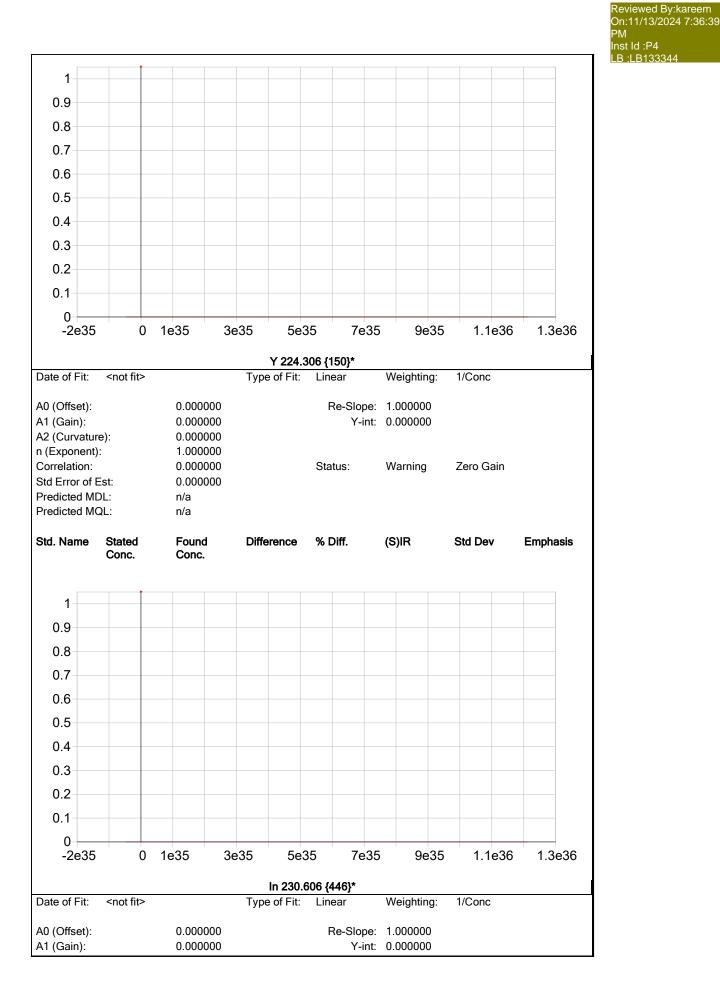




0.000000 A2 (Curvature): n (Exponent): 1.000000 Correlation: 0.000000 Status: Warning Zero Gain Std Error of Est: 0.000000 Predicted MDL: n/a Predicted MQL: n/a Std. Name Stated Found Difference % Diff. (S)IR Std Dev Emphasis Conc. Conc. 1 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1 0 -2e35 0 1e35 3e35 5e35 7e35 9e35 1.1e36 1.3e36 Y 371.030 { 91}* Type of Fit: Linear Weighting: 1/Conc Date of Fit: <not fit> A0 (Offset): 0.000000 Re-Slope: 1.000000 A1 (Gain): 0.000000 Y-int: 0.000000 A2 (Curvature): 0.000000 n (Exponent): 1.000000 Correlation: 0.000000 Status: Warning Zero Gain Std Error of Est: 0.000000 Predicted MDL: n/a Predicted MQL: n/a Std. Name Stated Found Difference % Diff. (S)IR Std Dev Emphasis Conc. Conc.

Reviewed By:kareem On:11/13/2024 7:36:39 PM

Inst Id :P4 LB :LB133344



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



SOP ID :	M3050B-Digestion-20						
SDG No :	N/A		Start Digest Date	11/06/2024	4 <b>Time :</b> <u>10:00</u>	_Temp :	96 °C
Matrix :	SOIL		End Digest Date:	11/06/2024	4 <b>Time :</b> <u>12:10</u>	_Temp :	96 °C
Pippete ID:	ICP A	-	Digestion tube ID	: M6054			
Balance ID :	M SC-2		Block thermomete	er ID: M	ET-DIG. #2		
Filter paper ID :	N/A		Dig Technician Sig	gnature:	120		
pH Strip ID :	N/A	•	Supervisor Signat	ure:	Sol.		
Hood ID :	#3		Temp :	1. 96°C	<b>2.</b> N/A		
Block ID:	1. HOT BLOCK #2	<b>2.</b> N/A					
Standared Name	2	MLS USED	STD	REF. # FROM L	.0G		
LFS-1		1.00	M600	0			
LFS-2		1.00	M600	9			
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
1:1 HNO3	10.00	MP81119
CONC: HNO3	5.00	M6116
30% H2O2	3.00	M5634
CONC: HCL	10.00	M6095
PTFE Boiling Stones	N/A	M5585
N/A	N/A	N/A

### Extraction Conformance/Non-Conformance Comments:

HOT BLOCK #2 Cell #34 : 96 C

Date / Ti	ime	Prepped Sample Relinquished By/Location	Received By/Location
1116124	12:30	replanet dig	So metals lock
		Preparation Group	Analysis Group



Lab Sample ID	Client Sample ID	pН	Initial Weight (g)	Final Vol (ml)	Color Before	Color After	Texture	Artifact	Comment	Prep Pos
P4693-01	BP-G5-WC	N/A	2.45	100	Brown	Yellow	Medium	N/A	N/A	1
P4693-05	BP-G4-WC	N/A	2.29	100	Brown	Yellow	Medium	N/A	N/A	2
P4694-01	Z-03A	N/A	2.36	100	Brown	Yellow	Medium	N/A	N/A	3
P4694-05	Z-04	N/A	2.20	100	Brown	Yellow	Medium	N/A	N/A	4
P4695-01	Z-01	N/A	2.22	100	Black	Brown	Medium	N/A	N/A	5
P4697-01	TP-1	N/A	2.26	100	Brown	Yellow	Medium	N/A	N/A	6
P4699-01	MIXED-DEMO	N/A	2.44	100	Light Grey	yellowish	Medium	N/A	N/A	7
P4699-01MS	MIXED-DEMOMS	N/A	2.35	100	Light Grey	Green yellowish Green	Medium	N/A	M6000,M6009	9
P4699-01MSD	MIXED-DEMOMSD	N/A	2.19	100	Light Grey	yellowish	Medium	N/A	M6000, M6009	10
P4699-01DUP	MIXED-DEMODUP	N/A	2.24	100	Light Grey	yellowish Green	Medium	N/A	N/A	8
P4700-01	MH-8	N/A	2.30	100	Black	Yellow	Medium	N/A	N/A	11
P4701-01	BP-F3	N/A	2.48	100	Yellow	Yellow	Medium	N/A	N/A	12
P4701-05	BP-F4	N/A	2.21	100	Brown	Yellow	Medium	N/A	N/A	13
P4706-01	TR-04-110424	N/A	2.29	100	Brown	Yellow	Medium	N/A	N/A	14
P4707-01	HD-02-110424	N/A	2.25	100	Brown	Yellow	Medium	N/A	N/A	15
P4708-01	OR-02-110424	N/A	2.46	100	Brown	Yellow	Medium	N/A	N/A	16
P4709-01	HR-02-110424	N/A	2.42	100	Brown	Yellow	Medium	N/A	N/A	17
94709-03	HR-03-110424	N/A	2.15	100	Brown	Yellow	Medium	N/A	N/A	18
94711-01	CF-613-COMP-16	N/A	2.23	100	Black	Brown	Medium	N/A	N/A	19
4711-06	CF-613-COMP-17	N/A	2.12	100	Brown	Yellow	Medium	N/A	N/A	20
4718-01	WB-307-SB01	N/A	2.30	100	Brown	Yellow	Medium	N/A	N/A	21
94718-02	WB-307-SB02	N/A	2.44	100	Brown	Yellow	Medium	N/A	N/A	22
4719-01	BAYAVE-STOCKPILE	N/A	2.21	100	Brown	Yellow	Medium	N/A	N/A	23
B164708BL	PBS708	N/A	2.28	100	Colorless	Colorless	Fine	N/A	N/A	24
B164708BS	LCS708	N/A	2.28	100	Colorless	Coloriess	Fine	N/A	M6000, M6009	25

Raw Sample Relinquished by:

- Jenno des

**Raw Sample Received by:** 1116 24

Date/Time

Page 1 of 1

Raw Sample Received by: Date/Time 11/8/24 9:00 Conord

WorkList Name :	PB164708	WorkList ID :	ID: 185165	Department :	Digestion	Dat	Date: 11-06-2024 08:49:03	4 08:49:03
Sample	Customer Sample	Matrix	Test	Preservative	Customer	Raw Sample Storage Location		Method
P4693-01	BP-G5-WC	Solid	Metale ICD TAI					
P4693-05	BP-G4-WC	Colid		Cool 4 deg C	PSEG03	121	11/02/2024	6010D
P4694-01	Z-03A		Metals ICP-TAL	Cool 4 deg C	PSEG03	L21	11/02/2024	6010D
PAROA_05	4 1 201	Solid	Metals ICP-TAL	Cool 4 deg C	PSEG03	L21	11/03/2024	6010D
T4094-00	2-04	Solid	Metals ICP-TAL	Cool 4 deg C	PSEG03	L21		
P4695-01	Z-01	Solid	Metals ICP-TAL	Cool 4 den C				U0100
P4697-01	TP-1	Solid	Metale ICP_TAI		POEGUS	L21	11/01/2024	6010D
P4699-01	MIXED-DEMO	0		Cool 4 deg C	PSEG03	L23	11/04/2024	6010D
P4700-01	MH-8		Metais Group3	Cool 4 deg C	EART12	K21	11/04/2024	6010D
P4701-01		DIIO	Metals ICP-TAL	Cool 4 deg C	PSEG03	L21	11/04/2024	6010D
P4701_05		Solid	Metals ICP-TAL	Cool 4 deg C	PSEG03	K23	11/04/2024	6010D
	07-174	Solid	Metals ICP-TAL	Cool 4 deg C	PSEG03	K23	- 11	2020
1.0-9074J	TR-04-110424	Solid	Metals ICP-TAL	Cool 4 deg C	PSEGOR	- 33		
P4707-01	HD-02-110424	Solid	Metals ICP-TAL	Cool 4 deg C	Docon			
P4708-01	OR-02-110424	Solid	Metals ICP-TAL	Cool 4 deg C				6010D
P4709-01	HR-02-110424	Solid	Metals ICP_TAI		L OEGOD		11/04/2024	6010D
P4709-03	HR-03-110424	Solid	Metals ICD TA:		PSEG05	L23	11/04/2024 6	6010D
P4711-01	CF-613-COMP-16			Cool 4 deg C	PSEG05	L23	11/04/2024 6	6010D
P4711-06	CF-613-COMP-17		Metals ICP-IAL	Cool 4 deg C	PSEG03	K51	11/04/2024 6	6010D
P4718_01	WID and prov	DIIO	Metals ICP-TAL	Cool 4 deg C	PSEG03	K51	11/04/2024 6	6010D
DA719 00	WD-007-0001	Solid	Metals ICP-TAL	Cool 4 deg C	PORT06	L21	- 11	6010D
	2090-100-044	Solid	Metals ICP-TAL	Cool 4 deg C	PORT06	L21	- 1	20100
10-61	BAYAVE-STOCKPILE	Solid	Metals ICP-TAL	Cool 4 deg C	PSEG03	K31		
							11/00/2024 0	

WorkList Name : PB164708

WORKLIST(Hardcopy Internal Chain)



PERCENT SOLID

Supervisor: Iwona Analyst: jignesh Date: 11/5/2024

OVENTEMP IN Celsius (°C): 107 Time IN: 17:20 In Date: 11/04/2024 Weight Check 1.0g: 1.00 Weight Check 10g: 10.00 OvenID: M OVEN#1

**QC:**LB133273

OVENTEMP OUT Celsius(°C): 103 Time OUT: 08:18 Out Date: 11/05/2024 Weight Check 1.0g: 1.00 Weight Check 10g: 10.00 BalanceID: M SC-4 Thermometer ID: % SOLID- OVEN

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
P4682-01	BELL-SHOP-RAGS	1	1.00	1.00	2.00	2.00	100.0	debris- rags
P4683-01	GHA605R-1-1	2	1.00	1.00	2.00	2.00	100.0	pilc
P4683-02	GHA605R-1-2	3	1.00	1.00	2.00	2.00	100.0	pilc
P4684-01	MECHANIC-ST-SWEEPINGS	4	1.14	8.39	9.53	8.03	82.1	
P4685-01	OK-01-11012024	5	1.15	8.44	9.59	9.26	96.1	
P4685-02	ОК-02-11012024-Е2	6	1.13	8.70	9.83	9.4	95.1	
P4686-01	GCP52	26	1.15	8.82	9.97	8.56	84.0	
P4686-02	GCP52MS	27	1.15	8.82	9.97	8.56	84.0	
P4686-03	GCP52MSD	28	1.15	8.82	9.97	8.56	84.0	
P4686-04	GCP53	29	1.13	8.46	9.59	8.19	83.5	
P4686-05	GCP54	30	1.00	1.00	2.00	2.00	100.0	P.T. SAMPLE
P4692-01	TAPLPR-SED02-103124-00 -T2	7	1.16	8.50	9.66	8.17	82.5	
P4692-02	TAPLPR-SED01-103124-00 -T2	8	1.15	8.59	9.74	8.05	80.3	
P4693-01	BP-G5-WC	9	1.13	8.84	9.97	8.73	86.0	
P4693-02	BP-G5-WC-EPH	10	1.14	8.83	9.97	8.6	84.5	
P4693-03	BP-G5-WC-VOC	11	1.12	8.71	9.83	8.71	87.1	
P4693-05	BP-G4-WC	12	1.13	8.70	9.83	8.84	88.6	
P4693-06	BP-G4-WC-EPH	13	1.15	8.44	9.59	8.13	82.7	
P4693-07	BP-G4-WC-VOC	14	1.15	8.84	9.99	9.53	94.8	
P4694-01	Z-03A	15	1.18	8.44	9.62	8.85	90.9	
P4694-02	Z-03A-EPH	16	1.12	8.66	9.78	8.95	90.4	
P4694-03	Z-03A-VOC	17	1.19	8.52	9.71	8.86	90.0	
P4694-05	Z-04	18	1.14	8.60	9.74	8.8	89.1	
P4694-06	Z-04-EPH	19	1.15	8.63	9.78	8.81	88.8	
P4694-07	Z-04-VOC	20	1.18	8.64	9.82	9.02	90.7	
P4695-01	Z-01	21	1.15	8.44	9.59	8.34	85.2	
P4695-02	Z-01-EPH	22	1.15	8.57	9.72	8.67	87.7	



PERCENT SOLID

Supervisor: Iwona Analyst: jignesh Date: 11/5/2024

OVENTEMP IN Celsius (°C): 107 Time IN: 17:20 In Date: 11/04/2024 Weight Check 1.0g: 1.00 Weight Check 10g: 10.00 OvenID: M OVEN#1 OVENTEMP OUT Celsius (°C): 103 Time OUT: 08:18 Out Date: 11/05/2024 Weight Check 1.0g: 1.00 Weight Check 10g: 10.00 BalanceID: M SC-4 Thermometer ID: % SOLID- OVEN

**QC:**LB133273

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
P4695-03	Z-01-VOC	23	1.18	8.73	9.91	8.74	86.6	
P4697-01	TP-1	24	1.15	8.70	9.85	8.83	88.3	
P4697-02	TP-1	25	1.14	8.68	9.82	9.04	91.0	
P4699-01	MIXED-DEMO	31	1.18	8.76	9.94	9.9	99.5	
P4700-01	МН-8	32	1.15	8.67	9.82	9.06	91.2	
P4700-02	MH-8-EPH	33	1.16	8.51	9.67	8.87	90.6	
P4700-03	MH-8-VOC	34	1.18	8.57	9.75	8.79	88.8	
P4701-01	BP-F3	35	1.11	8.78	9.89	8.46	83.7	
P4701-02	BP-F3-EPH	36	1.15	8.84	9.99	8.43	82.4	
P4701-03	BP-F3-VOC	37	1.15	8.67	9.82	8.06	79.7	
P4701-05	BP-F4	38	1.19	8.52	9.71	8.56	86.5	
P4701-06	BP-F4-EPH	39	1.19	8.67	9.86	8.86	88.5	
P4701-07	BP-F4-VOC	40	1.15	8.56	9.71	8.64	87.5	
P4703-01	S0-1	41	1.00	1.00	2.00	2.00	100.0	pil sample
P4703-02	0910	42	1.00	1.00	2.00	2.00	100.0	debris
P4703-03	1008	43	1.15	8.46	9.61	9.34	96.8	
P4705-01	1024	44	1.00	1.00	2.00	2.00	100.0	debris
P4711-01	CF-613-COMP-16	45	1.16	8.50	9.66	9.2	94.6	
P4711-02	CF-613-VOC-16	46	1.18	8.66	9.84	9.43	95.3	
P4711-03	CF-613-46	47	1.18	8.50	9.68	9.21	94.5	
P4711-04	CF-613-47	48	1.18	8.45	9.63	9.1	93.7	
P4711-06	CF-613-COMP-17	49	1.15	8.52	9.67	9.02	92.4	
P4711-07	CF-613-VOC-17	50	1.16	8.80	9.96	9.32	92.7	
P4711-08	CF-613-48	51	1.15	8.71	9.86	9.17	92.1	
P4711-09	CF-613-49	52	1.16	8.76	9.92	9.41	94.2	

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

			WORKLIST(Hardd	ST(Hardcopy Internal Chain)		677881 W	Ś	
WorkList Name :	%1-110424	WorkList ID :	: 185070	Department :	Wet-Chemistry	Dat		11-04-2024 08:01:17
Sample	Customer Sample	Matrix	Test	Preservative	Customer	Raw Sample Storage Location	Collect Date	Method
P4682-01	BELL-SHOP-RAGS	Solid	Percent Solids	Cool 4 deg C	PSEG03	113	11/04/2004	
P4683-01	GHA605R-1-1	Solid	Percent Solids	Cool 4 deg C	PSEG03	0 0 0 0 0 0 0 0 0 0 0 0	11/01/2024	Chemiech -50
P4683-02	GHA605R-1-2	Solid	Percent Solids	Cool 4 deg C	PSEG03	0 7	11/01/2024	
P4684-01	MECHANIC-ST-SWEEPINGS	Solid	Percent Solids	Cool 4 deg C	PSEG03	L13	11/01/2024	Chemtech -50
P4685-01	OK-01-11012024	Solid	Percent Solids	Cool 4 deg C	PSEG05	L13	11/01/2024	Chamtech - 20
P4685-02	OK-02-11012024-E2	Solid	Percent Solids	Cool 4 deg C	PSEG05	L13	11/01/2024	Chamtach_20
P4686-01	GCP52	Solid	Percent Solids	Cool 4 deg C	USEP04	A11	10/29/2024	Chemtech -SO
P4686-02	GCP52MS	Solid	Percent Solids	Cool 4 deg C	USEP04	A11	10/29/2024	Chemtech -SO
P4686-03	GCP52MSD	Solid	Percent Solids	Cool 4 deg C	USEP04	A11	10/29/2024	Chemtech -SO
P4686-04	GCP53	Solid	Percent Solids	Cool 4 deg C	USEP04	A11	10/30/2024	Chemtech -SO
P4686-05	GCP54	Solid	Percent Solids	Cool 4 deg C	USEP04	A11	10/30/2024	Chemtech -SO
P4692-01	TAPLPR-SED02-103124-00-T2	Solid	Percent Solids	Cool 4 deg C	WEST04	L21	10/31/2024	Chemtech -SO
P4692-02	TAPLPR-SED01-103124-00-T2	Solid	Percent Solids	Cool 4 deg C	WEST04	L21	10/31/2024	Chemtech -SO
P4693-01	BP-G5-WC	Solid	Percent Solids	Cool 4 deg C	PSEG03	L21	11/02/2024	Chemtech -SO
P4693-02	BP-G5-WC-EPH	Solid	Percent Solids	Cool 4 deg C	PSEG03	L21	11/02/2024	Chemtech -SO
P4693-03	BP-G5-WC-VOC	Solid	Percent Solids	Cool 4 deg C	PSEG03	L21	11/02/2024	Chemtech -SO
P4693-05	BP-G4-WC	Solid	Percent Solids	Cool 4 deg C	PSEG03	L21	11/02/2024	Chemtech -SO
P4693-06	BP-G4-WC-EPH	Solid	Percent Solids	Cool 4 deg C	PSEG03	L21	11/02/2024	Chemtech -SO
P4693-07	BP-G4-WC-VOC	Solid	Percent Solids	Cool 4 deg C	PSEG03	L21	11/02/2024	Chemtech -SO
P4694-01	Z-03A	Solid	Percent Solids	Cool 4 deg C	PSEG03	L21	11/03/2024	Chemtech_SO
P4694-02	Z-03A-EPH	Solid	Percent Solids	Cool 4 deg C	PSEG03	L21	11/03/2024	Chemtech -SO
Date/Time <u>1104 (20</u> Raw Sample Received by:	04 WH 15:35 Ved by: 26 6001				Date/Time	46140/11		7130
Raw Sample Relinquished by:	luished by:		Page 1 of 3	ŝ	Raw Sample Raw Sample	Raw Sample Received by: Raw Sample Relinquished by:	1 al	(roc)

			WORKLIST(Ha	IST(Hardcopy Internal Chain)	ain)	Ctreel V	6t	
WorkList Name :	%1-110424 V	WorkList ID :	ID: 185070	Department :	Wet-Chemistry		Date: 11-04-20	11-04-2024 08:01:17
Sample	Customer Sample	Matrix	Test	Preservative	Customer	Raw Sample Storage Location	Collect Date	Method
P4694-03	Z-03A-VOC	Solid	Percent Solids	Cool 4 ded C	DRECOS			
P4694-05	Z-04	Solid	Percent Solids	Cool 4 dea C			11/03/2024	Chemtech -SO
P4694-06	Z-04-EPH	Solid	Percent Solids	Cool 4 deg C			11/03/2024	Chemtech -SO
P4694-07	Z-04-VOC	Solid	Percent Solids		TOF 603		11/03/2024	Chemtech -SO
P4695-01	Z-01	Solid	Percent Solids	Cool 4 den C		- F21	11/03/2024	Chemtech -SO
P4695-02	Z-01-EPH	Solid	Percent Solids	Cool 4 ded C			11/01/2024	Chemtech -SO
P4695-03	Z-01-VOC	Solid	Percent Solids	Cool 4 dea C	PSEG03	121	11/01/2024	Chemtech -SO
P4697-01	TP-1	Solid	Percent Solids	Cool 4 dea C			11/01/2024	Chemtech -SO
P4697-02	TP-1	Solid	Percent Solids		TOE 03	L23	11/04/2024	Chemtech -SO
P4699-01	MIXED-DEMO	Solid	Percent Solids	Cool 4 den C		LZ3	11/04/2024	Chemtech -SO
P4700-01	MH-8	Solid	Parrent Solide				11/04/2024	Chemtech -SO
P4700-02	MH-8-FPH			Cool 4 deg C	PSEG03	L21	11/04/2024	Chemtech -SO
D4700.02		Solid	Percent Solids	Cool 4 deg C	PSEG03	L21	11/04/2024	Chemtech -SO
- +700-03	200	Solid	Percent Solids	Cool 4 deg C	PSEG03	L21	11/04/2024	Chemtech -SO
P4701-01		Solid	Percent Solids	Cool 4 deg C	PSEG03	K23	11/04/2024	Chemtech -SO
74701-02		Solid	Percent Solids	Cool 4 deg C	PSEG03	K23	11/04/2024	Chemtech -SO
F4/01-03	VOC	Solid	Percent Solids	Cool 4 deg C	PSEG03	K23	11/04/2024	Chemtech -SO
CU-1014-1		Solid	Percent Solids	Cool 4 deg C	PSEG03	K23	11/04/2024	Chemtech -SO
P4701-06		Solid	Percent Solids	Cool 4 deg C	PSEG03	K23	11/04/2024	Chemtech_SO
P4701-07	BP-F4-VOC	Solid	Percent Solids	Cool 4 deg C	PSEG03	K23	11/04/2024	Chamtach_CO
P4703-01	S0-1	Solid	Percent Solids	Cool 4 deg C	PSEG03	123	11/04/2023	
P4703-02	0	Solid	Percent Solids	Cool 4 deg C	PSEG03	L23	11/04/2024	Chemtech -SO
Date/Time \\ <u>04 \\</u> Raw Sample Received by: Raw Sample Reliminished hor	red by: rol w C/				Date/Time $\frac{1}{9}$	11/04/24	2	0 \$171
	dialited by.	1	Page	Page 2 of 3	Raw Sample F	Raw Sample Relinquished by:	A Le	1001

			WORKLIST(Har	WORKLIST(Hardcopy Internal Chain)	ain)	Ct x661 20,	273	
WorkList Name :	%1-110424	WorkList	WorkList ID: 185070	Department :	Wet-Chemistry	UI) Dat	Date: 11-04-2024 08:01:17	24 08:01:17
Sample	Customer Sample	Matrix	Test	Preservative	Customer	Raw Sample Storage Location	Collect Date Method	Method
P4703-03	1008	Solid	Percent Solids	Cool 4 dea C				
P4705-01	1024	Solid	Percent Solids	Cool 4 der C		- 123	11/04/2024	11/04/2024 Chemtech -SO
P4711-01	CF-613-COMP-16	Solid	Derrent Colide		10000	LZ3	11/04/2024	11/04/2024 Chemtech -SO
D4714 00				C001 4 deg C	PSEG03	K51	11/04/2024	Chemtech -SO
11-02	CF-613-VOC-16	Solid	Percent Solids	Cool 4 deg C	PSEG03	K51	11/04/2024	
P4711-03	CF-613-46	Solid	Percent Solids	Cool 4 den C	DOFCON		11/04/2024	Criemtech -SO
P4711-04	CF-613-47	Solid	Percent Solids	Cool 4 dea C			11/04/2024	11/04/2024 Chemtech -SO
P4711-06	CF-613-COMP-17	Solid	Percent Solids			Lcx	11/04/2024	Chemtech -SO
P4711-07	CE-613-VOC-17	1940		o fan t inno	PSEG03	K51	11/04/2024	11/04/2024 Chemtech -SO
00 1171			Percent Solids	Cool 4 deg C	PSEG03	K51	11/04/2024	Chemtech -SO
P4/11-08	CF-613-48	Solid	Percent Solids	Cool 4 deg C	PSEG03	K51	11/04/2024	11/04/2024 Charter Co

11/04/2024 Chemtech -SO 11/04/2024 Chemtech -SO

K51 K51

PSEG03 PSEG03

Cool 4 deg C Cool 4 deg C

Percent Solids

Solid

CF-613-49

P4711-09

C C C Date/Time 11 04 124 151.35 Raw Sample Received by: Raw Sample Relinquished by:

FO (019 C 04141 Raw Sample Relinquished by: Date/Time 1) 04 14 4 Raw Sample Received by:

Page 3 of 3



Review By	mohan	Review On	11/9/2024 12:07:42 AM				
Supervise By	kareem	Supervise On	11/13/2024 7:36:39 PM				
STD. NAME	STD REF.#						
ICAL Standard	MP83078,MP830	)79,MP83080,MP83081,MP83082,MP	83084				
ICV Standard	MP83085	MP83085					
CCV Standard	MP83088	MP83088					
ICSA Standard	MP83086,MP830	MP83086,MP83087					
CRI Standard	MP83084	MP83084					
LCS Standard							
Chk Standard	MP83091 MP830	092					

Sr#	SampleId	ClientID	QcType	Date	Comment	Operator	Status
1	S0	SO	CAL1	11/07/24 13:23		Kareem	ОК
2	S1	S1	CAL2	11/07/24 13:28		Kareem	ок
3	S2	S2	CAL3	11/07/24 13:32		Kareem	ок
4	S3	S3	CAL4	11/07/24 13:36		Kareem	ок
5	S4	S4	CAL5	11/07/24 13:40		Kareem	ок
6	S5	S5	CAL6	11/07/24 13:45		Kareem	ок
7	ICV01	ICV01	ICV	11/07/24 13:49		Kareem	ОК
8	LLICV01	LLICV01	LLICV	11/07/24 14:23		Kareem	ок
9	ICB01	ICB01	ICB	11/07/24 14:38		Kareem	ок
10	CRI01	CRI01	CRDL	11/07/24 14:42		Kareem	ок
11	ICSA01	ICSA01	ICSA	11/07/24 14:47		Kareem	ок
12	ICSAB01	ICSAB01	ICSAB	11/07/24 14:51		Kareem	ок
13	CCV01	CCV01	CCV	11/07/24 15:01		Kareem	ОК
14	CCB01	CCB01	ССВ	11/07/24 15:05		Kareem	ок
15	P4645-04	Z-02-WC	SAM	11/07/24 15:09		Kareem	ок
16	P4659-04	MH-2	SAM	11/07/24 15:14		Kareem	ОК
17	P4660-03	WC-TA2-01-C	SAM	11/07/24 15:18		Kareem	ОК
18	P4660-07	WC-WOOD-01-C	SAM	11/07/24 15:22		Kareem	ок



Review	w By mo	han	Review On	1	11/9/2024 12:07:	:42 AM		
Super	vise By kar	eem	Supervise	On	11/13/2024 7:36	:39 PM		
STD. N		STD R						
ICAL Sta		MP83078 MP8308	3,MP83079,MP83080,MP83081, 5	MP83082,MP830	084			
CCV Sta		MP83088						
ICSA Sta			5,MP83087					
CRI Stan		MP83084	4					
Chk Stan		MP8309 ⁻	1 MP83092					
					•	•		
19	P4660-11		WC-CONCRETE-01-0	SAM	11/07/24 15:27		Kareem	ОК
20	P4667-04		BP-F-6	SAM	11/07/24 15:31		Kareem	ОК
21	21 P4667-08		BP-F-5	SAM	11/07/24 15:36		Kareem	ОК
22	22 P4667-12		TP-10	SAM	11/07/24 15:40		Kareem	ок
23	23 P4667-16		BP-F-7	SAM	11/07/24 15:45		Kareem	ок
24	P4679-04		MH-1	SAM	11/07/24 15:49		Kareem	ок
25	CCV02		CCV02	CCV	11/07/24 15:53		Kareem	ОК
26	CCB02		CCB02	ССВ	11/07/24 15:58		Kareem	ок
27	P4680-04		BP-F26	SAM	11/07/24 16:02		Kareem	ОК
28	P4680-08		BP-F25	SAM	11/07/24 16:06		Kareem	ОК
29	P4684-01		MECHANIC-ST-SWEI	SAM	11/07/24 16:11		Kareem	ок
30	P4684-01DUP		MECHANIC-ST-SWEI	DUP	11/07/24 16:15		Kareem	ок
31	P4684-01L		MECHANIC-ST-SWEI	SD	11/07/24 16:20		Kareem	ок
32	P4684-01MS		MECHANIC-ST-SWEI	MS	11/07/24 16:24	0.1ML OF M6010 AND M6001 WERE ADDED TO 10ML OF THE SAMPLE	Kareem	ОК
33	33 P4684-01MSD		MECHANIC-ST-SWEI	MSD	11/07/24 16:28	0.1ML OF M6010 AND M6001 WERE ADDED TO 10ML OF THE SAMPLE	Kareem	ОК
34	34 P4684-01A		MECHANIC-ST-SWEI	PS	11/07/24 16:32	0.1ML OF M6010 AND M6001 WERE ADDED TO 10ML OF THE SAMPLE	Kareem	ОК
35	PB164560TB		PB164560TB	MB	11/07/24 16:36		Kareem	ок



Review	w By mo	han Review	' On	11/9/2024 12:0	07:42 AM		
Superv	vise By kar	eem Superv	ise On	11/13/2024 7:3	36:39 PM		
STD. N	JAME	STD REF.#					
ICAL Star ICV Star CCV Star ICSA Sta CRI Stan LCS Star Chk Stan	ndard ndard ndard dard dard ndard	MP83078,MP83079,MP83080,MP83 MP83085 MP83086 MP83086,MP83087 MP83084 MP83091 MP83092	3081,MP83082,MP	83084			
36	PB164665BL	PB164665BL	MB	11/07/24 16:41		Kareem	ОК
37	CCV03	CCV03	CCV	11/07/24 16:45		Kareem	ОК
38	CCB03	CCB03	ССВ	11/07/24 16:49		Kareem	ОК
39	PB164665BS	PB164665BS	LCS	11/07/24 16:54	0.1ML OF M6010 AND M6001 WERE ADDED TO 10ML OF THE SAMPLE	Kareem	ОК
40	P4693-04	BP-G5-WC	SAM	11/07/24 16:58		Kareem	ОК
41	P4693-08	BP-G4-WC	SAM	11/07/24 17:02		Kareem	ОК
42	P4694-04	Z-03A	SAM	11/07/24 17:06		Kareem	ОК
43	P4694-08	Z-04	SAM	11/07/24 17:11		Kareem	ОК
44	P4695-04	Z-01	SAM	11/07/24 17:15		Kareem	ОК
45	P4700-04	MH-8	SAM	11/07/24 17:20		Kareem	ОК
46	P4701-01	BP-F3	SAM	11/07/24 17:24		Kareem	ОК
47	P4701-08	BP-F4	SAM	11/07/24 17:29		Kareem	ОК
48	P4711-05	CF-613-COMP-16	SAM	11/07/24 17:33		Kareem	ОК
49	CCV04	CCV04	CCV	11/07/24 17:56		Kareem	ОК
50	CCB04	CCB04	ССВ	11/07/24 18:04		Kareem	ОК
51	P4711-10	CF-613-COMP-17	SAM	11/07/24 18:08		Kareem	ок
52	P4702-01	TOTE-1	SAM	11/07/24 18:13		Kareem	ОК
53	P4662-06DL2	102524-DDL2	SAM	11/07/24 18:17	NOT USE	Kareem	Not Ok
54	P4662-06DL	102524-DDL	SAM	11/07/24 18:22	NOT USE	Kareem	Not Ok



Review	w By mo	ohan	Review O	n	11/9/2024 12:07	:42 AM		
Superv	vise By ka	reem	Supervise	On	11/13/2024 7:36	:39 PM		
STD. N	JAME	STD R	FF #					
ICAL Star ICV Star ICSA Star CRI Stan LCS Star Chk Stan	ndard ndard ndard dard dard ndard	MP83078 MP83085 MP83088 MP83086 MP83086	8,MP83079,MP83080,MP8308 5 5 8 8,MP83087	,MP83082,MP83	084			
55	P4662-06		102524-D	SAM	11/07/24 18:28		Kareem	ОК
56	CCV05		CCV05	CCV	11/07/24 18:32		Kareem	ок
57	CCB05		CCB05	ССВ	11/07/24 18:37		Kareem	ок
58	P4702-01DUP		TOTE-1DUP	DUP	11/07/24 18:43		Kareem	ок
59	9 P4702-01L		TOTE-1L	SD	11/07/24 18:47		Kareem	ок
60	P4706-01		TR-04-110424	SAM	11/07/24 18:51		Kareem	ок
61	P4708-01		OR-02-110424	SAM	11/07/24 18:56		Kareem	ок
62	P4711-01		CF-613-COMP-16	SAM	11/07/24 19:00		Kareem	ОК
63	P4711-06		CF-613-COMP-17	SAM	11/07/24 19:04		Kareem	ОК
64	CCV06		CCV06	CCV	11/07/24 19:08		Kareem	ОК
65	CCB06		CCB06	ССВ	11/07/24 19:12		Kareem	ОК
66	P4702-01MS		TOTE-1MS	MS	11/07/24 19:16	0.1ML OF M6010 AND M6001 WERE ADDED TO 10ML OF THE SAMPLE	Kareem	ОК
67	P4702-01MSD		TOTE-1MSD	MSD	11/07/24 19:20	0.1ML OF M6010 AND M6001 WERE ADDED TO 10ML OF THE SAMPLE	Kareem	ок
68	P4702-01A		TOTE-1A	PS	11/07/24 19:24	0.1ML OF M6010 AND M6001 WERE ADDED TO 10ML OF THE SAMPLE	Kareem	ОК
69	PB164662TB		PB164662TB	MB	11/07/24 19:28		Kareem	ОК
70	PB164685TB		PB164685TB	MB	11/07/24 19:32		Kareem	ОК
71	PB164712BL		PB164712BL	MB	11/07/24 19:37		Kareem	ОК



Revie	w By mo	han Review O	n	11/9/2024 12:0	07:42 AM			
Super	vise By kar	eem Supervise	On	11/13/2024 7:3	36:39 PM			
STD. N	NAME	STD REF.#						
ICAL Sta		MP83078,MP83079,MP83080,MP83081 MP83085	,MP83082,MF	283084				
CCV Sta		MP83088						
ICSA Sta	andard	MP83086,MP83087						
CRI Star		MP83084						
Chk Star		MP83091 MP83092						
72 PB164712BS		PB164712BS	LCS	11/07/24 19:41	0.1ML OF M6010 AND M6001 WERE ADDED TO 10ML OF THE SAMPLE	Kareem	ОК	
73	P4720-01	JC-701-COMP-01	SAM	11/07/24 19:45		Kareem	ОК	
74	P4720-01DUP	JC-701-COMP-01DU	IDUP	11/07/24 19:50		Kareem	ОК	
75	P4720-01L	JC-701-COMP-01L	SD	11/07/24 19:54		Kareem	ОК	
76	CCV07	CCV07	CCV	11/07/24 19:58		Kareem	ок	
77	CCB07	CCB07	ССВ	11/07/24 20:02		Kareem	ОК	
78	P4617-04	CONCRETE-PILE	SAM	11/07/24 20:08		Kareem	ОК	
79	P4617-04DUP	CONCRETE-PILEDU	IDUP	11/07/24 20:12		Kareem	ОК	
80	P4617-04L	CONCRETE-PILEL	SD	11/07/24 20:17		Kareem	ОК	
81	P4617-04MS	CONCRETE-PILEMS	MS	11/07/24 20:21	0.1ML OF M6010 AND M6001 WERE ADDED TO 10ML OF THE SAMPLE	Kareem	ок	
82	P4617-04MSD	CONCRETE-PILEMS	MSD	11/07/24 20:25	0.1ML OF M6010 AND M6001 WERE ADDED TO 10ML OF THE SAMPLE	Kareem	ок	
83	P4549-04	TT-069-IDWGW-2024	4 SAM	11/07/24 20:34		Kareem	ОК	
84	P4617-04A	CONCRETE-PILEA	PS	11/07/24 20:41	0.1ML OF M6010 AND M6001 WERE ADDED TO 10ML OF THE SAMPLE	Kareem	ок	
85	P4549-04DUP	TT-069-IDWGW-2024	4 DUP	11/07/24 20:45		Kareem	ок	
86	P4549-04L	TT-069-IDWGW-2024	4 SD	11/07/24 20:49		Kareem	ОК	
87	P4549-04MS	TT-069-IDWGW-2024	4MS	11/07/24 20:54	0.1ML OF M6010 AND M6001 WERE ADDED TO 10ML OF THE SAMPLE	Kareem	ок	



Review	w By mol	han	Review On	ı	11/9/2024 12:07	:42 AM		
Superv	vise By kar	eem	Supervise	On	11/13/2024 7:36	:39 PM		
STD. N		STD R						
ICAL Star		MP83078 MP83085	3,MP83079,MP83080,MP83081, 5	MP83082,MP830	)84			
CCV Star		MP83088						
ICSA Sta	ndard		5,MP83087					
CRI Stan LCS Star		MP83084	1					
Chk Stan		MP83091	1 MP83092					
88	CCV08		CCV08	CCV	11/07/24 20:58		Kareem	ОК
89	9 CCB08		CCB08	ССВ	11/07/24 21:02		Kareem	ок
90	P4549-04MSD		TT-069-IDWGW-2024	MSD	11/07/24 21:08	0.1ML OF M6010 AND M6001 WERE ADDED TO 10ML OF THE SAMPLE	Kareem	ОК
91	P4549-04A		TT-069-IDWGW-2024	PS	11/07/24 21:12	0.1ML OF M6010 AND M6001 WERE ADDED TO 10ML OF THE SAMPLE	Kareem	ОК
92	P4720-01MS		JC-701-COMP-01MS	MS	11/07/24 21:16	0.1ML OF M6010 AND M6001 WERE ADDED TO 10ML OF THE SAMPLE	Kareem	ОК
93	P4720-01MSD		JC-701-COMP-01MSI	MSD	11/07/24 21:20	0.1ML OF M6010 AND M6001 WERE ADDED TO 10ML OF THE SAMPLE	Kareem	ОК
94	P4720-01A		JC-701-COMP-01A	PS	11/07/24 21:24	0.1ML OF M6010 AND M6001 WERE ADDED TO 10ML OF THE SAMPLE	Kareem	ОК
95	P4722-03		WC-1(0-6)	SAM	11/07/24 21:29	Fe high	Kareem	Dilution
96	P4722-08		WC-2(0-6)	SAM	11/07/24 21:33		Kareem	ок
97	P4722-13		WC-3(0-6)	SAM	11/07/24 21:38		Kareem	ОК
98	PB164723BL		PB164723BL	MB	11/07/24 21:42		Kareem	ок
99	PB164723BS		PB164723BS	LCS	11/07/24 21:47	0.1ML OF M6010 AND M6001 WERE ADDED TO 10ML OF THE SAMPLE	Kareem	ОК
100	CCV09		CCV09	CCV	11/07/24 21:51		Kareem	ок
101	CCB09		CCB09	ССВ	11/07/24 21:55		Kareem	ок
102	02 P4693-01		BP-G5-WC	SAM	11/07/24 22:09		Kareem	ок



Review	w By mo	han Revie	ew On	11/9/2024 12:0	07:42 AM		
Super	vise By kar	eem Supe	rvise On	11/13/2024 7::	36:39 PM		
STD. N	NAME	STD REF.#					
ICAL Sta ICV Sta ICSA Sta ICSA Sta CRI Star LCS Star Chk Star	ndard ndard undard udard ndard	MP83078,MP83079,MP83080,MF MP83085 MP83088 MP83086,MP83087 MP83084 MP83091 MP83092	283081,MP83082,MF	² 83084			
103	P4693-05	BP-G4-WC	SAM	11/07/24 22:13		Kareem	ОК
104	P4694-01	Z-03A	SAM	11/07/24 22:17		Kareem	ОК
105	P4694-05	Z-04	SAM	11/07/24 22:22		Kareem	ОК
106	P4695-01	Z-01	SAM	11/07/24 22:26		Kareem	ОК
107	P4697-01	TP-1	SAM	11/07/24 22:30		Kareem	ОК
108	P4699-01	MIXED-DEMO	SAM	11/07/24 22:34		Kareem	ОК
109	P4699-01DUP	MIXED-DEMOD	UP DUP	11/07/24 22:39		Kareem	ОК
110	P4699-01L	MIXED-DEMOL	SD	11/07/24 22:43		Kareem	ОК
111	P4699-01MS	MIXED-DEMOM	S MS	11/07/24 22:47	0.1ML OF M6010 AND M6001 WERE ADDED TO 10ML OF THE SAMPLE	Kareem	ОК
112	CCV10	CCV10	CCV	11/07/24 22:52		Kareem	ОК
113	CCB10	CCB10	ССВ	11/07/24 22:56		Kareem	ОК
114	P4699-01MSD	MIXED-DEMOM	SD MSD	11/07/24 23:00	0.1ML OF M6010 AND M6001 WERE ADDED TO 10ML OF THE SAMPLE	Kareem	ОК
115	P4699-01A	MIXED-DEMOA	PS	11/07/24 23:04	0.1ML OF M6010 AND M6001 WERE ADDED TO 10ML OF THE SAMPLE	Kareem	ОК
116	P4700-01	MH-8	SAM	11/07/24 23:09		Kareem	ОК
117	P4701-01RE	BP-F3RE	SAM	11/07/24 23:13	NOT USE	Kareem	Not Ok
118	P4701-05	BP-F4	SAM	11/07/24 23:17		Kareem	ОК
119	P4707-01	HD-02-110424	SAM	11/07/24 23:22		Kareem	ОК



Review	w By mo	han	Review Or	ı	11/9/2024 12:07	7:42 AM		
Superv	vise By kar	eem	Supervise	On	11/13/2024 7:36	339 PM		
STD. N	JAME	STD R	EF.#					
CCV Star ICSA Sta CRI Stan LCS Star	ICV Standard MP CCV Standard MP ICSA Standard MP CRI Standard MP LCS Standard		3 6,MP83087	MP83082,MP830	)84			
120	P4718-01		WB-307-SB01	SAM	11/07/24 23:26		Kareem	ОК
121	1 P4718-02		WB-307-SB02	SAM	11/07/24 23:30		Kareem	ок
122	P4719-01		BAYAVE-STOCKPILE	SAM	11/07/24 23:34		Kareem	ок
123	PB164708BL		PB164708BL	MB	11/07/24 23:38		Kareem	ок
124	CCV11		CCV11	CCV	11/07/24 23:43		Kareem	ОК
125	CCB11		CCB11	ССВ	11/07/24 23:47		Kareem	ок
126	PB164708BS		PB164708BS	LCS	11/07/24 23:51	0.1ML OF M6010 AND M6001 WERE ADDED TO 10ML OF THE SAMPLE	Kareem	ок
127	PB164563BL		PB164563BL	MB	11/07/24 23:55		Kareem	ОК
128	PB164563BS		PB164563BS	LCS	11/08/24 00:05	0.1ML OF M6010 AND M6001 WERE ADDED TO 10ML OF THE SAMPLE	Kareem	ОК
129	PB164634BL		PB164634BL	MB	11/08/24 00:08		Kareem	ОК
130	PB164634BS		PB164634BS	LCS	11/08/24 00:13	0.1ML OF M6010 AND M6001 WERE ADDED TO 10ML OF THE SAMPLE	Kareem	ОК
131	PB164647BL		PB164647BL	MB	11/08/24 00:17		Kareem	ОК
132	132 PB164647BS		PB164647BS	LCS	11/08/24 00:21	0.1ML OF M6010 AND M6001 WERE ADDED TO 10ML OF THE SAMPLE	Kareem	ок
133	P4722-03DL		WC-1(0-6)DL	SAM	11/08/24 00:26	5x for Fe	Kareem	Confirm
134	LR1		LR1	HIGH STD	11/08/24 00:30		Kareem	ОК
135	LR2		LR2	HIGH STD	11/08/24 00:35		Kareem	ОК



Revie	w By	mo	han	R	eview On	l	11/9/2024 12:07	:42 AM			
Super	vise By	kar	eem	S	upervise	On	11/13/2024 7:36	:39 PM			
STD. N	NAME		STD R	EF.#							
ICAL Sta	ICAL Standard MP83078,MP83079,MP8				80,MP83081,I	MP83082,MP830	)84				
ICV Sta	ICV Standard MP83085										
	CCV Standard MP83088 ICSA Standard MP83086,MP83087										
	CRI Standard MP83084 LCS Standard			4							
Chk Star			MP8309 [.]	1 MP83092							
136	CCV12			CCV12		CCV	11/08/24 00:39		к	areem	ок
137	CCB12			CCB12		ССВ	11/08/24 00:43		к	areem	ОК
138	138 P4701-01DL BP-F3D		BP-F3DL		SAM	11/08/24 00:48	NOT USE	к	areem	Not Ok	
139	139 CCV13 CCV13		CCV13		CCV	11/08/24 00:57		К	areem	ок	
140	140 CCB13 CCB13			CCB13		ССВ	11/08/24 01:01		к	areem	ОК



### Prep Standard - Chemical Standard Summary

Order ID : P4699

Test : Metals Group3

Prepbatch ID : PB164708,

Sequence ID/Qc Batch ID: LB133344,LB133344,

### Standard ID :

MP81119,MP83078,MP83079,MP83080,MP83081,MP83082,MP83083,MP83084,MP83085,MP83086,MP83087,MP830 88,MP83091 MP83092,

### Chemical ID :

M5130,M5192,M5218,M5223,M5288,M5295,M5296,M5390,M5394,M5429,M5467,M5498,M5515,M5585,M5634,M5658 ,M5697,M5698,M5747,M5748,M5769,M5798,M5799,M5800,M5801,M5802,M5806,M5814,M5815,M5816,M5817,M581 8,M5819,M5820,M5875,M5935,M5962,M5970,M5978,M5982,M6000,M6009,M6021,M6023,M6028,M6030,M6033,M60 95,M6111,M6116,M6117,W2606,W3112,



<u>Recipe</u> <u>ID</u> 169	NAME 1:1HNO3	<u>NO.</u> MP81119	Prep Date 06/21/2024	Expiration Date 04/24/2025	<u>Prepared</u> <u>By</u> Al-Terek Isaac	<u>ScaleID</u> METALS_SCA LE_2 (M SC-2)	ETTE_1 (ICP	Sarabjit Jaswal
FROM	1250.00000ml of M5935 + 1250.0000	00ml of W26	506 = Final Q	uantity: 2500.0	00 ml		<u>A)</u>	
Recipe ID	NAME	<u>NO.</u>	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	PipettelD	Sarabiit Jaswal

	<u>ID</u>	NAME	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	PipetteID	Sarabjit Jaswal
	902	ICP AES CAL BLK ( SO/ICB/CCB)	<u>MP83078</u>	11/06/2024	12/06/2024	Kareem	None	None	
						Khairalla			11/07/2024
	<u>FROM</u>	125.00000ml of M6111 + 2350.0000	)ml of W311	2 + 25.00000	ml of M6117 =	Final Quantity:	2500.000 ml		
L									



Recipe ID 907	NAME ICP AES STD S ( S5 )	<u>NO.</u> <u>MP83079</u>	Prep Date 11/06/2024	Expiration Date 12/06/2024	Prepared By Kareem Khairalla	<u>ScaleID</u> None	PipetteID None	Sarabjit Jaswal
<u>FROM</u>	5.00000ml of M5296 + 5.00000ml of of M5875 + 5.00000ml of M5970 + 5.							
Recipe				Expiration	Prepared			Supervised By

<u>Recipe</u> <u>ID</u> 910	NAME ICP AES STD S4	<u>NO.</u> MP83080	<u>Prep Date</u> 11/06/2024	Expiration Date 12/06/2024	Prepared By Kareem Khairalla	<u>ScaleID</u> None	PipettelD None	Sarabjit Jaswal
<u>FROM</u>	50.00000ml of MP83078 + 50.00000	ml of MP83	)79 <i>=</i> Final Q	uantity: 100.00	0 ml			



<u>Recipe</u> <u>ID</u> 909	NAME ICP AES STD S3	<u>NO.</u> MP83081	Prep Date 11/06/2024	Expiration Date 12/06/2024	<u>Prepared</u> <u>By</u> Kareem Khairalla	<u>ScaleID</u> None	<u>PipetteID</u> None	Sarabjit Jaswal
FROM	25.00000ml of MP83079 + 75.00000	L ml of MP83(	)78 = Final Q	uantity: 100.00	0 ml			

Recipe ID 3913	NAME ICP AES STD S2	<u>NO.</u> MP83082	Prep Date 11/06/2024	Expiration Date 12/06/2024	<u>Prepared</u> <u>By</u> Kareem Khairalla	<u>ScaleID</u> None	<u>PipetteID</u> None	Sarabjit Jaswal
<u>FROM</u>	16.00000ml of MP83079 + 184.0000	Dml of MP8	3078 = Final (	Quantity: 200.0	00 ml		I	



Т

Recipe ID 2950	NAME ICP AES S1/CRI STOCK STD	<u>NO.</u> MP83083	Prep Date 11/06/2024	Expiration Date 12/06/2024	<u>Prepared</u> <u>By</u> Kareem Khairalla	<u>ScaleID</u> None	<u>PipetteID</u> None	Sarabjit Jaswal
FROM	0.03000ml of M5798 + 0.03000ml of of M6033 + 0.06000ml of M5747 + 0. 0.10000ml of M5962 + 0.10000ml of of M5799 + 0.20000ml of M5819 + 0. 0.50000ml of M5390 + 0.50000ml of of M5769 + 1.00000ml of M5806 + 1. MP83078 = Final Quantity: 100.000	10000ml of M5970 + 0. 20000ml of M5814 + 1. 00000ml of	M5697 + 0.10 10000ml of M M6021 + 0.20 00000ml of M	0000ml of M569 5982 + 0.15000 0000ml of M602 5192 + 1.00000	98 + 0.10000ml 0ml of M5800 + 23 + 0.25000ml 0ml of M5288 +	of M5801 + 0.1 0.20000ml of M of M5467 + 0.2 1.00000ml of M	0000ml of M58 5748 + 0.2000 5000ml of M58 5498 + 1.0000	320 + 00ml 302 +

<b>Recipe</b>				Expiration	Prepared			Supervised By
ID	NAME	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	PipettelD	Sarabjit Jaswal
2951	ICP AES S1/CRI WORK STD	<u>MP83084</u>	11/06/2024	12/06/2024	Kareem	None	None	
					Khairalla			11/07/2024
FROM	2.00000ml of MP83083 + 98.00000m	l of MP830	78 = Final Qu	antity: 100.000	ml			



Recipe ID 912	NAME ICP AES ICV SOLN	<u>NO.</u> MP83085	Prep Date 11/06/2024	Expiration Date 12/06/2024	Prepared By Kareem Khairalla	<u>ScaleID</u> None	PipetteID None	Sarabjit Jaswal
FROM	0.02500ml of M5429 + 0.02500ml of of M5295 + 89.77500ml of MP83078				)ml of M5218 +	0.25000ml of N	15982 + 10.000	)00ml

<u>Recipe</u> <u>ID</u> 904	NAME ICP AES ICSA SOLN	<u>NO.</u> MP83086	<b>Prep Date</b> 11/06/2024	Expiration Date 11/19/2024	<u>Prepared</u> <u>By</u> Kareem Khairalla	<u>ScaleID</u> None	<u>PipetteID</u> None	Sarabjit Jaswal
<u>FROM</u>	l 25.00000ml of M5130 + 225.00000m	l of MP8307	/8 = Final Qu	antity: 250.000				11/07/2024



Recipe ID 3494	NAME ICP AES ICSAB SOLN-1	<u>NO.</u> MP83087	Prep Date 11/06/2024	Expiration Date 11/19/2024	Prepared By Kareem Khairalla	<u>ScaleID</u> None	<u>PipetteID</u> None	Sarabjit Jaswal
FROM	0.01000ml of M5815 + 0.01000ml of of M5130 + 10.00000ml of M5223 + 7					1.00000ml of M	5982 + 10.000	l00ml

<u>Recipe</u> <u>ID</u> 911	NAME ICP AES CCV SOLN	<u>NO.</u> MP83088	Prep Date 11/06/2024	Expiration Date 12/06/2024	Prepared By Kareem Khairalla	<u>ScaleID</u> None	PipettelD None	Sarabjit Jaswal
<u>FROM</u>	50.00000ml of MP83078 + 50.00000	ml of MP83	079 = Final Q	uantity: 100.00	0 ml			



Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
EPA	PART A / ICSA ( ICP ) STOCK SOLN	ICSA-1211	11/19/2024	05/20/2024 /	04/20/2021 / bin	M5130
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57042 / Mo, 1000 PPM, 125 ml	051722	05/17/2025	07/01/2022 / bin	06/17/2022 / jaswal	M5192
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	S2-MEB711674	11/02/2026	07/01/2022 / bin	09/10/2021 / bin	M5218
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	11/19/2024	05/20/2024 /	04/20/2021 / bin	M5223
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	071122	07/11/2025	09/01/2022 / jaswal	07/21/2022 / jaswal	M5288
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
EPA	ICV-1 / ICV (ICP/ICPMS) STOCK SOLN	ICV-1014	02/05/2025	08/07/2024 / jaswal	02/20/2020 / bin	M5295



Standards, Inc.

### CHEMICAL RECEIPT LOG BOOK

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	Z9651Q / CHEM-CLP-4/.25L	S2-MEB711673	11/02/2026	09/19/2022 / jaswal	08/20/2022 / jaswal	M5296
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57056 / Ba, 1000 PPM, 125 ml	072122	07/21/2025	08/07/2024 / jaswal	09/18/2022 / bin	M5390
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-MEB714159	01/13/2027	11/28/2022 / bin	09/19/2022 / bin	M5394
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57103 / Li, 10000 PPM, 125 ml	070622	07/06/2025	01/30/2023 / bin	01/26/2023 / bin	M5429
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 #
Absolute Standards, Inc.	58120 / Ca, 10000 PPM, 500 ml	031523	03/15/2026	08/15/2023 / iaswal	03/17/2023 / bin	M5498

jaswal

bin



Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58126 / Fe, 10000 PPM, 500 ml	092122	09/21/2025	08/01/2024 / Jaswal	03/17/2023 / bin	M5515
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	02/28/2025	01/20/2024 /	06/12/2023 / jaswal	M5585
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
PCI Scientific Supply, Inc.	1403 / Hydrogen Peroxide, 30% 1 gal	820803	02/03/2025	04/18/2024 /	08/03/2022 / Al-Terek	M5634
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
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
	58025 / Mn, 1000 PPM,	102623	10/26/2026	04/18/2024 /	10/27/2023 /	



Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	/ Lead (Pb) 1000PPM	100923	10/09/2026	05/20/2024 / Jaswal	12/20/2023 / jaswal	M5747
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	/ Nickel (Ni) 1000PPM			12/20/2023 / jaswal	M5748	
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58112 / Mg, 10000 PPM, 500 ml	091823	09/18/2026	05/24/2024 / Jaswal	01/03/2024 / bin	M5769
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57004 / Be, 1000 PPM, 125 ml	102523	10/25/2026	02/09/2024 / bin	02/09/2024 / bin	M5798
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57050 / Sn, 1000 PPM, 125 ml	071123	07/11/2026	02/09/2024 / bin	02/09/2024 / bin	M5799
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #

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.	57051 / Sb, 1000 PPM, 125 ml	51 / Sb, 1000 PPM, 120523 12/		08/07/2024 / 01/03/2024 jaswal jaswal		M5802	
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	122223	12/22/2026	08/01/2024 / Jaswal	01/03/2024 / jaswal	M5806	
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #	
Absolute Standards, Inc.	57005 / B, 1000 PPM, 125 ml	071123	07/11/2026	03/26/2024 / Sohil	01/03/2024 / jaswal	M5814	
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #	
Absolute Standards, Inc.	57115 / P, 10000 PPM, 125 ml	041723	04/17/2026	05/21/2024 / Jaswal	02/09/2024 / jaswal	M5815	
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #	
Absolute			12/29/2026	05/20/2024 / Jaswal	02/09/2024 / jaswal	M5816	



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Supplier			Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57116 / S, 10000 PPM, 125 ml	071123	07/11/2026	03/01/2024 / jaswal	02/09/2024 / jaswal	M5817
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57014 / Si, 1000 PPM, 125 ml	122023	12/20/2026	03/06/2024 / jaswal	02/09/2024 / jaswal	M5818
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	111623	11/16/2026	03/20/2024 / jaswal	02/09/2024 / jaswal	M5819
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57015 / P, 1000 PPM, 125 ml	091123	09/11/2026	05/01/2024 / jaswal	02/09/2024 / jaswal	M5820
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CLPP-CAL-1 / CLP CAL SOLUTION #1, 125mL	T2-MEB714417	01/27/2027	04/19/2024 / jaswal	02/22/2024 / jaswal	M5875
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical			12/08/2024	06/21/2024 / Al-Terek	06/07/2024 / Al-Terek	M5935



Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #	
Absolute Standards, Inc.	57034 / Se, 1000 PPM, 125 ml	060624	06/06/2027	07/02/2024 / Jaswal	06/14/2024 / Jaswal	M5962	
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #	
Absolute Standards, Inc.	57003 / Li, 1000 PPM, 125 ml	M, 125 061224 06/21/2027 07/01/2024 / 07/01/2024 / Jaswal Jaswal		M5970			
Supplier	lier ItemCode / ItemName		Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #	
Inorganic Ventures	CGTI1-1 / TITANIUM 125mL 1000ug/mL	T2-TI719972	06/17/2027	08/07/2024 / jaswal	02/22/2024 / Jaswal	M5978	
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	031524	03/15/2027	07/01/2024 / Jaswal	06/11/2024 / Jaswal	M5982	
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #	
Inorganic Ventures	WW-LFS-1 / Laboratory Fortified Stock Solution 1, 125 ml	T2-MEB723367	08/30/2026	08/13/2024 / Jaswal	05/14/2024 / Jaswal	M6000	
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #	
Inorganic Ventures	WW-LFS-2 / Laboratory Fortified Stock Solution 2, 125 ml	U2-MEB731108	03/17/2028	08/13/2024 / Jaswal	05/14/2024 / Jaswal	M6009	



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.	57048 / Cd, 1000 PPM, 125 ml	070124	07/01/2027	08/05/2024 / kareem	01/25/2019 / Jaswal	M6028
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57047 / Ag, 1000 PPM, 125 ml	122823	12/28/2026	08/05/2024 / kareem	08/05/2024 / Jaswal	M6030
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58113 / AI, 10000 PPM, 500 ml	011623	01/16/2026	08/07/2024 / Jaswal	01/03/2024 / Jaswal	M6033
		· 	Evaluation		Received Date (	Chamtach

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)		03/17/2029	10/26/2024 / Janvi	10/21/2024 / Janvi	M6095
	(CS/0X2.5L)					



Supplier	ItemCode / ItemName	ItemCode / ItemName Lot # Expiration Date Opened B				Chemtech Lot #
Seidler Chemical	Chemical BA-9530-33 / Hydrochloric Acid, Instra-Analyzed (cs/6x2.5L)		05/09/2027	11/04/2024 / Eman	09/29/2024 / Janvi	M6111
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)	24B1362001	05/03/2025	11/04/2024 / Janvi	09/29/2024 / Eman	M6116
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)	24B1362001	05/06/2025	11/06/2024 / Janvi	09/29/2024 / Eman	M6117
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	DIW / DI Water	Daily Lab-Certified	10/24/2024	10/24/2019 / apatel	10/24/2019 / apatel	W2606

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

m/z->	1.067	m/z-> 2.0€7	5.014	m/z-> 1.0E5	2.5 <b>E</b> 4	5. 0 114	1. Cadmium nitrate tetrahydrate (Cd)	Compound	Weight shov	Expiration Date: Recommended Storage: Nominal Concentration (µg/mL):		CERTIFIED WEIGHT REPORT:	Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com
		 		0 ⁶		[1] Spectrum No.1		RM#	Weight shown below was dliuted to (mL):	Expiration Date: nended Storage: ntration (µg/mL):	Part Number: Lot Number: Description:	PORT:	<b>1s, Inc.</b> om
		120		20		-	IN024 CDM092021A1	Lot Number	6UTB uted to (mL):	070127 Ambient (20 °C) <b>1000</b>	<u>57048</u> <u>070124</u> Cadmium (Cd)		
		130		30		12.514 800	1000 99.	Nominal Pu Conc. (µg/mL) (1	2000.07 0.1		(Cd)		R
200		140		\$		12.514 sec]:58148.D# [Count] [Linear]	99.999 0.10 36.5	Purity Uncertainty Assay (%) Purity (%) (%)	5E-05 Balance Uncertainty 0.100 Flask Uncertainty		Solvent: 2%		Certified R
		1 () ()		ő		Count] [Line	.5 5.4797	say Target 6) Weight (g)	ţ		ent: 24002546 2% 40.0	Lot #	Certified Reference Material CRM S 15 12 4
		160		0 O		ar]	5.4804	Actual Actual Weight (g) Conc. (µg/mL)			Nitric Acid		terial CRM
		170		70			1000.1	11	Re	5	5		M6028
		-1 2 C		BO			10022-68-1	Expanded Uncertainty (Solvent +/- (µg/mL) CAS# 0	Reviewed By: Ped	\$	Alloch & B		-
		190 200		90 100				SDS Information (Solvent Safety Info. On Attached pg.) # OSHA PEL (TWA) LD51	Pedro L. Rentas	ento	Brack		ANAB IS AR-153 https://Ab
				-			orl-rat 60.2mg/kg 3108	ned pg.) NIST LD50 SRM	070124		070194		ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com

1 of 2

Part # 57048

Lot # 070124

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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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## Physical Characterization:

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

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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).

**e**24

M5296 OP: 09/19/2022 BH



## **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:	CHEM-CLP-4		
Lot Number:	S2-MEB711673		
Matrix:	3% (v/v) HNO3 3% (v/v) HF		
Value / Analyte(s):	1 000 μg/mL ea: Boron, Silicon, Titanium	Molybdenum, Tin,	

### 3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE Boron, B	CERTIFIED VALUE 1 000 ± 6 μg/mL	ANALYTE Molybdenum, Mo	CERTIFIED VALUE 1 000 ± 6 μg/mL				
Silicon, Si	1 000 ± 7 μg/mL	Tin, Sn	1 000 ± 6 µg/mL				
Titanium, Ti	1 000 ± 7 μg/mL						
Density:	1.030 g/mL (measured at 20 ± 4 °C)						
Assay Information:							
ANALYTE	METHOD	NIST SRM#		SRM LOT#			
B	ICP Assav	3107		110830			

В	ICP Assay	3107	110830
Мо	ICP Assay	3134	130418
Si	ICP Assay	3150	130912
Sn	ICP Assay	3161a	140917
Ti	ICP Assay	3162a	130925

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	Characterization of CRM/RM by One Method Certified Value, X _{CRM/RM} , where one method of characterization
used is the weighted mean of the results:	is used is the mean of individual results:
$X_{CRM/RM} = \Sigma(w_i) (X_i)$	X _{CRM/RM} = (X _a ) (u _{char a} )
X _i = mean of Assay Method i with standard uncertainty u _{char i}	X _a = mean of Assay Method A with
$w_i$ = the weighting factors for each method calculated using the inverse square of the variance: $w_i = (1/u_{chari})^2 / (\Sigma(1/(u_{chari})^2)$	u _{char} a = the standard uncertainty of characterization Method A
CRM/RM Expanded Uncertainty (±) = U _{CRM/RM} = k (u ² _{char} + u ² _{bb} + u ² _{lts} + u ² _{ts} ) ^{1/2}	CRM/RM Expanded Uncertainty (±) = U _{CRM/RM} = k (u ² char a + u ² bb + u ² lts + u ² ts) ¹
k = coverage factor = 2	k = coverage factor = 2
$\mathbf{u_{char}} = \left[\sum ((\mathbf{w_i})^2 (\mathbf{u_{char}})^2)\right]^{\frac{1}{2}}$ where $\mathbf{u_{char}}$ are the errors from each characterization method	u _{char a} = the errors from characterization
ubb = bottle to bottle homogeneity standard uncertainty	u _{bb} = bottle to bottle homogeneity standard uncertainty
u _{lts} = long term stability standard uncertainty (storage)	ults = long term stability standard uncertainty (storage)
u _{te} = transport stability standard uncertainty	ute = transport stability standard uncertainty

- 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

4.0

### 6.0 INTENDED USE

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

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

### 7.1 Storage and Handling Recommendations

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

- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.

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

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

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**

November 02, 2021

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

### 11.2 Lot Expiration Date

### - November 02, 2026

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

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

### 11.3 Period of Validity

- Sealed TCT Bag Open Date:

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

### 12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Michael Booth Director, Quality Control

Michael 2 Booth

### Certifying Officer:

Paul Gaines Chairman / Senior Technical Director

Paul R Line



# **Certificate of Analysis**

300 Technology Drive Christiansburg, VA 24073 USA inorganicventures.com

3.0

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:	T2-MEB714417		
Matrix:	5% (v/v) HNO3		
Value / Analyte(s):	5 000 μg/mL ea: Calcium, Magnesium,	Potassium, Sodium,	
	2 000 μg/mL ea: Aluminum,	Barium,	
	1 000 μg/mL ea: Iron,		
	500 μg/mL ea: Nickel, Zinc, Manganese,	Vanadium, Cobalt,	
	250 μg/mL ea: Silver,	Copper,	
	200 μg/mL ea: Chromium,		
	50 μg/mL ea: Beryllium		
CERTIFIED VALUE	S AND UNCERTAINTIES		

ANALYTE Aluminum, Al	CERTIFIED VALUE 2 000 ± 7 μg/mL	ANALYTE Barium, Ba	CERTIFIED VALUE 2 000 ± 9 μg/mL
Beryllium, Be	50.00 ± 0.26 μg/mL	Calcium, Ca	5 000 ± 22 μg/mL
Chromium, Cr	200.0 ± 1.0 μg/mL	Cobalt, Co	500.0 ± 2.4 μg/mL
Copper, Cu	250.0 ± 1.0 μg/mL	Iron, Fe	1 000 ± 4 μg/mL
Magnesium, Mg	5 000 ± 20 μg/mL	Manganese, Mn	500.0 ± 2.0 μg/mL
Nickel, Ni	500.0 ± 2.2 μg/mL	Potassium, K	5 000 ± 19 μg/mL
Silver, Ag	250.0 ± 1.1 μg/mL	Sodium, Na	5 000 ± 18 μg/mL
Vanadium, V	499.7 ± 2.2 μg/mL	Zinc, Zn	500.0 ± 2.2 μg/mL

Density:

1.118 g/mL (measured at 20 ± 4 °C)

### **Assay Information:**

ANALYTE Ag	METHOD ICP Assay	NIST SRM# 3151	SRM LOT# 160729
Ag	Volhard	999c	999c
AI	ICP Assay	3101a	140903
AI	EDTA	928	928
Ва	ICP Assay	3104a	140909
Ва	Gravimetric		See Sec. 4.2
Ве	ICP Assay	3105a	090514
Ве	Calculated		See Sec. 4.2
Са	ICP Assay	3109a	130213
Са	EDTA	928	928
Со	ICP Assay	3113	190630
Со	EDTA	928	928
Cr	ICP Assay	3112a	170630
Cr	Calculated		See Sec. 4.2
Cu	ICP Assay	3114	121207
Cu	EDTA	928	928
Fe	ICP Assay	3126a	140812
Fe	EDTA	928	928
К	ICP Assay	3141a	140813
К	Gravimetric		See Sec. 4.2
Mg	ICP Assay	3131a	140110
Mg	EDTA	928	928
Mn	ICP Assay	3132	050429
Mn	EDTA	928	928
Na	ICP Assay	3152a	120715
Na	Gravimetric		See Sec. 4.2
Ni	ICP Assay	3136	120619
Ni	EDTA	928	928
V	IC 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	Characterization of CRM/RM by One Method Certified Value, X _{CRM/RM} , where one method of characterization
used is the weighted mean of the results:	is used is the mean of individual results:
$X_{CRM/RM} = \Sigma(w_i) (X_i)$	X _{CRM/RM} = (X _a ) (u _{char a} )
X _i = mean of Assay Method i with standard uncertainty u _{char i}	X _a = mean of Assay Method A with
$w_i$ = the weighting factors for each method calculated using the inverse square of the variance: $w_i = (1/u_{chari})^2 / (\Sigma(1/(u_{chari})^2)$	u _{char} a = the standard uncertainty of characterization Method A
CRM/RM Expanded Uncertainty (±) = U _{CRM/RM} = k (u ² _{char} + u ² _{bb} + u ² _{lts} + u ² _{ts} ) ^{1/2}	CRM/RM Expanded Uncertainty (±) = U _{CRM/RM} = k (u ² char a + u ² bb + u ² lts + u ² ts) ¹
k = coverage factor = 2	k = coverage factor = 2
$\mathbf{u_{char}} = \left[\sum ((\mathbf{w_i})^2 (\mathbf{u_{char}})^2)\right]^{\frac{1}{2}}$ where $\mathbf{u_{char}}$ are the errors from each characterization method	u _{char a} = the errors from characterization
ubb = bottle to bottle homogeneity standard uncertainty	u _{bb} = bottle to bottle homogeneity standard uncertainty
u _{lts} = long term stability standard uncertainty (storage)	ults = long term stability standard uncertainty (storage)
u _{te} = transport stability standard uncertainty	ute = transport stability standard uncertainty

- 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

4.0

### 6.0 INTENDED USE

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

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

### 7.1 Storage and Handling Recommendations

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

- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.

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

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

Note: This solution contains Silver (Ag), please refer to our Sample Preparation Guide for more information.

https://www.inorganicventures.com/sample-preparation-guide/samples-containing-silver

### 8.0 HAZARDOUS INFORMATION

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

### 9.0 HOMOGENEITY

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

### 10.0 QUALITY STANDARD DOCUMENTATION

### 10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

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

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

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

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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

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

### 11.1 Certification Issue Date

January 27, 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

### - January 27, 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

**Certifying Officer:** 

Paul Gaines Chairman / Senior Technical Director

SD978Ci Paul R Saines



**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-3		
Lot Number:	T2-MEB714159		
Matrix:	7% (v/v) HNO3		
Value / Analyte(s):	1 000 μg/mL ea: Arsenic, Selenium,	Lead, Thallium,	
	500 μg/mL ea: Cadmium		

### 3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE Arsenic, As	CERTIFIED VALUE 1 000 ± 8 µg/mL	ANALYTE Cadmium, Cd	CERTIFIED VALUE 500.0 ± 2.1 μg/mL
Lead, Pb	1 000 ± 5 μg/mL	Selenium, Se	1 000 ± 8 μg/mL
Thallium, Tl	1 000 ± 7 μg/mL		

Density:

1.043 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
ТІ	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	Characterization of CRM/RM by One Method Certified Value, X _{CRM/RM} , where one method of characterization
used is the weighted mean of the results:	is used is the mean of individual results:
$X_{CRM/RM} = \Sigma(w_i) (X_i)$	X _{CRM/RM} = (X _a ) (u _{char a} )
X _i = mean of Assay Method i with standard uncertainty u _{char i}	X _a = mean of Assay Method A with
$w_i$ = the weighting factors for each method calculated using the inverse square of the variance: $w_i = (1/u_{chari})^2 / (\Sigma(1/(u_{chari})^2)$	u _{char} a = the standard uncertainty of characterization Method A
CRM/RM Expanded Uncertainty (±) = U _{CRM/RM} = k (u ² _{char} + u ² _{bb} + u ² _{lts} + u ² _{ts} ) ^{1/2}	CRM/RM Expanded Uncertainty (±) = U _{CRM/RM} = k (u ² char a + u ² bb + u ² lts + u ² ts) ¹
k = coverage factor = 2	k = coverage factor = 2
$\mathbf{u_{char}} = \left[\sum ((\mathbf{w_i})^2 (\mathbf{u_{char}})^2)\right]^{\frac{1}{2}}$ where $\mathbf{u_{char}}$ are the errors from each characterization method	u _{char a} = the errors from characterization
ubb = bottle to bottle homogeneity standard uncertainty	u _{bb} = bottle to bottle homogeneity standard uncertainty
u _{lts} = long term stability standard uncertainty (storage)	ults = long term stability standard uncertainty (storage)
u _{te} = transport stability standard uncertainty	ute = transport stability standard uncertainty

- 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

4.0

### 6.0 INTENDED USE

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

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

### 7.1 Storage and Handling Recommendations

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

- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.

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

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

### 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

### January 13, 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

### - January 13, 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

**Certifying Officer:** 

Paul Gaines Chairman / Senior Technical Director

SD978Ci Paul R Saines

# Certificate of Analysis

Refine your results. Redefine your industry. RD:05/14/2024

**INORGANIC**" V E N T U R E S

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:	T2-MEB723367
Matrix:	5% (v/v) HNO3

	Value / Analyte(s):	1 000 µg/mL ea: Potassium,		
		600 μg/mL ea: Phosphorus,		
		300 µg/mL ea: Sodium,	Iron,	
		200 µg/mŁ ea: Magnesium, Cerium, Thallium,	Aluminum, Selenium,	
		100 µg/mL ea: Lead,	Calcium,	
		80 μg/mL ea: Arsenic,		
		70 μg/mL ea: Mercury,		
		50 μg/mL ea: Nickel,		
		40 µg/mL ea: Chromium,		
		30 µg/mL ea: Copper, Vanadium,	Boron,	
		20 μg/mL ea: Zinc, Barium, Cadmium, Manganese,	Strontium, Beryllium, Cobalt, Lithium,	
3.0	CERTIFIED VALUES	7.5 µg/mL ea: Silver AND UNCERTAINTI	ES	

ANALYTE Aluminum, Al	CERTIFIED VALUE 200.0 ± 0.7 µg/mL	ANALYTE Arsenic, As	CERTIFIED VALUE 80.0 ± 0.7 µg/mL
Barium, Ba	20.00 ± 0.09 µg/mL	Beryllium, Be	20.00 ± 0.13 µg/mL
Boron, B	30.00 ± 0.18 µg/mL	Cadmium, Cd	20.00 ± 0.09 µg/mL
Calcium, Ca	100.0 ± 0.4 μg/mL	Cerium, Ce	200.0 ± 0.8 μg/mL
Chromium, Cr	40.00 ± 0.30 μg/mL	Cobalt, Co	20.00 ± 0.10 µg/mL
Copper, Cu	30.00 ± 0.13 µg/mL	Iron, Fe	300.0 ± 1.3 μg/mL
Lead, Pb	100.0 ± 0.4 µg/mL	Lithium, Li	20.00 ± 0.08 µg/mL
Magneslum, Mg	200.0 ± 0.8 µg/mL	Manganese, Mn	20.00 ± 0.08 µg/mL
Mercury, Hg	70.0 ± 0.3 µg/mL	Nickel, Ni	50.00 ± 0.22 μg/mL
Phosphorus, P	600.0 ± 2.7 μg/mL	Potassium, K	1 000 ± 4 µg/mL
Selenium, Se	200.0 ± 1.3 µg/mL	Silver, Ag	7.50 ± 0.03 μg/mL
Sodium, Na	300.0 ± 1.4 μg/mL	Strontium, Sr	20.01 ± 0.08 µg/mL
Thailium, Ti	200.0 ± 1.4 µg/mL	Vanadium, V	30.00 ± 0.13 μg/mL
Zinc, Zn	20.00 ± 0.09 µg/mL		

Density:

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

Assay Information:

ANALYTE Ag	METHOD ICP Assay	NIST SRM# 3151	SRM LOT# 160729
Ag	Volhard	999c	999c
Ag	Calculated		See Sec. 4.2
A	ICP Assay	3101a	140903
Al	EDTA	928	928
As	ICP Assay	3103a	100818
В	ICP Assay	3107	190605
Ba	ICP Assay	3104a	140909
Ва	Gravimetric		See Sec. 4.2
Be	ICP Assay	3105a	090514
Са	ICP Assay	3109a	130213
Са	EDTA	928	928
Cd	ICP Assay	3108	130116
Cd	EDTA	928	928
Се	ICP Assay	3110	090504
Ce	EDTA	928	928
Co	ICP Assay	3113	190630
Со	EDTA	928	928
Cr	ICP Assay	3112a	170630
Cu	ICP Assay	3114	121207
Cu	EDTA	928	928
Fe	ICP Assay	3126a	140812
Fe	EDTA	928	928
Hg	ICP Assay	3133	160921
Hg	EDTA	928	928
к	ICP Assay	3141a	140813
к	Gravimetric		See Sec. 4.2
Li	ICP Assay	3129a	100714
Li	Gravimetric		See Sec. 4.2
Mg	ICP Assay	3131a	140110
Mg	EDTA	928	928
Mn	ICP Assay	3132	050429
Mn	EDTA	928	928
Na	ICP Assay	Traceable to 3152A	S2-NA700842
Na	Gravimetric	0400	See Sec. 4.2
Ni Ni	ICP Assay	3136	120619
P	EDTA	928 3139a	928
P	ICP Assay Acidimetric		060717
F Pb	ICP Assay	84L 3128	84L
Pb	EDTA	928	101026 928
Se	ICP Assay	3149	920 100901
Sr	EDTA	928	928
Sr	ICP Assay	Traceable to 3153a	920 K2-SR650985
TI	ICP Assay	3158	151215
V	IC Assay	3165	160906
v	EDTA	928	928
Zn	ICP Assay	3168a	120629
Zn	EDTA	928	928
	Eco 4		

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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	Characterization of CRM/RM by One Method
Certified Value, X _{CRMRM} , where two or more methods of characterization are used is the weighted mean of the results:	Certified Value, X _{CRM/RM} , where one method of characterization is used is the mean of individual results:
$\begin{split} & X_{CRM/RM} \equiv \Sigma(w_i) \; (X_i) \\ & X_i = \text{mean of Assay Method i with standard uncertainty } u_{char, i} \\ & w_i = \text{the weighting factors for each method calculated using the inverse square of the variance:} \\ & w_i = (1/u_{char, i})^2 / (\Sigma(1/(u_{char, i})^2)) \end{split}$	$X_{CRM/RM} = (X_a) (u_{char a})$ $X_a = mean of Assay Method A withu_{char a} = the standard uncertainty of characterization Method A$
CRM/RM Expanded Uncertainty (±) = U _{CRM/RM} = k $(u^2_{char} + u^2_{bb} + u^2_{lts} + u^2_{ts})^{V_2}$ k = coverage factor = 2 $u_{char} = [\Sigma[(w_i)^2 (u_{char}_i)^2])^{V_2}$ where $u_{char}$ is the errors from each characterization method $u_{bb}$ = bottle to bottle homogeneity standard uncertainty $u_{lts} = long term stability standard uncertainty (storage) u_{te} = transport stability standard uncertainty$	CRM/RM Expanded Uncertainty (±) = U _{CRM/RM} = k ( $u^2_{chara} + u^2_{bb} + u^2_{tts} + u^2_{ts}$ ) ^{1/k} k = coverage factor = 2 u _{chara} = the errors from characterization u _{bb} = bottle to bottle homogeneity standard uncertainty u _{Its} = long term stability standard uncertainty (storage) u _{uts} = transport stability standard uncertainty

- 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

4.0

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

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

### 7.1 Storage and Handling Recommendations

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

- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.

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

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

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

### 8.0 **HAZARDOUS INFORMATION**

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

### 9.0 HOMOGENEITY

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

### 10.0 **QUALITY STANDARD DOCUMENTATION**

### 10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

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

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

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

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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

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

### **11.1 Certification Issue Date**

August 30, 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

### - August 30, 2026

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

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

### **11.3 Period of Validity**

- Sealed TCT Bag Open Date:

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

### 12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

### **Certificate Approved By:**

Thomas Kozikowski Manager, Quality Control

SD9781.

Certifying Officer:

**Paul Gaines** Chairman / Senior Technical Director

Page 6 of 6

# **Certificate of Analysis**

Refine your results. Redefine your industry. RD:05/14/2024

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

ÍNORGANÍ

VENTURES

**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:	U2-MEB731108
Matrix:	5% (v/v) HNO3 tr. HF
Value / Analyte(s):	200 μg/mL ea: Silica,
	80 μg/mL ea: Antimony,
	70 μg/mL ea: Tin,
	40 μg/mL ea: Molybdenum,
	20 μg/mL ea:
	Titanium

### 3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE Antimony, Sb	CERTIFIED VALUE 80.1 ± 0.6 µg/mL	ANALYTE Molybdenum, Mo	CERTIFIED VALUE 40.03 ± 0.18 µg/mL
Silica, SIO2	200.2 ± 1.3 μg/mL	Tin, Sn	70.0 ± 0.4 µg/mL
Titanium, Ti	20.01 ± 0.13 μg/mL		

Density:

1.025 g/mL (measured at 20 ± 4 °C)

### **Assay Information:**

ANALYTE Mo	METHOD ICP Assay	NIST SRM# 3134	SRM LOT# 130418
Мо	Calculated		See Sec. 4.2
Sb	ICP Assay	3102a	140911
SiO2	ICP Assay	3150	130912
Sn	ICP Assay	3161a	140917
π	ICP Assay	3162a	130925
ті	Calculated		See Sec. 4.2

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

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

Certified Value, X_{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 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 (±) =  $U_{CRM/RM} \simeq k \left\{ u_{char}^2 + u_{bb}^2 + u_{ts}^2 + u_{ts}^2 \right\}^{\frac{1}{2}}$ 

k = coverage factor = 2

 $\begin{array}{l} u_{char} = [\overline{\Sigma}((w_{i})^{2} \, (u_{char})^{2})]^{2} \ \ \, \mbox{ where } u_{char} \ \, _{i} \mbox{ are the errors from each characterization method} \\ u_{bb} = bottle \ \, \mbox{ bottle homogeneity standard uncertainty} \\ u_{hs} = long \ \, \mbox{ term stability standard uncertainty (storage)} \end{array}$ 

uts = transport stability standard uncertainty

### 4.0 TRACEABILITY TO NIST

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:

$$\begin{split} X_{CRM/RM} = (X_{a}) (u_{oher \ a}) \\ X_{a} = mean \ of Assay Method A with \\ u_{oher \ a} = the standard uncertainty of characterization Method A \end{split}$$

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

 $\label{eq:coverage factor = 2} \\ u_{char} a = the errors from characterization \\ u_{bb} = bottle to bottle homogeneity standard uncertainty$  $u_{its} = long term stability standard uncertainty (storage)$  $u_{its} = transport stability standard uncertainty$ 

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

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

### 7.1 Storage and Handling Recommendations

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

- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.

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

- For more information, visit www.inorganicventures.com/TCT HF Note: This standard should not be prepared or stored in glass.

### 8.0 HAZARDOUS INFORMATION

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

### 9.0 HOMOGENEITY

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

### 10.0 QUALITY STANDARD DOCUMENTATION

### 10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

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

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

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

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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

### **11.1 Certification Issue Date**

March 17, 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

### - March 17, 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.

- 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.

### NAMES AND SIGNATURES OF CERTIFYING OFFICERS 12.0

**Certificate Approved By:** 

Thomas Kozikowski Manager, Quality Control

3D978 .........

**Certifying Officer:** 

**Paul Gaines** Chairman / Senior Technical Director



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

Instructions for QATS Reference Material: ICP-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.
  - **<u>CAUTION</u>**: Read instructions carefully before opening bottle(s) and proceeding with the analyses.

Contains Heavy Metals HAZARDOUS MATERIAL

Safety Data Sheets Available Upon Request

### (A) SAMPLE DESCRIPTION

Enclosed is a set of one (1) or more bottles of 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: AI, Ca, Fe, and Mg. The ICSB solution contains the analytes: Ag, As, Sb, Ba, Be,

RM ICP-AES ICSA-1211 B-0710 SFAM.docx

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QATS Form 20-007F189R01, 01-17-2023



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**ICSA** 

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### 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			ERENCE CH	IECK SAMPL CSB-0710	E ICP-AES IO	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)
AI	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
Са	5000	245000	208000	282000	235000	199000	271000
Cr	10	(52.0)	42.0	62.0	542	460	624
Со	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
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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.

m/z->	1.0E6	2.0E6	m/z->	1000	2000	1.0E5	2.0E5	1. Ammonium molybdate (Mo)	Compound	Volume show	NIST Tes	Recommended Storage: Nominal Concentration (µg/mL):	Expire	Part Lot Des	CERTIFIED WEIGHT REPORT:	Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com
210			110		đ		[1] Spectrum No.1		Nur	vn below was o	<b>NIST Test Number:</b>	d Storage: n (µg/mL):	Expiration Date:	Part Number: Lot Number: Description:		s, Inc.
2			120		N		No.1	58142 022222	Part Lot Number Number	Volume shown below was diluted to (mL):	<b>6UTB</b>	Ambient (20 °C) 1000	051725	57042 051722 Molybde		-
							[ 8.594	0.1000	Dilution Factor	3000.41		20 °C)		<u>57042</u> <u>051722</u> Molybdenum (Mo)		
			130		G		sec]:5704	300.0	Initial Un Vol. (mL) Pip	0.058 Flas	5E-05 Bala					M.S.
			140		40 0		8.594 sec]:57042.D# [Count] [Linear]	0.084	Uncertainty N Pipette (mL) Conc	Flask Uncertainty	Balance Uncertainty			MKE	_	Certified Rep M.5192
			150		50		unt] [Líne	1000	Nominal Conc. (µg/mL) Co				0.5%	MKBQ8597V Am	Lot #	ference M.
			160		60		)ar]	10001.0	Initial Conc. (µg/mL) C				15.0 ×	Ammonium hydroxide		Certified Reference Material CRM いちいのえいたいのんりはてい
			170		70			1000.0	Final Conc. (µg/mL)	Г			Ammonium hydroxide	æ	-	M 172
								2.1	Expanded Uncertainty +/- (µg/mL)		Reviewed By:	N's	Formulated By:	A		
			180		80			13106-76-8	(Solve CAS#			to I		deronce		•
			190		90			5 mg(Mo)/m3	SDS Information nt Safety Info. On Attac OSHA PEL (TWA)		Pedro L. Rentas	era	Lawrence Barry	An		nt 、
			200		100			13 orl-rat 333 mg/kg	SDS Information (Solvent Safety Info. On Attached pg.) # OSHA PEL (TWA) LD50		s 051722	/	rry 051722	Ψ		ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com
								kg 3134	NIST		722		722			4 Accredite ate Numbe ndards.com

Part # 57042 Lot # 051722

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**Certified Reference Material CRM** 



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

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

							Trace M	letals	Verifica	ition	by ICP-N	IS (µ	g/mL)						
A	<0.02	ß	40.02	Dv	20.02	Ηŕ	3	1		1									
SP SP	A).02	Ĵ,	2.0	7 5	10.02	1	<0.02	' E	20.02	N	<0.02	P	<0.02	Se	<0.2	4L	<0.02	W	<0.02
<u>,</u>		<u>م</u>	10.2	5	20.02	Ho	<0.02	Lu	<0.02	ß	<0.02	Re	<0.02	Si	40.02	5	<0.02	11	4000
2	202	ŝ	20.02	E	<0.02	h	<0.02	Mg	<0.01	ò	<007	Rh	50	۸,	2003	3	3	: (	
Ba	40.02	S	<0.02	3	300	7	3	ξ,	2	2			10.02	26	70.02		20.02	<	20.02
Be	5	?	3	2	20.02	l =	70.02	UTAT	20.02	Pd	<0.02	Rb	<0.02	Na	40.2	Ъ	<0.02	ΥЪ	<0.02
	-	2	70.02	Ca	<0.02	He	<02	Hg	40.2	P	<0.02	Ru	<0.02	S	40.02	J	300	<	2003
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ω	40.02	6	<0.02	An	3	ş	3	E		; ;	TO'NE	UH	70.02	0	20.05	Sn	20.02	5	<0.02
					10.01	0.1	20.05	ING	20.02	~	40.2	Sc	<0.02	Ta	<0.02	Т	<0.02	72	<0.02
																			And in the second secon

(T)= Target analyte

# Physical Characterization:

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

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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 # 57042 Lot # 051722



**Certificate of Analysis** 

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

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### 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

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Product Code:	Multi Analyte Custom Grade Solution	on
Catalog Number:	CHEM-QC-4	
Lot Number:	S2-MEB711674	
Matrix:	3% (v/v) HNO3 3% (v/v) HF	
Value / Analyte(s):	1 000 μg/mL ea: Boron, Silicon, Titanium	Molybdenum, Tin,

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

### 3.0 CERTIFIED VALUES AND UNCERTAINTIES

**ICP** Assay

ANALYTE Boron, B	CERTIFIED VALUE 1 000 ± 7 μg/mL	ANALYTE Molybdenum, Mo	CERTIFIED VALUE 1 000 ± 5 μg/mL	
Silicon, Si	1 000 ± 7 μg/mL	Tin, Sn	1 000 ± 5 μg/mL	
Titanium, Ti	1 001 ± 6 μg/mL			
Density:	1.032 g/mL (meas	sured at 20 ± 4 °C)		
Assay Information	ו:			
ANALYTE	METHOD	NIST SRM#		SRM LOT#
В	ICP Assay	3107		110830
Мо	ICP Assay	3134		130418
Si	ICP Assay	3150		130912
Sn	ICP Assay	3161a		140917

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.

3162a

Characterization of CRM/RM by Two or More Methods Certified Value, X _{CRM/RM} , where two or more methods of characterization are	Characterization of CRM/RM by One Method Certified Value, X _{CRM/RM} , where one method of characterization
used is the weighted mean of the results:	is used is the mean of individual results:
$X_{CRM/RM} = \Sigma(w_i) (X_i)$	X _{CRM/RM} = (X _a ) (u _{char a} )
X _i = mean of Assay Method i with standard uncertainty u _{char i}	X _a = mean of Assay Method A with
$w_i$ = the weighting factors for each method calculated using the inverse square of the variance: $w_i = (1/u_{chari})^2 / (\Sigma(1/(u_{chari})^2)$	u _{char} a = the standard uncertainty of characterization Method A
CRM/RM Expanded Uncertainty (±) = U _{CRM/RM} = k (u ² _{char} + u ² _{bb} + u ² _{lts} + u ² _{ts} ) ^{1/2}	CRM/RM Expanded Uncertainty (±) = U _{CRM/RM} = k (u ² char a + u ² bb + u ² lts + u ² ts) ¹
k = coverage factor = 2	k = coverage factor = 2
$\mathbf{u_{char}} = \left[\sum ((\mathbf{w_i})^2 (\mathbf{u_{char}})^2)\right]^{\frac{1}{2}}$ where $\mathbf{u_{char}}$ are the errors from each characterization method	u _{char a} = the errors from characterization
ubb = bottle to bottle homogeneity standard uncertainty	u _{bb} = bottle to bottle homogeneity standard uncertainty
u _{lts} = long term stability standard uncertainty (storage)	ults = long term stability standard uncertainty (storage)
u _{te} = transport stability standard uncertainty	ute = transport stability standard uncertainty

- 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

4.0

### 6.0 INTENDED USE

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

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

### 7.1 Storage and Handling Recommendations

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

- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.

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

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

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**

November 02, 2021

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

### 11.2 Lot Expiration Date

### - November 02, 2026

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

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

### 11.3 Period of Validity

- Sealed TCT Bag Open Date:

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

### 12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Michael Booth Director, Quality Control

Michael 2 Booth

### Certifying Officer:

Paul Gaines Chairman / Senior Technical Director

Paul R Line



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

Instructions for QATS Reference Material: ICP-AES ICS

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### (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.** 

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RM ICP-AES ICSA-1211 B-0710 SFAM.docx

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The Quality Assurance Technical Support (QATS) contract is operated by APTIM Federal Services, LLC.



**ICSA** 

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### Instructions for QATS Reference Material: ICP-AES ICS

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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.

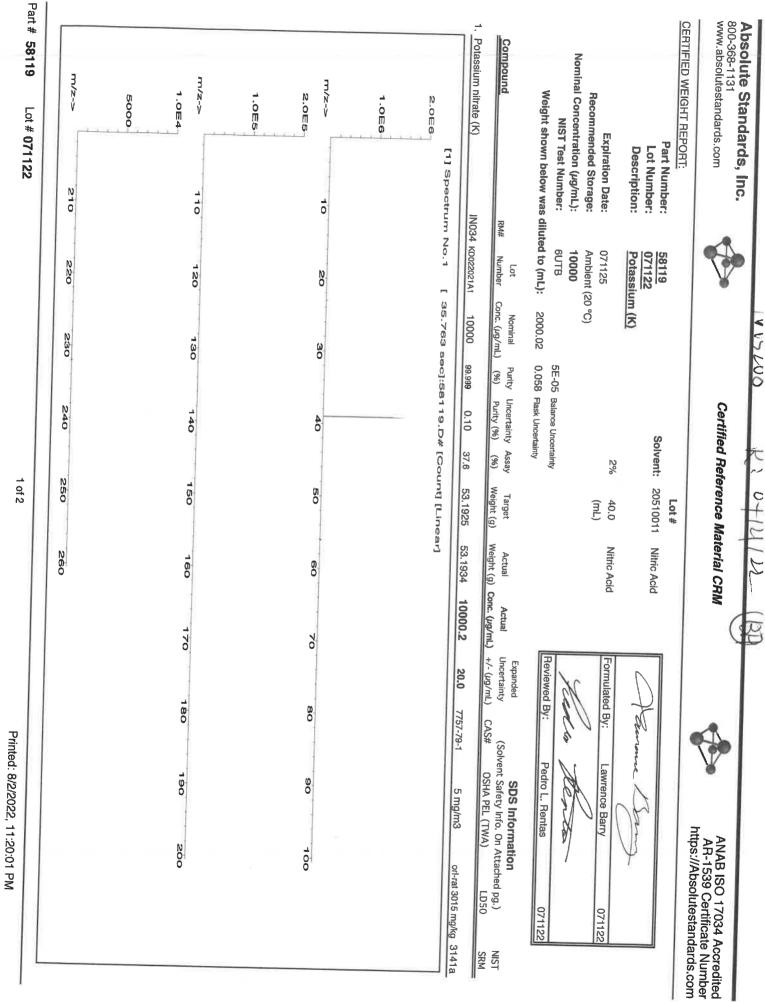
**ICSB-0710, Analytes, mixed with ICSA-1211, Interferents:** Pipet 10 mL of the ICSA solution and 10 mL of the ICSB solution into a 100 mL volumetric flask and dilute to volume with 2% v/v HNO₃. Analyze this ICSAB solution by ICP-AES.

### (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.

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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.



1 of 2

Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com	Certified Reference Material CRM	*	ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com
Instrumental Analysis by Indu	Mass Spec		
<0.02	Trace Metals V		
40.02     40.02       40.02     Ca	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	<0.2	W U V V V V O 0.02 Y D O 0.02 Y D O 0.02 Y D O 0.02 Y D O 0.02 Y D O 0.02
Physical Characterization:	(T)= Target analyte		
Homogeneity: No heterogeneity was ob	Homogeneity: No heterogeneity was observed in the preparation of this standard.	Ce	Certified by:
		( )	P. S.
	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 All standard containers are meticulously cleaned prior to use	ated. ed in	
* Standards are prepared gravimetrically using balances that ar * Standards are certifed (+/-) 0.5% of the stated value, unless * Standards should be stored with caps tight and under appu * All standards should be stored with caps tight and under appu # Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelin Measurement Result," NIST Technical Note 1297, U.S. Govern	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 Frances for Evaluating for Evaluating and Frances for Evaluating fo		
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QUALITY ASSURANCE TECHNICAL SUPPORT LABORATORY "An ISO 9001:2015 Certified Program" R : 以120 2 [

Instructions for QATS Reference Material: Inorganic ICV Solutions

### QATS LABORATORY INORGANIC REFERENCE MATERIAL INITIAL CALIBRATION VERIFICATION SOLUTIONS (ICV1, ICV5, AND ICV6)

**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.
  - **<u>CAUTION</u>**: Read instructions carefully before opening bottle(s) and proceeding with the analyses.

Contains Metals in Dilute Acidic or Cyanide in Basic Aqueous Solutions HAZARDOUS MATERIAL

> Safety Data Sheets Available Upon Request



### (A) SAMPLE DESCRIPTION

Enclosed is a set of one (1) or more Aqueous Inorganic Reference Materials containing various analyte concentrations. ICV1 and ICV5 are in a matrix of dilute nitric acid. ICV6 is in a matrix of dilute basic solution. For the reference material source in reporting ICVs use "USEPA". For the reference material lot number for the ICV1, ICV5, and ICV6 solutions use "ICV1-1014", "ICV5-0415", and "ICV6-0400", respectively.

### (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 Initial Calibration Verification Solutions (ICVs) are to be used to evaluate the accuracy of the initial calibrations of ICP, AA, and Cyanide colorimetric instruments, and are to be used with the CLP SOWs and revisions. The values for each element in the ICVs are listed below in  $\mu g/L$  (ppb) for the resulting solution(s) after the dilution of the concentrate(s) according to the following instructions. Use Class 'A' glassware to prepare the solution(s).

ICV1-1014 For ICP-AES analysis, use a 10-fold dilution by pipetting 10 mL of the ICV1 concentrate into a 100 mL volumetric flask and dilute to volume with 2% (v/v) nitric acid.

RMs ICV 1, 5, 6 SFAM.docx

Page 1 of 2

QATS Form 20-007F188R00, 04-19-2021



The Quality Assurance Technical Support (QATS) contract is operated by APTIM Federal Services, LLC.



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

AP11MInstructions for QATS Reference Material: Inorganic ICV SolutionsICV1-1014For ICP-MS analysis, use a 50-fold dilution by pipetting 2 mL of the ICV1 concentrate<br/>into a 100 mL volumetric flask and dilute to volume with 1% (v/v) nitric acid.ICV5-0415For the cold vapor analysis of mercury by AA, use a 100-fold dilution by pipetting<br/>1 mL of the ICV5 concentrate into a 100 mL volumetric flask and dilute to volume<br/>with 2% (v/v) nitric acid. The ICV5 concentrate is prepared in 0.05% (w/v) K2Cr2O7<br/>and 5% (v/v) nitric acid.ICV6-0400For the analysis of cyanide, use a 100-fold dilution by pipetting 1 mL of the ICV6<br/>concentrate into a 100 mL volumetric flask and dilute to volume with Type II water.<br/>Distill this solution along with the samples before analysis. The cyanide concentrate<br/>is prepared from K3Fe(CN)6, Type II water, and 0.1 % sodium hydroxide, and will<br/>decompose rapidly if exposed to light.

NOTE: USE TYPE II WATER AND HIGH-PURITY ACIDS FOR ALL DILUTIONS.

### (D) CERTIFIED CONCENTRATIONS OF QATS ICV1, ICV5, AND ICV6 SOLUTIONS

	ICV1-1014	
Element	Concentration (µg/L) (after 10-fold dilution)	Concentration (µg/L) (after 50-fold dilution)
AI	2500	500
Sb	1000	200
As	1000	200
Ba	520	100
Be	510	100
Cd	510	100
Ca	10000	2000
Cr	520	100
Co	520	100
Cu	510	100
Fe	10000	2000
Pb	1000	200
Mg	6000	1200
Mn	520	100
Ni	530	110
K	9900	2000
Se	1000	200
Ag	250	50
Na	10000	2000
TI	1000	210
V	500	100
Zn	1000	200

	ICV5-0415		ICV6-0400
Element	Concentration (µg/L) (after 100-fold dilution)	Analyte	Concentration (µg/L) (after 100-fold dilution)
Hg	4.0	CN [.]	99

Ex Recomme Nominal Concentry Weight sho 2.0E6 m/z-> 2.0E5 1.0E5 5.0E5 2.5E6	Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com CERTIFIED WEIGHT REPORT: Part Number: Lot Number:
Expiration Date:         072125         2%         40.0         Nitric Addi           nanded Storage:         Ambient (20 °C)         fml)         5E-05         Baaroe Uncertainy         fml)         fml)         ST Test Number:         fml)         SE-05         Baaroe Uncertainy         fml)         fml)         SE-05         Baaroe Uncertainy         SE-05         Baaroe Uncertainy         fml)         fml)         SE-05         Baaroe Uncertainy         SE-05         Baaroe Uncertainy         Actual         Number:         fml)         Winght (a)         Winght (b)         Wingh	Part Number: Lot Number: Description:
NIST Test Number:         6UTB         5E-D5         Bainone Uncertainty Nominal         Purity         Uncertainty         Actual           Barlum nitrate (Ba)         IN023         N0022         0.0058         Fast Uncertainty         Actual           1.0EE6         I11         Spectrum         No.1         [112.514         see]:65156.0.#         Country (N)         (N)         Weight (Q)           1.0EE6         I11         Spectrum         No.1         [12.514         see]:65156.0.#         Count [Linean]           2.0EE6         I10         20         30         40         sio         eo           1.0EE6         I         10         20         30         40         sio         eo           2.0EE5         10         20         30         40         sio         eo         sio         eo           2.0EE5         10         120         130         140         150         160         eo           soccea         1.0         120         130         140         150         160           soccea         1.0         1.20         1.30         1.40         150         160           soccea         1.5         1.5         1.50 <td< th=""><th>Expiration Date: Recommended Storage: Nominal Concentration (µg/mL):</th></td<>	Expiration Date: Recommended Storage: Nominal Concentration (µg/mL):
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	Part # 57056 Lot # 072122

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



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

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

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# Physical Characterization:

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

Certified by:

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- * 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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Material CI	Nitric Acid	Actual Weight (g) 100.0173		
Reference	20510011 20.0 (mL)	Target Weight (g) 100.0134		5
Certified Reference Material CRW	Solvent: Solvent: 2% 5E-05 Balance Uncertainty 0.058 Flask Uncertainty	Uncertainty Assay Purity (%) (%) 0.10 10.0	240 240 240 240 240 240 240 240 240 240	
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		Lot Nominal RM# Number Conc. (ug/mL) IN019 LIZ042018A1 10000	130 ²⁰ 1	
Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com	CERTIFIED WEIGHT REPORT: Part Number: 57103 Lot Number: 070622 Description: Lithium ( 070622 Recommended Storage: Ambient ( Nominal Concentration (µg/mL): 10000 NIST Test Number: 6UTB Weight shown below was diluted to (mL):	Compound R Lithium nitrate (Li) IN	1.0E6     [1] Spectrum No.1       5.0E5     10       m/2->     10       250     10       m/2->     10       10     20       m/2->     210       m/2->     210	

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

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

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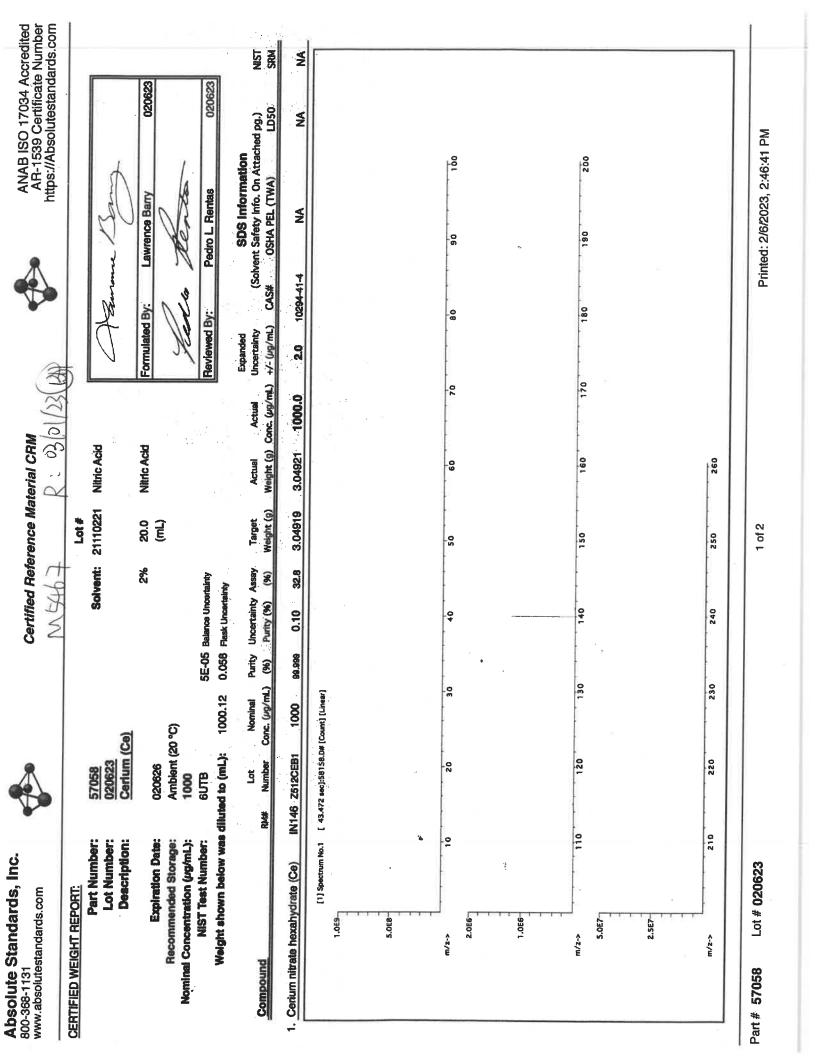
**Physical Characterization:** 

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

Lot # 070622 Part # 57103



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# 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 standard.

Certified by:

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

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

All standard containers are meticulously cleaned prior to use.

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

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

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ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com	031523	on ttached pg.) NIST LD50 SRM ont-rat >2000mo/kg 3109a	Ő	O O N
ARA	Ped X Gio	SDS Information (Solvent Safety Info. On Attached pg.) CSHA PEL (TWA) LD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C CD5C C	-0 0	190 200
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Certified Reference Material CRM	Lot # Solvent: 21110221 2% 60.0 (mL) Uncertainty sentainty	Uncertainty Assay Target Purity (%) (%) Weight (g) 0.10 38.9 75.1990	0.D# [Count] [Line	140 150 240 250
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Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com	CERTIFIED WEIGHT REPORT: Part Number: 58120 Lot Number: 031523 Description: 031526 Expiration Date: 031526 Recommended Storage: Ambient (2 Nominal Concentration (µg/mL): 10000 NIST Test Number: 6UTB Weight shown below was diluted to (mL):	Compound 1. Calcium carbonate (Ca)	2.0E4 1.0E4 3.0E4 5.0E4 2.5E4	T.OES 1.0ES 5.0E4 m/2-> 2 m/2-> 2 Part # 58120 Lot # 031523

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Certified Reference Material CRM



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

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**Physical Characterization:** 

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

Certified by:

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

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

* All standard containers are meticulously cleaned prior to use.

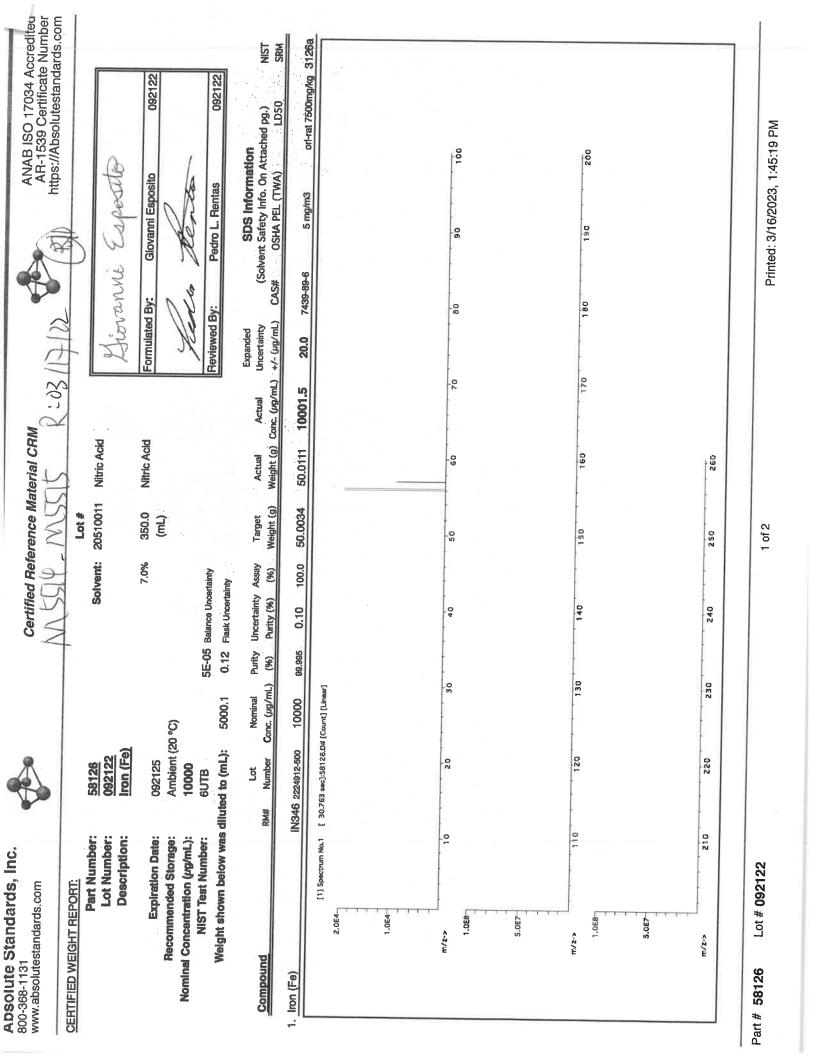
Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).

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

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

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

Part # 58120 Lot # 031523



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

Certified Reference Material CRM



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

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	<0.02	8	<0.10	Au	<0.02	£	<0.02	PN	<b>20.02</b>	M	<b>402</b>	3	40.02	f	<0.02	F	<0.02	77	<000×

**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).

Lot # 092122 Part # 58126



### MATERIAL CERTIFICATE OF COMPLIANCE

DATE: JUNE 12, 2023

CUSTOMER:PCI SCIENTIFIC SUPPLY, INCPURCHASE ORDER NO.6054931CATALOG NO.BOI5021-450LPRODUCT DESCRIPTION:BOILING STONES, TFE, 454GMSQUANTITY:10 EACH

SPECIFICATION (S): Made from Virgin PTFE Resin

LOT NO.

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.

W126678

Valu

Laura Valencia Quality Assurance Inspector

F:U:J:GF:PCISCI:COC-55118-BOI5021-061223

## CORCO CHEMICAL CORPORATION

Manufacturers of ACS Reagents and Semiconductor Grade Chemicals

### **CERTIFICATE OF ANALYSIS**

Date: 8/3/2022

M5631 M5632 M5633 M5634 Lot No 820803

Hydrogen Peroxide, ACS Reagent Grade

TEST	MAXIMUM LIMITS	RESULT
Appearance	Colorless and free from suspended matter or sediment	Pass
Assay	29-32%	31.4%
Color (APHA)	10	5
Residue after Evaporation	0.002%	.0001%
Titratable Acid	0.0006 meq/g	< .0006 meq/g
Chloride (Cl)	2 ppm	< 1 ppm
Nitrate (NO ₃ )	2 ppm	< 1 ppm
Phosphate	2 ppm	< 1 ppm
Sulfate (SO ₄ )	5 ppm	< .5 ppm
Ammonium (NH4)	5 ppm	< 1 ppm
Heavy Metals (as Pb)	1 ppm	< .1 ppm
lron (Fe)	0.5 ppm	< .1 ppm
Sodium Stannate	200 – 300 ppb	Pass

***Our Hydrogen Peroxide is considered un-stabilized because it is very slightly stabilized with Sodium Stannate, 500 ppb maximum, just for safety purposes.

Date of MFG: 8/2022 Retest date: 8/2024

Gína M. Rambo Office Manager

CORCO CHEMICAL CORPORATION. 299 CEDAR LANE. FAIRLESS HILLS, PA 19030. 215-295-5006. FAX 215-295-0781

m/z->	N.5 6	m/z-≯ 5.0E5	ភ. ០ ពេស	m/z-> 1.0≣6	5000	1.0트4	1. Chromium(III) nitrate nonahydrate (Cr)	Compound	Volume sho	Expiration Date: Recommended Storage: Nominal Concentration (Jug/mL):	Par De	CERTIFIED WEIGHT REPORT:	www.absolutestandards.com
N 10		110		<b>1</b>		[1] Spectrum No.1		Pa	Volume shown below was diluted to (mL):	Expiration Date: nended Storage: ntration (µg/mL):	Part Number: Lot Number: Description:	0	3
220		120		N. O		-	58124 071122	Part Lot Number Number	filuted to (mL):	060526 Ambient (20 °C) 1000	<u>58024</u> 060523 Chromium (Cr)		A
230		130		ů. O		31,393 80	0.1000	Dilution Factor	2000.02		1 (Cr)		MS
240		140				c]:57024.	200.0 0.084	Initial Uncertainty Vol. (mL) Pipette (mL)	0.058 Flask U				MS658
				ð.		31,393 sec]:57024.D# [Count] [Línear]	084 1000	Uncertainty Nominal Pipetta (mL) Conc. (µg/mL)	Flask Uncertainty		21110221 2.0%	Lot #	) A
N 50		<b>1</b> の の		S		t] [Linear]	10 10000.1	nał Initial g/mL) Conc. (µg/mL)		(mL)	221 Nitric Acid % 40.0	# Solvent:	
200		160		0		ş	0.1 <b>1000.0</b>	al Final rg/mL) Conc. (µg/mL)		Ľ	Acid .0 Nitric Acid	ent:	123
		170		70			0.0 2.2	Expanded al Uncertainty ig/mL) +/- (µg/mL)	Lineviewed by.	X	Acid Formulated By:		1
		180		8- 0-		1	7789-02-8	) CAS		a la	Horner		
		190		Ŷ				jolvent Os		ten	Lawrence Barry		Y
		20- 00-		100			0.5 mg(Cr)/m3 ort-	SDS Information nt Safety Info. On Attac OSHA PEL (TWA)		Ø	nce Barry		AH-15: https://Ab
		0		o			ort-rat 3250 mg/kg	ched pg.) LDS0	00000	00050	060523		AH-1539 Certificate Number https://Absolutestandards.com
							g 3112a	NIST		٥ <u> </u>	[ω]	1	te Numbe dards.com

Part # 58024 Lot # 060523

1 of 2

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Absolute Standards, Inc.       Certified Reference         800-368-1131       Image: Certified Reference         www.absolutestandards.com       Image: Certified Reference         Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):	andards.cor	s by Indu	ictive	y Coupled	Plasn	na Mass S	Spectr C	Certified Reference Material Ci	ICP-M	IS):	ateria	I CRM					¥	크	ANAB AR-11 ttps:///	ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com	034 Acc lificate N standar	lumbe ds.corr
the stype of the style						Trace N	Metals	s Verification	ation	হ	ICP-MS		/g/mL)									
AI <0.02		40,02	Dv	40.02	H	<0.02	E	40.02	- N	- -	20		A) 02	8	a)	-	-			3		
		40.02	Er Dy	<0.02	Ho	<ol> <li>40.02</li> <li>40.02</li> </ol>	달드	4)02 4)02	N N	A0.02	88	~ 7	40.02 0.02	<u>8</u> %	40.02 00.02	ਜ ਸ	<b>4 4</b>	c ¥		<0.02		
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		40.02	2 ଜ ା	40.02	323	4 4 A	N M ;	8 8 8	× 77 ·	A 40 12	រ ន រ	Sc Sm	40.02 2002	Ta s	4 4 A A	11 S 🔒						
								(T)=	(T)= Target analyte	anatyte												
Physical Characterization:	aracteriz	ation:															C	Certified by:	by:		a	
Homogeneity: No heterogeneity was observed in the preparation of this standard.	No heteroge	meity was o	observe	d in the preps	aration (	of this stand	lard.										1	14	1		ľ	
<ul> <li>* The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.</li> <li>* 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.</li> <li>* All standard containers are meticulously cleaned prior to use.</li> <li>* Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).</li> <li>* Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.</li> <li>* All standards should be stored with caps tight and under appropriate laboratory conditions.</li> <li>* 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).</li> </ul>	ad value is ds, 18.2 n ation of all are prepar are prepar are certife ds should ds should ent Result.	he conc megohm d Ill standarc are me ars are me are are are me ars are me ars are me ars are me ars are me ars are me are are are me are are are me are are are are are are are are are are are are are are are are are are are are are are are are are are are are are are are are are are are are	entrat leioniz ls. sticulou etrica .5% of .5% of .5	ed water, c ed water, c usly cleane ully using ba f the state f the state f the state and Kuyat, a Note 122	ted fro calibrat d prior alanced d value and un and un 97, U.S	red Class, ted Class, that are that are that are der appro Guideline Guideline	A glass A glass calibra priate s for E nent P	nd volume sware and ited with ites stated laborator, ivaluating vinting Off	the hi weight cond y cond fice, W	ighest p ighest p is trace itions. xpressir /ashingt	ments ourity able tr able the ton, D.	unless raw m raw m NIST 0 NIST 0. C. (19	materials are used in Materials are used in ST (see above). ertainty of NIST 1994).	se stat re usec vve). NIST	n .							

Part # 58024 Lot # 060523

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	DRT: Part Number Lot Number Description	*	58029 102523 Copper (C	211)			Lot # 24002546	Solvent: Nitric Acid	, , ,	1/20	in Electro	Ce_		
	xpiration Date		102526 Ambient (20 1000				2.0%	40.0 (mL)	Nitric Acid	Formulated B	y: 1 1/0 7	Benson Chan	10252	23
NIST	Test Number shown below		6UTB	2000.02	5E-05 0.058	Balance Uncert Flask Uncertain				Reviewed By Expanded		Pedro L. Rentas	10252	23
Compound		Part Number	Lot Number	Dilution Factor	Initial Vol. (mL)	Uncertainty Pipette (mL)	Nominal Conc. (µg/mL)	Initial Conc. (µg/mL)	Final Conc. (µg/mL)	Uncertainty +/- (µg/mL)	(Solv CAS#	vent Safety Info. On OSHA PEL (TWA)	Attached pg.) LD50	NIST SRM
Copper(II) nitrate trihydr	rate (Cu)	58129	100223	0.1000	200.0	0.084	1000	10000.1	1000.0	2.2	10031-43-3	1 mg/m3	ori-rat 794 mg/kg	3114
1.0E6	[1] Spect	trum N	0.1 [ :	33.422 s	ec]:58(	029.D# [0	Count] [Li	inear]						
5.0E5														
5.0E5 m/z-> 5.0E7		0	20	30	<b>5</b> 8 8	40	50	60	70	5	e`o	90	100	
m/z->	a	0	20	30	<b>3</b>	40	50	60	70	5	BO	90	100	
m/z-> 5.0E7		10	20	30		40	150	60			80		100	
m/z-> 5.0E7 2.5E7														
m/z-> 5.0E7 2.5E7 m/z->														





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

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

	Contraction of the local division of the loc	0.204					Trace M	etals	S Verifica	ition	by ICP-M	is (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	Tb	<0.02	l w	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	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
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	⊲0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	Т	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:

Bar ? Ma

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Absolute Standar 800-368-1131 www.absolutestandards.		4		793. T. 999		ertified R 5 ⁻ 6 ⁻ 4 5		Naterial CR				AF AF	AB ISO 17034 A 1-1539 Certificat c://Absolutestanc	e Number
CERTIFIED WEIGHT REPO	RT: Part Number: Lot Number: Description:		<u>58025</u> 102623 Manganes	se (Mn)			Lot # 24002546	Solvent: Nitric Acid			le la cara de la cara	Ce_		
	Expiration Date: ended Storage:		102626 Ambient (20 1000				2.0%	60.0 (mL)	Nitric Acid	Formulated E	dy: Lo Z	Benson Chan	102623	
	T Test Number: shown below w	<b>ras dilut</b> e Part	6UTB ed to (mL): Lot	3000.41 Dilution	5E-05 0.058	Balance Uncert Flask Uncertain Uncertainty		Initial	Final	Reviewed By Expanded Uncertainty		Pedro L. Rentas SDS Inform vent Safety Info. Or		NIST
Compound		Number	Number	Factor	Vol. (mL)	Pipette (mL)	Conc. (µg/mL)	Conc. (µg/mL)	Conc. (µg/mL)	+/- (µg/mL)	CAS#	OSHA PEL (TWA		SRM
1. Manganese(II) nitrate te	trahydrate (Mn)	58125	071123	0.1000	300.0	0.084	1000	10000.1	1000.0	2.1	20694-39-7	7 5 mg/m3	ort-rat >300mg/kg	3132
5.0E6 2.5E6	[1] Spectru	im No	.1 [3	4.243 66	c]:570	25.D# [C	ount] [Lir	near]						
m/z->	10		20	30		40	50	60	70	e e e e e e e e e e e e e e e e e e e	ΒO	90	100	
5.0E7														
m/z->	110		120	130		140	150	160	170	> 1	80	190	200	
1.0E8														
5.0E7														
m/z->	210		220	230		240	250	260						





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

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

-							Trace M	etals	Verifica	tion	by ICP-M	IS (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	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	П	<0.02	v	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	lr _.	<0.02	Mn	Т	Pd	<0.02	Rb	<0.02	Na	⊲0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T) = Target analyte

### **Physical Characterization:**

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

Certified by:

Ben P. M

* 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 balances that are calibrated with weights traceable to NIST (see above).

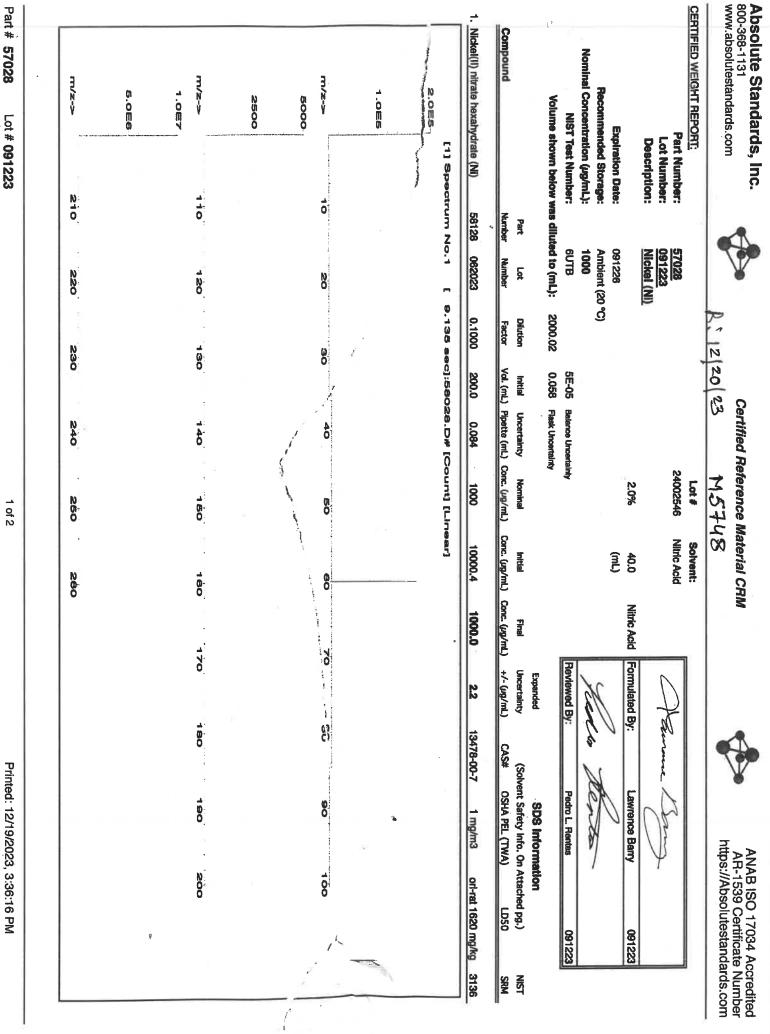
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m/z->		2.0E6	m/z->	0.0 П 14	A ) ]	1.0E5	m/z->	0, 0 11 12 12 12 12 12 12 12 12 12 12 12 12	1.005	1. Lead(II) nitrate (Pb)	Compound	Weight sho	NIST 1	Recommended Storage: Nominal Concentration (µg/mL):	Exc		CERTIFIED WEIGHT REPORT:	ADSOIUTE Standards, Inc. 800-368-1131 www.absolutestandards.com
21 0 220 0			110 120				10 20		[1] Spectrum No.1 [ 14	IN029 PBD122016A1	Lot M RM# Number Conc	s diluted to (mL):	NIST Test Number: 6UTB		Expiration Date: 100926	Lot Number: 100923 Description: Lead (Pb)		om
230			130 140				30 40		14.144 sec]:58082.D# [Count] [Linear]	1000 93.999 0.10 62.5	Nominal Purity Uncertainty Assay Conc. (µg/mL) (%) Purity (%) (%) V	3000.41 0.06 Flask Uncertainty	5E-05 Balance Uncertainty		2%			Certified Referenc R ÷ 12/20[を3
250 260			150 180 170				50 60 70		tj [Linear]	4.80071 4.80077 1000.0	Target Actual Actual Weight (g) Weight (g) Conc. (µg/mL)			(111)	60.0 Nitric Acid	46 NITHC ACID		Certified Reference Material CRM ションンクロン MSチムチ
			0 180 190				80 00			2.0 10099-74-8 0.05 mg/m3	Expanded SDS Informa Uncertainty (Solvent Safety Info. On +/- (µg/mL) CAS# OSHA PEL (TWA)		Reviewed By: Pedro L. Rentas	Kerten Hen	Formulated By: Lawrence Barry	Admine By		*
			2000				100			m3 intrvns-rat 83 mg/kg 3128	SDS Information (Solvent Safety Info. On Attached pg.) NIST # OSHA PEL (TWA) LD50 SRM		tas 100923	Ø	ny 100923	\¥		ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com

	DEFF12: 10205000					2 of 2							00923	Lot # 100923		Part # 57082
		are used in ove). NIST	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 standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above). Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated. All Standards should be stored with caps tight and under appropriate laboratory conditions. Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).	ity raw the to Ni the Unc. (	The certified value is the concentration calculated from gravimetric and volumetric measurements Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity 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 t 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 Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D	netric d the d. g and I g ffice, V	and volur assware ar vrated with wise state te laborate Printing C Printing C	s A gli re califi ropria nes foi nment	or to use. S. Gover S. Gover	ated f calibr valance t and c t, C.E. 297, U	tion calcu ed water usly clear ally using f the stat and Kuya al Note 1; al Note 1;	sentrat deioniz deioniz deioniz deioniz echnic c, B.N. h S.% o c, B.N. h i. S.% o c, B.N.h h i. S.% o c, B.N.h h h i. S.% o c, B.N.h h h h h h h h h h h h h h h h h h h	The certified value is the concentration calculated from gravimetric and volume Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the preparation of all standards. All standard containers are meticulously cleaned prior to use. Standards are prepared gravimetrically using balances that are calibrated with w Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated. All Standards should be stored with caps tight and under appropriate laboratory Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating a Measurement Result," NIST Technical Note 1297, U.S. Government Printing Offi	value i ion of a contain e prepa e certif keferen t Result t Result	certified preparat landard a dards ar dards ar tandards tandards suremen suremen	* The * Purifi * Stan * Stan Mea
P. S.	for the second s							ındard.	1 of this sta	paratio	xd in the pre	observe	Homogeneity: No heterogeneity was observed in the preparation of this standard.	o heterog	encity: N	Homog
Certified by:	S				Vte	get anal	(T)= Target analyte						zation:	racteri	Physical Characterization:	Physi
W         40.02           V         40.02           Yb         40.02           Yb         40.02           Zn         40.02           Zn         40.02           Zn         40.02           Zn         40.02	Ть         Алл           11         Алл	e 40.2 g 40.02 a 40.02 a 40.02 a 40.02 a 40.02 a 40.02 a 40.02	40.02         Se           40.02         Si           40.02         Ag           40.02         Ag           40.02         Na           40.02         Na           40.02         Si	Rb Sm Sm	40.02 40.02 40.02 40.02 40.02	P P R P	40.02 40.02 40.02 40.02 40.02	Hg Mg	- 40.02 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 7	요 한 않 날 막 発 표	40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.02 40.020	~ Co Co Co 또 편 것	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	5	40.02 40.02 40.02 40.02 40.02	Al Sb Ba Bi Bi
			(µg/mL)		by ICP-MS		Verification	Metals	Trace M							
					MS):	(ICP-	trometry	s Spe	sma Mas	ed Pla	ly Couple	uctive	Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):	Analy	umental	Instru
ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com				CRM	Certified Reference Material C	erenc	tified Re	Ce					s, Inc.	ards.co	Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com	w.absolut



Part # 57028 Lot # 091223 2 of 2		<ul> <li>* 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.</li> <li>* All standard containers are meticulously cleaned prior to use.</li> <li>* Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).</li> <li>* Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.</li> <li>* All Standards should be stored with caps tight and under appropriate laboratory conditions.</li> <li>* 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).</li> </ul>	Homogeneity: No heterogeneity was observed in the preparation of this standard.	(T) = Target aria/vie	AI         A02         Cd         A02         Dy         A02         H         A02         N         T         Pr         A02         S         A02         C4         A02         E         A02         H         A02         Li         A02         N         T         Pr         A02         S         A02         C4         A02         E         A02         C4         A02         E         A02         H         A02         Li         A02         N         T         Pr         A02         S         A02         G         A02         H         A02         Li         A02         N         A02         R         A02         S         A02         S         A02         I         A02         N         A02         N <t< th=""><th>Instrumental Analysis by Inductively Coupled Plasma Mass Spectroscopy (ICP-MS): Trace Metals Verification by ICP-MS (µg/mL)</th><th>www.absolutestandards.com</th></t<>	Instrumental Analysis by Inductively Coupled Plasma Mass Spectroscopy (ICP-MS): Trace Metals Verification by ICP-MS (µg/mL)	www.absolutestandards.com
			et .	2	Tb         40.02           Te         40.02           TI         40.02           Th         40.02           Sn         40.02           Ti         40.02		
	5 		P. S.	Certified by:	W         -0.02           U         -0.02           V         -0.02           Yb         -0.02           Yb         -0.02           Yb         -0.02           Zn         -0.02           Zr         -0.02           Zr         -0.02		AR-1539 Certificate Number https://Absolutestandards.com

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Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com	M	M5768 [M5769 (64) Certified Reference Material	ce Material CRM	42/s	ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com
CERTIFIED WEIGHT REPORT: Part Number: Lot Number: Description:	<u>58112</u> 091823 Magneslum (Mg)	Solvent: 24	Lot # 24002546 Nitric Acid	Advenue	Or -
Expiration Date:       091826         Recommended Storage:       Ambient (         Nominal Concentration (µg/mL):       10000         NIST Test Number:       6UTB         Weight shown below was diluted to (mL):	20 °C)		(mL) (mL) $(BF)$ $R - \frac{1}{3}/2\phi$	Formulated By: Heviewed By:	Lawrence Barry 091823 Pedro L. Rentas 091823
Compound	Lot Nominal I RM# Number Conc. (µg/mL)	Purity Uncertainty Assay T (%) Purity (%) (%) We	Target Actual Actual Weight (g) Weight (g) Conc. (vg/mL)	Expanded Uncertainty +/- (µg/mL) CAS	SDS Information (Solvent Safety Info. On Attached pg.) NIST # OSHA PEL (TWA) LDSO SRM
1. Magnesium nitrate hexahydrate (Mg) IN030 маюзаал	10000	99.999 0.10 8.51 23		20.0 13446-1	ng/kg 3
[1] Spectrum No.1 1.0E6		[ 19.923 sec]:58112.D# [Count] [Linear]	[Linear]		
а. О Ща С					
m/z-> 10	20	8	ø	70 80	90 100
1000 -		·		4	
₩/z->	120 130	140	150 160	170 180 1	190
1.0 []					
Part # 58112 Lot # 091823		-	1 of 2	Drintod	Drintod- 10/00/0000 0.56-15 DM

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		Inc



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

Γ							Trace Mo	etals	Verifica	tion	by ICP-N	IS (µ	g/mL)						
									1100 100 100 100					100	The second second				
A	<0.02	8	<0.02	Dy	<0.02	Hf	<0.02	5	<0.02	Ni	<0.02	Ŗ	<0.02	Se	40.2	qI.	<0.02	W	<0.02
SP	<0.02	G	<0.2	E.	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	ŝ	<0.02	Te	<0.02	d	<0.02
As	<0.2	ĉ	<0.02	E	<0.02	In	<0.02	Mg	]	SO	<0.02	Rh	<0.02	Ag	<0.02	H	<0.02	V	40.02
Ba	<0.02	S	<0.02	ନୁ	<0.02	F	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Ъ	<0.02	Υb	<0.02
Ве	<0.01	Ŷ	<0.02	Ga	<0.02	Fe	40.2	Hg	<0.2	٩	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	ĸ	<0.02
B	<0.02	S	<0.02	Ģ	<0.02	La	<0.02	Mo	<0.02	Ŗ	<0.02	Sm	<0.02	ŝ	<0.02	Sn	<0.02	6	<0.02
<b>5</b>	40.02	ç	<b>40.02</b>	Au	<0.02	P	<0.02	Nd	<0.02	ĸ	<0.2	S.	<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:

* 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).

Part # 58112 Lot # 091823



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							Trace M	letals	Verification	Ition	by ICP-MS		(ng/mL)							_
		and the second se	A CONTRACTOR OF A CONTRACTOR					All and the	TANK ALL STATE	The second s	ALL DESCRIPTION OF THE OWNER OF T	Nonese and			and the second second second				A COLUMN TO A C	10
A	<0.02	3	<0.02	à	<0.02	Hf	<0.02	ГI	<0.02	N	<0.02	Ł	<0.02	Se	<0.2	Trb	<0.02	M	<0.02	-
Sb	<0.02	J	40.2	固	<0.02	Ho	≤0.02	2	<0.02	£	<0.02	Re	<0.02	S	<0.02	Pe L	<b>40.02</b>	D	<0.02	_
As	<02	ඊ	<0.02	Eu	40.02	ч	40.02	Mg	10.0>	ő	<0.02	Rh	<0.02	Ag	<0.02	F	≤0.02	>	<0.02	-
Ba	<0.02	ű	<0.02	3	40.02	Ц	<0.02	Mn	<0.02	P	≤0.02	£	<0.02	Ra	<b>40</b> 12	đ	<0.02	\$	<0.02	-
Be	T	Ċ	0.02	G	<0.02	e.	<02	Hg	<02	۵.	<0.02	Ru	≤0.02	2	<0.02	μ	<0.02	7	<0.02	-
Ä	<0.02	රී	<0.0≥	පී	<0.02	r.	<0.02	Mo	<0.02	đ,	<b>40.02</b>	Sm	≤0.02	s	<0.02	Sn	<0.02	Za	<0.02	-
æ	<0.02	ð	<0.02	Au	<0.02	£	40.02	PN	<0.02	М	<0.2	ŝ	<0.02	Ta	<0.02	F	<0.02	2	40.02	_
									(T) = Tarr	get analy	yte									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 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 ( $\frac{1}{4}$ ) 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 # 57050 Lot #	m/z->	N.01 M.4	m/2->-	1.0E5	177/2-> 2.0E5	N G M G	8. 0 11 15	1. Ammonium hexatluorostannate(IV) (Sn)	Compound	Expiration Date: Recommended Storage: Nominal Concentration (µg/mL): NIST Test Number: Weight shown below w	<u>CERTIFIED WEIGHT REPORT</u> Part N Lot N Desc	Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com
Lot # 071123	210		110 120		0 No		[1] Spectrum No.1	(W) (Sn) INO10 SND042023A1	Lot RM# Number	Expiration Date: 071126 Pecommended Storage: Ambient (20 °C) Concentration (µg/mL): 1000 NIST Test Number: 6UTB Weight shown below was diluted to (mL):	<u>PORT:</u> Part Number: <u>57050</u> Lot Number: <u>071123</u> Description: <u>Tin (Sn)</u>	s.com
	230		130		e e		[ 15.034 sec]:	1000	Nominal Conc. (µg/mL)	0 °C) 499.93	2	V
	20		140		ð		15.034 sec]:58150.D# [Count] [Linear]	99.999 0.10 44.2	Purity Uncertainty Assay (%) Purity (%) (%)	5E-05 Balance Uncertainty 0.058 Flask Uncertainty	Solvents:	Certifi
	N30 260		150 160		8		unt) [Linear]	1.13107	r Target Actual Weight (g) Weight (g)	(mL)	Lot # 21110221 22D0562008	Certified Reference Material
			170		70			1001.6	Actual Conc. (µg/mL)	ric acid	ric acid	CRM
			180		80			16919-	Expanded Uncertainty (Solv +/- (µg/mL) CAS#	Formulated By:		PPGP M
			190 200		90 100			7 mg/m3	<b>SDS Information</b> (Solvent Safety Info. On Attached pg.) )# OSHA PEL (TWA) LD50	Benson Chan		R
			0		ŏ			ω	on tached pg.) NIST LD50 SRM	071123 - 071123		ANAB ISC AR-1539 ( https://Abso
												ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com

Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com	•	Cei	Certified Reference Material CRM	ial CRM		ANAB ISO 17034 Accredited
www.absolutestandards.com	5				<b>V</b>	AR-1539 Certificate Number https://Absolutestandards.com
Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):	ductively Coupled	Plasma Mass Spec	trometry (ICP-MS):			
		Trace Metals	Is Verification by ICP-MS	P-MS (µg/mL)		
AI <0.02 Cd <0.02	Dy <0.02	4003				
A)2 C C		2 2 2 2 2 2 2	40.02 Ni		Se <0.2 Tb Si <0.02 Te	40.02 W 40.02
2 2 2 2 2 2 2 2			<0.01 Os <0.02 Pd	Rb Rb		\$ < c
	Ge 40.02	Fe 40.2 Hg	40.2 P 40.02 Pt	Ru Sm		_
			(T) = Target	4	ZITAS	<0.02 Zr <0.02
Physical Characterization:						Certified by:
Homogeneity: No heterogeneity was observed in the preparation of this standard.	observed in the prepa	ration of this standard.				//
ŝ	9					mr P All
		9 4			20	
					÷	
<ul> <li>* The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.</li> <li>* 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.</li> <li>* All standard containers are meticulously cleaned prior to use.</li> <li>* Standards are prepared gravimetrically using balances that are politoriated with using balances.</li> </ul>	centration calculat deionized water, ca ds. eticulously cleaned	d from gravimetric librated Class A gla prior to use.	and volumetric measurer ssware and the highest p	nents unless otherwise stated. writy raw materials are used in	ie stated. 'e used in	

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 # 57050 Lot # 071123

2 of 2

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redited Jumber ds.com	NIST SRM	3113		
ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com	Formulated By: Lawrence Barry 091923 Formulated By: Lawrence Barry 091923 Reviewed By: Pedro L. Rentas 091923 Expanded SDS Information Uncertainty (Solvent Safety Info. On Attached pg.) N +/- (ug/mL) CAS# 0SHA PEL (TWA) LD50 S	ng/kg	180 B0 190 200 200 200	Printed: 2/8/2024, 5:01:14 PM
AM I'U ( fru (	Nitric Acid	1000.0		
Certified Reference Material CRM $02109124$	Solvent: Nttric Acid 40.0 (mL) httal bittal Conc. (ug/mL)	10000.0		
artified Réference l 0 Z   0 9 1 2 4	Lot # C 24002546 2.0% 2.0% Nominat Nominat Conc. (rg/mL)	1000	34.243 eec]:58027.D# [Count] [Linear] 30 40 50 130 140 150 230 240 250	1 of 2
Certified F		0.084	240 240 240	
Å	5E-05 0.058 on Initial or Vol. (mL)	00 200.0	3 eec]:55 230 30 23 130	
	57027 091923 Cobait (Co) 091926 Ambient (20 °C) 1000 6UTB 6UTB 6UTB d to (mL): 2000.02 Lot Dilution Lot Dilution	23 0.1000		
	57027 091923 Cobalt ( Cobalt ( Ambient Ambient 1000 6UTB ss diluted to (mL Part Lot	58127 050923		
Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com	CERTIFIED WEIGHT REPORT: Part Number: Lot Number: Description: Cobait (C Cobait (C 091926 Recommended Storage: Nominal Concentration (µg/mL): Nominal Concentration (µg/mL): Nominal Concentration (µg/mL): COTB NIST Test Number: COTB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB CODB	1. Cobatt(II) nitrate hexahydrate (Co) 58		<pre>Part # 57027 Lot # 091923</pre>

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Certified Reference Material CRM



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

L	200	10	2 Contraction	4	2000		400			-		4							
	20.05	3	20.05	5	20.02	Ħ	40.02	3	<0.02	ż	40.02	£	40.02	8	40.2	f	₫.02	M	<b>40.02</b>
_	40.02	లి	<b>4</b> 02	山	€0.02	Ho	40.02	5	<0.02	Ż	<u>40.02</u>	Re	<0.02	3	≤0.02	Te	€0.02	D	<0.02
_	402	ථ	€0.05	圕	40.02	Ч	<b>40.02</b>	Mg	10 ⁰ ⊳	ő	≤0.02	붭	<0.02	Ag	<b>40.02</b>	F	<0.02	Ż	<0.02
_	40.02	చి	≤0.02	ઝ	<b>600</b>	ы	<0.02	Mn	<0.02	P	40,02	ßb	<0.02	Na	40.2	đ	<0.02	Ŗ	<0.02
_	10.05	ບັ	≤0.02	g	<b>20.0</b> 2	ङ	402	Hg	40.2	۵.	€0.02	Ru	<0.02	<u>ې</u>	≪0.02	Ta	≤0.02	Y	€0.02
_	<0.02	ථ	£-	ö	40.02	Ľ	<b>0</b> 02	Mo	<u>60.02</u>	æ,	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	2	<b>6</b> .02
_	40.02	ට්	<0.02	Au	<b>40.02</b>	£	40.02	PN	40.02	м	<b>4</b> 02	8	<b>40.02</b>	£	40.02	Ë	40.02	72	2002

Physical Characterization:

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

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

the preparation of all standards.

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

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

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

Certified by:

Printed: 2/8/2024, 5:01:04 PM	1 of 2	Part # 57033 Lot # 111323
ő	230 240 250 26	m/z-> 210 220 2
		G O O
160 170 180 190 200	130 140 150 1	m/≥-> 110 120 1
		N m 4
80 70 80 100	90 40 50	5.0E4
		- 1 .0 m B
	34.433 sec]:57033.D# [Count] [Linear]	[1] Spectrum No.1 [ 34.433 2.0E5
1000.0 2.0 7440-38-2 0.5 mg/m3 orl-rat	400.0 0.084 1000	1. Arsenic (As) 58133 020522 0.1000
Expanded <b>SDS Information</b> Final Uncertainty (Solvent Safety Info. On Attached pg.) <u>nL) Conc. (ug/mL) +/- (ug/mL) CAS</u> # OSHA PEL (TWA) LD50	11	Part Lot Dilution Compound Number Number Factor
Reviewed By: Pedro L. Rentas 111323	0.06 Flask Uncertainty	Volume shown below was diluted to (mL): 4000.0
Hedre Fenter		
Id Acid Formulated By: Lawrence Barry 111992	24002546 Nitric Acid 2.0% 80.0	Description: <u>Arsenic (As)</u>
п (	Lot <b>#</b> Solvent:	
ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com	Certified Reference Material CRM	Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com

< 00 **N** 



**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):

Cd         A002         Dy         A002         Hf         A002         Li         A002           Ca         A02         Er         A02         Hf         A002         Li         A002           Ca         A02         Er         A02         Hf         A002         Li         A002           Ca         A02         Er         A02         Hf         A002         Li         A002           Ca         A02         Gd         A002         In         A002         Mg         A001           Ca         A02         Ge         A002         Fe         A02         Mg         A002           Ca         A02         Ge         A022         Ha         A022         Mg         A022           Ca         A02         Ge         A02         He         A02         Mg         A02           Ca         A02         Ge         A02         He         A02         Mg         A02           Ca         A02         He         A02         Mg         A02         A02         Mg         A02           Ca         A02         Au         A02         He         A02         Mg         A02	4002       Cl       4002       Cl       4002       Cl       4002       Cl       4002       Fr       4002         T       Ca       402       Er       4002       Hr       4002       Li       4002       Fr       4002         T       Ca       402       Er       4002       Hr       4002       Li       4002       Fr       4002         4002       Ca       402       Er       4002       Hr       4002       Li       4002       Re       4002         4002       Ca       4002       Fr       4002       Mg       4001       05       4002       Re       4002         4002       Ca       4002       Fr       4002       Mg       4002       Rh       4002         4002       Ca       4002       Fr       402       Hg       402       P       4002       Rh       4002         4002       Ca       4002       Fr       4002       Rh       4002       Sh       4002         4002       Au       4002       Fr       4002       Rh       4002       Sh       4002         4002       Au       4002       Fr       4002	ADM2       CA       ADM2       Dy       ADM2       Hf       ADM2       Li       ADM2       Ni       ADM2       Pr         T       Ca       AD2       Er       ADM2       Hf       ADM2       Li       ADM2       Ni       ADM2       Pr       ADM2         T       Ca       AD2       Er       ADM2       Hf       ADM2       Li       ADM2       Ni       ADM2       Pr       ADM2         ADM2       Ca       ADM2       Er       ADM2       Hf       ADM2       Li       ADM2       Ni       ADM2       Pr       ADM2         ADM2       Ca       ADM2       Er       ADM2       Ir       ADM2       Ni       ADM2       Pr       ADM2         ADM2       Ca       ADM2       Fr       ADM2       Mr       ADM2       Rit       ADM2         ADM2       Ca       ADM2       Fr       ADM2       Mr       ADM2       Rit       ADM2         ADM2       Ca       ADM2       Fr       ADM2       Rit       ADM2       Rit       ADM2         ADM2       Ca       ADM2       Rit       ADM2       Rit       ADM2       Rit       ADM2	ADV2         CA         ADV2         Dy         ADV2         Hf         ADV2         LI         ADV2         N         ADV2         Pr         ADV2         Pr         ADV2         Fr         ADV2         Hf         ADV2         LI         ADV2         Nh         ADV2         Pr         ADV2         Nh         ADV2         Nh         ADV2         Pr         ADV2         Nh         ADV2 <th>-</th> <th>1</th> <th>Ľ.,</th> <th>20.05</th> <th>18</th> <th>70.02</th> <th>ę</th> <th>No.4</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>l</th> <th></th> <th></th> <th></th> <th></th>	-	1	Ľ.,	20.05	18	70.02	ę	No.4							l				
4002       Cd       4002       Dy       4002       Hf       4002       Li       4002       Nh         4002       Ca       402       Er       4002       Hf       4002       Li       4002       Nh       4002       Re         T       Ce       4002       Er       4002       Hf       4002       Li       4002       Re         4001       Cr       4002       Eu       4002       In       4002       Ma       4002       Re         4001       Cr       4002       Gd       4002       Ir       4002       Mg       4001       0%       4002       Re         4001       Cr       4002       Gd       4002       Fe       4002       Mg       4002       Rh         4002       Co       4002       Fe       4002       Hg       4002       P       4002       Rh         4002       Ge*       4002       Fe       4002       Hg       4002       P       4002       Rh         4002       Ge*       4002       La       4002       Mo       4002       Rh         4002       Ge*       4002       La       4002       Rh<	4002         Cd         4002         Dy         4002         Hr         4002         Li         4002         Pr           4002         Ca         402         Dy         4002         Hr         4002         Ni         4002         Pr           4002         Ca         402         Er         4002         Hr         4002         Li         4002         Pr           4002         Ca         4002         Er         4002         Hr         4002         Ni         4002         Pr         4002           4001         Ca         4002         Er         4002         Ir         4002         Ni         4002         Re         4002           4001         Ca         4002         Fr         4002         Mr         4002         Re         4002           4002         Ca         4002         Fr         402         Mg         402         Re         4002           4002         Ca         4002         Fr         402         Mg         4002         Ru         4002           4002         Ca         4002         Fr         402         Mg         4002         Sm         4002         Sm         400	AD02         CA         AD02         Dy         AD02         Hf         AD02         Li         AD02         N         AD02         Fr         AD02 <td>Ann         Ann         Ann<td>3</td><td>3</td><td></td><td></td><td>4</td><td>3</td><td>s</td><td>3</td><td>~</td><td>40.02</td><td>N</td><td><b>40.02</b></td><td>3</td><td>40.02</td><td>Au</td><td>&lt;0.02</td><td>ß</td><td>20.02</td><td>æ</td></td>	Ann         Ann <td>3</td> <td>3</td> <td></td> <td></td> <td>4</td> <td>3</td> <td>s</td> <td>3</td> <td>~</td> <td>40.02</td> <td>N</td> <td><b>40.02</b></td> <td>3</td> <td>40.02</td> <td>Au</td> <td>&lt;0.02</td> <td>ß</td> <td>20.02</td> <td>æ</td>	3	3			4	3	s	3	~	40.02	N	<b>40.02</b>	3	40.02	Au	<0.02	ß	20.02	æ
A002       Cd       A002       Dy       A002       Hf       A002       Li       A002       Ni       A002       Pr         A002       Ca       A02       Er       A002       Ho       A002       Li       A002       Ni       A002       Pr         A002       Ca       A02       Er       A002       Ho       A002       Li       A002       Ni       A002       Re         A001       Cr       A002       Gd       A002       Ir       A002       Mg       A001       Os       A002       Rh         A001       Cr       A002       Gd       A002       Fe       A002       Mg       A002       Rh         A002       Fe       A002       Fe       A022       Hg       A022       Rh         A003       Gr       Gr       A002       Fe       A02       Hg       A002       Rh	ADD2         Cd         ADD2         Dy         ADD2         Hf         ADD2         Li         ADD2         N         ADD2         Pr         ADD2           T         C4         AD2         Er         AD2         Hf         AD2         Li         AD2         Pr         AD2         Pr         AD2         AD2         Nh         AD2         Pr         AD2         AD2         Nh         AD2	Aug       A	If ace metals verification by ICP-MS ( $\mu$ g/mL) $40n^2$ $6n^2$ $6n^2$ $6n^2$ $11^2$ $40n^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $11^2$ $1$	<0.02 Sn	40.02			-	40.02	Sin	<0.02	P	A0.02	Mo	20.02	5	20.02	ģ	20.02	2	10.04	1 <u>5</u>
4002         Cd         4002         Dy         4002         Hf         4002         Li         4002         Ni         4002         Pr           4002         Ca         402         Er         4002         Hf         4002         Li         4002         Pr           4002         Ca         4002         Er         4002         Ho         4002         Li         4002         Pr           4001         Cr         4002         Gd         4002         Ir         4002         Mg         4001         Os         4002         Rt           4001         Cr         4002         Gd         4002         Ir         4002         Mg         4001         Os         4002         Rt           4001         Cr         4002         Gd         4002         Ir         4002         Mg         4002         Rt           4001         Cr         4002         Gd         4002         Ir         4002         Rt         4002         Rt           4001         Cr         4002         Rt         4002         Rt         4002         Rt         4002         Rt	ADD2         Cd         ADD2         Dy         ADD2         Hf         ADD2         Li         ADD2         Ni         ADD2         Pr         ADD2           T         Cc         ADD2         Er         ADD2         Hf         ADD2         Li         ADD2         Ni         ADD2         Pr         ADD2         Re         ADD2	Aug         Aug <td>$\begin{array}{c c c c c c c c c c c c c c c c c c c$</td> <td>&lt;0.02 Tm</td> <td>40,02</td> <td></td> <td>_</td> <td>s</td> <td>40.02</td> <td>Ru</td> <td>&lt;0.02</td> <td>•</td> <td><b>CU</b>.2</td> <td>8u</td> <td>202</td> <td>. 4</td> <td>0.02</td> <td>) ¢</td> <td>3</td> <td>3 1</td> <td>3</td> <td>R !</td>	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	<0.02 Tm	40,02		_	s	40.02	Ru	<0.02	•	<b>CU</b> .2	8u	202	. 4	0.02	) ¢	3	3 1	3	R !
4002         Cd         4002         Dy         4002         Hf         4002         Li         4002         Ni         4002         Pr           4002         Ca         402         Er         4002         Hf         4002         Li         4002         Ni         4002         Pr           4002         Ca         4002         Er         4002         Ho         4002         Li         4002         Ni         4002         Re           4002         Ca         4002         Eu         4002         In         4002         Mg         4001         Os         4002         Re           4002         Ca         4002         Eu         4002         In         4002         Mg         4001         Os         4002         Re	ADD2         Cd         ADD2         Dy         ADD2         Hf         ADD2         Li         ADD2         Ni         ADD2         Pr         ADD2           T         Ce         ADD2         Er         ADD2         Hf         ADD2         Li         ADD2         Ni         ADD2         Pr         ADD2           T         Ce         ADD2         Er         ADD2         Hn         ADD2         Li         ADD2         Ni         ADD2         Re         ADD2           ADD2         Cs         ADD2         En         ADD2         In         ADD2         Ni         ADD2         Re         ADD2           ADD2         Cs         ADD2         En         ADD2         In         ADD2         Ni         ADD2         Re         ADD2           ADD2         Cs         ADD2         En         ADD2         In         ADD2         Ni         ADD2         Re         ADD2           ADD2         Cs         ADD2         Fr         ADD2         Ni         ADD2         Rh         ADD2	AD02       Cd       AD02       Dy       AD02       Hf       AD02       Li       AD02       Ni       AD02       Pr       AD02         T       Ca       AD2       Et       AD02       Hf       AD02       Li       AD02       Ni       AD02       Pr       AD02         T       Ca       AD02       Et       AD02       Hf       AD02       Li       AD02       Ni       AD02       Re       AD02         AD02       Ca       AD02       Et       AD02       In       AD02       Ni       AD02       Re       AD02         AD02       Ca       AD02       Et       AD02       In       AD02       Ni       AD02       Re       AD02         AD02       Ca       AD02       In       AD02       Mg       AD01       Os       AD02       Rh       AD02	If ace metals verification by ICP-MS (µg/mL)         4002       C4       4002       Dy       4002       Hf       4002       L       4002       Ni       4002       Fr       4002         T       Ca       402       Er       4002       Hf       4002       Li       4002       Ni       4002       Fr       4002         T       Ca       402       Er       4002       Hi       4002       Li       4002       Re       4002         4002       Ca       4002       En       4002       In       4002       Re       4002       Re       4002         4002       Ca       4002       Fr       4002       In       4002       Re       4002       Re       4002         4002       Ca       4002       Fr       4002       Re       4002       Re       4002         4002       Ca       4002       Fr       4002       Re       4002       Re       4002	1 40.2 Th 40.02	40.2	-	-	Z	<0.02	Ko	20.02	2	20.02		10.02	<b>1</b>	3	ۍ ا	3	ç	A001	e e
40.02         Cd         40.02         Dy         40.02         Hf         40.02         Li         40.02         Ni         40.02         Pr           40.02         Ca         40.2         Er         40.02         Hf         40.02         Li         40.02         Ni         40.02         Pr           T         Ce         40.02         Eu         40.02         In         40.02         Me         40.01         On         Pr           T         Ce         40.02         Eu         40.02         In         40.02         Me         40.01         On         Pr	40.02         Cd         40.02         Dy         40.02         Hf         40.02         Li         40.02         Ni         40.02         Pr         40.02           T         Ce         40.02         Er         40.02         Hf         40.02         Li         40.02         Ni         40.02         Pr         40.02           T         Ce         40.02         Er         40.02         In         40.02         Ni         40.02         Re         40.02	40.02         Cd         40.02         Dy         40.02         Hr         40.02         Li         40.02         Ni         40.02         Pr         40.02           T         Ca         40.2         Er         40.02         Hr         40.02         Li         40.02         Ni         40.02         Pr         40.02           T         Ca         40.2         Er         40.02         In         40.02         Ni         40.02         Re         40.02           T         Ca         40.02         En         40.02         In         40.02         Ni         40.02         Re         40.02	I race metals verification by ICP-MS (µg/mL)         4002       C4       4002       Dy       4002       Hf       4002       Li       4002       Ni       4002       Pr       4002         T       Ce       4002       Ei       4002       Hf       4002       Li       4002       Ni       4002       Pr       4002         T       Ce       4002       Ei       4002       In       4002       Ni       4002       Re       4002         T       Ce       4002       Ei       4002       In       4002       Ni       4002       Re       4002	11 70'05	20.02	_	-	2	20.02	2 2	0.00	2 9	3		3	4	4102	£	40.02	S	A0.02	Ba
Cla         Cla <td>40.02         Cd         40.02         Dy         40.02         Hf         40.02         Li         40.02         Ni         40.02         Pr         40.02           40.02         Ca         40.2         Er         40.02         Hf         40.02         Li         40.02         Ni         40.02         Pr         40.02</td> <td>40.02         Cd         40.02         Dy         40.02         Hf         40.02         Li         40.02         Ni         40.02         Pr         40.02           40.02         Ca         40.2         Er         40.02         Hf         40.02         Li         40.02         Ni         40.02         Pr         40.02           40.02         Ca         40.2         Er         40.02         H6         40.02         Li         40.02         Ni         40.02         Re         40.02&lt;</td> <td>40.02         Cd         40.02         Dy         40.02         Hf         40.02         Li         40.02         Ni         40.02         Fr         40.02         Re         40</td> <td></td> <td></td> <td></td> <td>5</td> <td>_</td> <td>3</td> <td>T T</td> <td>4000</td> <td>ç Ç</td> <td>4001</td> <td>Me</td> <td>40.02</td> <td>2</td> <td>40.02</td> <td>臣</td> <td><b>40.02</b></td> <td>ନ</td> <td>T</td> <td>As</td>	40.02         Cd         40.02         Dy         40.02         Hf         40.02         Li         40.02         Ni         40.02         Pr         40.02           40.02         Ca         40.2         Er         40.02         Hf         40.02         Li         40.02         Ni         40.02         Pr         40.02	40.02         Cd         40.02         Dy         40.02         Hf         40.02         Li         40.02         Ni         40.02         Pr         40.02           40.02         Ca         40.2         Er         40.02         Hf         40.02         Li         40.02         Ni         40.02         Pr         40.02           40.02         Ca         40.2         Er         40.02         H6         40.02         Li         40.02         Ni         40.02         Re         40.02<	40.02         Cd         40.02         Dy         40.02         Hf         40.02         Li         40.02         Ni         40.02         Fr         40.02         Re         40				5	_	3	T T	4000	ç Ç	4001	Me	40.02	2	40.02	臣	<b>40.02</b>	ନ	T	As
40.02 Cd 40.02 Dy 40.02 Hr 40.02 Li 40.02 Ni 40.02 Pr	40.02 Cd 40.02 Dy 40.02 Hr 40.02 Li 40.02 Ni 40.02 Pr 40.02		ADD     CA     ADD     Dy     ADD     Hf     ADD     Li     ADD     Ni     ADD     Pr     ADD	40.02 Te	40.02	_	23		40.02	R	<b>4</b> .02	<b>Ş</b>	40.02	E	<0.02	Ho	20.02	5	202	ç	AU/UZ	2
			I and the and	A0.2 Tb	40.2		8		20.02	7	20.02	INI	70.02	¢.	10.02	; ;	0.00	1	\$	5	3	<u>a</u>
			I race Metals Verification by ICP-MS (µg/mL)	l	l	l				,	-		2000		COLP	JH	20.02	Þ	40.02	2	40.02	A

(T) = Target analyte

Physical Characterization:

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

Low P. S.

**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 # 57033 Lot # 111323

	N G O			
		230	220	m/z-≻ 210
				א. מ מ
				5.0E8
170 180 190 200	150 180	180 140	120 10	m/z-> 110
				N 07 00
				5.0E0
70 80 90 100	50	40	N. O SO	m/z->
				1.0臣4
	nt) [Línear]	12.275 sec]:58105.D# [Count] [Linear]		[1] Spectrum No.1 2.0E4
1000.4 2.0 10043-35-3 2 mg/m3 orl-rat 2660 mg/kg	11.55772 11.56201	99.9999 0.10 17.3 11	IN018 BV082016A1 1000	1. Boric acid (B) IN018
Expanded SDS Information Actual Uncertainty (Solvent Safety Info. On Attached pg.) Conc. (µg/mL) +/- (µg/mL) CAS# OSHA PEL (TWA) LD50	Target Actual Weight (g) Weight (g) (	ssay 96)	Nominal Conc. (µg/mL)	Compound RM#
		O DSR Elset I tangetsinte	1000 4R	Weight shown halow was diluted to (mi ):
Reviewed By: Pedro L. Rentas 071123	(IIII)	5E-05 Batance Uncertainty	t (20 °C)	Recommended Storage: Nominal Concentration (µg/mL): NIST Test Number:
Formulated By: Benson Chan	40.0 Ammonium hydroxide	2.0%	Boron (B)	Description:
hydroxide	Lot # Solvent: MKBQ8597V Ammonium hydroxide	Solvent: MK	57005 071123	CERTIFIED WEIGHT REPORT: Part Number: Lot Number:
-	Certified Reference Material CRM	Certified Refere	D A	Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com
ANAB ISO 17 AR-1539 Cei https://Absolut	ince Material CRI 아이지 지원 나 Lot # BO8597V Ammonium 40.0 Ammonium (mL)	Certified Refere		* Standards, Inc. 31 testandards.com <u>WEIGHT REPORT:</u> Part Number: Lot Number: Description: Expiration Date: Recommended Storage: al Concentration (ug/mL):



**Certified Reference Material CRM** 



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

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

							Trace Me	tals	Verifica	Ition	by ICP-	Ś	(µg/mL)						
\$ <u>8</u> 2	40.02	0 2 2 2 2 2 2	40.02	E J	<0.02	Ho	4.02 0.02	臣미	40.02 002	N N	40.02 20.02	R 7	A A 8 8	s %	A () 2	1	8 8 8	¥ ¥	40.02
	_	2 8	3 2 2	2 8	202	- 5	40.02	Mg	<0.01	õ	<0.02	Rh	<0.02	Ag	<0.02	3	40.02	< (	40.02
		<b>ဂ</b>	<b>A</b> 0.02	ត្ន ព	A) (2)	<b>स</b> ह	A) 3		20.02	2 2	<0.02	R	40.02	Na	40.2	T	<0,02	5	40.02
_	_	8	<0.02	ନ୍ମ	<0.02	5	3		3 4	2 -	20.02	, Ki	40.02	ş	<0.02	Tm	<0.02	¥	<0.02
		6	<0.02	Au	40.02	3	A 22	N	98	7 7	2002	8 H		i w	40.02	18	<0.02	2	<0.02
												3	2010	14	20.02	11	20.02	5	40.02

(T) = Target analyte

**Physical Characterization:** 

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

In P. Str

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).

Part #: 57005 Lot # 071123

R I D Z M (PL)     M 57 L 5     M       Humber:     ETTIE     Selvent:     Z110221     M 57 L 5     M       Sectorizion:     Phaseborous (P)     2%     40.0     M 16 Add     Phaseborous (P)       Sectorizion:     Phaseborous (P)     2%     40.0     M 16 Add     Phaseborous (P)     2%     40.0     M 16 Add       Sectorizion:     Phaseborous (P)     2%     40.0     M 16 Add     Phaseborous (P)     Phaseborous (P)     Phaseborous (P)     2%     40.0     M 16 Add       Sectorizion:     Nomai     Phaseborous (P)     2%     40.0     M 16 Add     Phaseborous (P)     Phase	m/z->	2500	m/z->	500	m/z->	₽.5 ₩4	5.0E4	1. Ammonium dihydrogen phosphate (P)	Compound	Expiration Date: Recommended Storage: Nominal Concentration (µg/mL): NIST Test Number: Weight shown below wa	CERTIFIED WEIGHT REPORT: Par Lo De	www.absolutestandards.com
R I C Z M (2 M)         M S R IS           Inter Internation         Solvent:         21110221         Nitric Acid         Formulated By:         Lawrence Ba           20 C)         2%         40.0         Nitric Acid         Formulated By:	210		110		0		[1] Spectrum		_	Expiration Date: Recommended Storage: I Concentration (µg/mL): NIST Test Number: Weight shown below was d	DRT: Part Number: Lot Number: Description:	om
R I C 2 / Q / 2 //         M 5 //         M 6 //         M 5 //	220		120		N O				Lot Number	041726 Ambient (20 <b>10000</b> 6UTB 6UTB	<u>57115</u> 041723 Phosphore	5
MSR 15     Image: MSR 15     Image: MSR 15     Image: MSR 15     Image: MSR 16       Iric Acid     Formulated By:     Formulated By:     Image: MSR 16       Actual     Actual     Lippanded     SDS Informulated By:     Pedro L. Renta       Actual     Actual     Uncertainty     (Solvent Safety Info.     SDS Informulated By:     Pedro L. Renta       2.7239     10000.0     20.0     7722-76-1     5 mg/m3       2.7239     10000.0     20.0     7722-76-1     5 mg/m3       2.7239     10000.0     150     150     150	230		130		۵		2.074 sec]:58			00.02	uus (P)	R
thic Acid Find Acid Formulated By: Lawrence Barn Reviewed By: Pedro L. Renta Lippanded Actual Actual Uncertainty (Solvent Safety Info. eight (g) Conc. (ug/mL) CAS# OSHA PEL (T) 2.7299 10000.0 20.0 7722-76-1 5 mg/m3 2.7299 10000.0 20.0 7722-76-1 5 mg/m3 2.7299 10000.0 1100 eio	240		140		<b>6</b>		1115.D# [Cou		Uncertainty Assay Purity (%) (%)	2% Balance Uncertainty Flask Uncertainty	Solvent:	22/29/12
To so so	250		150		U, O		ınt] [Linear]	1 1				4 1
ht Formulated By: Lawrence Barn Feviawed By: Pedro L. Renta: Expanded SDS Infor Uncertainty (Solvent Safety Info. 	260							2.7289 10000	actual Actual Actual Actual	tric Acid	tric Acid	15815
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<b>Abs</b>	Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com	Stand standard	<b>ards,</b> Is.com	Inc.	~				Ce	tified Re	feren	Certified Reference Material CRM	ial CR	M					https AR	ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com	4 Accredited ate Number undards.com
н	nstrum	ental A	nalysis	by Ind	uctive	ly Coupl	ed Pla	Instrumental Analysis by Inductively Coupled Plasma Mass Spectroscopy (ICP-MS);	s Spec	troscopy	(ICP-	-MS):									
_								Trace Metals	etals	Verifica	Ition	Verification by ICP-MS	1.00	(µg/mL)							
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* *	The cer Purified the nre	The certified value is the concen Purified acids, 18.2 megohm dei the preparation of all standards	lue is t 8.2 m	the conc egohm c	xentrat deioniz	ion calcul ed water,	ated f	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 etandarde	metric s A gla	and volu ssware a	metric nd the	measurei highest p	nents ; )urity n	unless oth aw mater	nerwise ials are	e stated. 9 used in					
* * * * *	All stan Standar Standar All Stan Uncerta Measun	dard co ds are p dards sl ldards sl linty Ref ement R	ntainer prepare certifed erence lesult, "	s are me d gravin l (+/-) 0 l (+/-) 0 e stored : Taylou NIST Te	eticulo netrica ).5% o d with r, B.N. echnic;	usly clear illy using i f the stat caps tigh and Kuya al Note 1;	hed pri balanc ied val t and i t, C.E. 297, U	<ul> <li>* All standard containers are meticulously cleaned prior to use.</li> <li>* Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).</li> <li>* Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated.</li> <li>* All Standards should be stored with caps tight and under appropriate laboratory conditions.</li> <li>* 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).</li> </ul>	e calib other ropriat nes for nment	rated wit wise stat e laborat Evaluatir Printing (	h weig ed. ory co Office,	hts trace nditions. Expressin Washingt	able to og the l	to NIST (see above). e Uncertainty of NIST D.C. (1994).	e abov ty of N	e). IIST					
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Part #			# DA 1	733						U.	2	5					2				
Part #	57115		Lot # 041723	723							2 of 2	f2					Print	Printed: 2/8/2024, 5:01:22 PM	24, 5:0	1:22 PM	

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m/z->	2.5E8	5. 0 8 8	m/z->	5.027	1.0E8	m/z->	2.5E5	5.0E5	Ammonium sulfate (S)	Compound	NIST Test Number: 6UTB Weight shown below was diluted to (mL):	Expiration Date: Recommended Storage: Nominal Concentration (µg/mL):	Lot Number: Description:	800-368-1131 www.absolutestandards.com
012			110			10		[1] Spectrum No.1	IN117	RM#	umber: low was dilute	n Date: lorage: Jg/mL):	Description:	
NNO			120			No.		-	IN117 SLBR7225V	Lot Number C	GUTB d to (mL):	122926 Ambient (20 °C) 1000	<u>57016</u> <u>122923</u> Sulfur (S)	
N 30-			130		8	30		33.603 80	1000	Nominal F Conc. (µg/mL)	4000.0 5	ĉ		<i>P</i> O
N 44 0			140			40		33.603 sec]:57016.D# [Count] [Linear]	99.9 0.10 24	Purity Uncertainty Assay (%) Purity (%) (%)	5E-05 Balance Uncertainty 0.06 Flask Uncertainty		Solvent:	Certified Re
NBO			18			50		Count] [Lin	24.3 16.4979	lssay Target (%) Weight (g)	ţy		Lot # nt: 122923	fere 12
200			180			8		9 gr]	16.4980	Actual Weight (g)			ASTM Type 1 Water	aterial CRN M &
			170			8			1000.0	Actual ( Conc. (µg/mL)	5			rm 167816-
			180			80			2.0 77	Expanded Uncertainty +/- (µg/mL)	Reviewed By:	X	Formulated By:	
									7783-20-2	(Solvent CAS# 0	Ped	\$	and the second sec	
			190			80			NA	SDS Information It Safety Info. On Attac OSHA PEL (TWA)	Pedro L. Rentas		Benson Chan	http
			2000			100			orl-rat 4250mg/kg 3181	SDS Information (Solvent Safety Info. On Attached pg.) NIST # OSHA PEL (TWA) LD50 SRM	122923	7	100001	AR-1539 Certificate Number https://Absolutestandards.com

Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).	<ul> <li>* All standard containers are meticulously cleaned prior to use.</li> <li>* All standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).</li> <li>* Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated.</li> <li>* All standards should be stored with caps tight and under appropriate laboratory conditions.</li> <li>* All standards should be stored with caps tight and under appropriate laboratory conditions.</li> <li>* Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST</li> </ul>	* 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 menarstion of all standards		Homogeneity: No heterogeneity was observed in the preparation of this standard.	Physical Characterization:	(T) = Target analyte	AI         4002         Cd         4002         Py         4002         HI         4002         Li         4002         Ni         4002         Pr         4002         Th         4002         Th         4002         Th         4002         Th         4002         Th         4002         Th         4002         Ni         4002         Ni         4002         Th         4002         Th         4002         Ni         4002         Ni	Trace Metals Verification by ICP-MS (µg/mL)	Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):	Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com
æ			5 -	- All	Certified by:		4002         W         40.02           40.02         U         40.02           40.02         V         40.02           40.02         V         40.02           40.02         Yb         40.02           40.02         Ya         40.02           40.02         Za         40.02			ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com

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20.0 7763-20-2 NA orf-rat 4250mg/kg 3181	10000.1	82,4682	82.4675	0.10 24.3	99,9	10000	IN117 SLBR7225V	IN1	1. Ammonium sulfate (S)
Expanded SDS Information Uncertainty (Solvent Safety Info. On Attached pg.) NIST +/- (ug/mL) CAS# OSHA PEL (TWA) LDSO SRM	(g) Conc. (µg/mL)	Actual Weight (g)	Target Weight (g)	Uncertainty Assay Purity (%) (%)	Purity (%)	Nominal Conc. (µg/mL)	Lot. Number	RM#	Compound
i By: Ped	[F			Balance Uncertainty Flask Uncertainty	0.058	1999.48	led to (mL):	Weight shown below was diluted to (mL):	Weight show
da Terra Barry	1 1					20 °C)	071126 Ambient (20 °C) <b>10000</b>	Expiration Date: nended Storage: htration (µg/mL):	Expiration Date: Recommended Storage: Nominal Concentration (µg/mL):
around Bring	Type 1 Water	ASTM Ty	Lot# 071123	Solvent:		E)	57116 071123 Sulfur (S)	<u>PORT:</u> Part Number: Lot Number: Description:	CERTIFIED WEIGHT REPORT: Part N Lot N Desc
ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com	CRM		ference M	Certified Reference Material	R a			om	Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com
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Acsolute Standards, Inc. 800-368-1131 www.absolutestandards.com			Certified Reference Material CRM	ence Material (	CRM			•	ANAB AR-15 https://A	ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com
Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):	uctively Couple	d Plasma Mass S	Spectrometry (I	CP-MS):						
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ruysical Cnaracterization:				- market				Q	Certified by:	
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<ul> <li>The certified value is the concentration calculated from gravimetric and volumetric measurements</li> <li>Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity in the preparation of all standards.</li> <li>All standard containers are maticulated class A glassware and the highest purity in the preparation of all standards.</li> </ul>	Intration calcula Bionized water, ( S.	ted from gravime calibrated Class A	tric and volumet glassware and t	ric measuremen he highest purit	ts unless otherwise stated. Y raw materials are used in	wise sta are use	ited. in			
* 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.	etrically using b 5% of the state	alances that are c d value, unless ot	alibrated with we herwise stated.	eights traceable	to NIST (see a	bove).				
* Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.	with caps tight B.N. and Kuyat, chnical Note 12	and under approp , C.E., "Guidelines 97, U.S. Governme	riate laboratory ( for Evaluating ar ent Printing Offic	conditions. nd Expressing the, Washington,	ne Uncertainty of NIST D.C. (1994).	of NIST				
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$\begin{array}{c c c c c c c c c c c c c c c c c c c $	m/z>	ζι Ο Μ Ο	m/z-> 1.0E6	₩/z-> 2.0E6	5000 2500	Compound 1. Ammonium hexafluorosilicate (Si)	Expiration Date: Recommended Storage: Nominal Concentration (µg/mL): NIST Test Number: Weight shown below wa	<u>CERTIFIED WEIGHT REPORT:</u> Part Nu Lot Nu Descri	Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com
Certified Reference Material CRM       A: 12: p 4: 2.4     Ph/SI R       Solvent:     24002546       2%     40.0       2%     40.0       2%     40.0       2%     40.0       2%     40.0       2%     40.0       2%     40.0       2%     40.0       2%     40.0       2%     40.0       2%     40.0       2%     40.0       2%     40.0       2%     40.0       2%     40.0       2%     40.0       2%     40.0       2%     1140       1140     12.865       111     12.865       111     12.865       111     12.865       111     12.865       111     12.865       111     12.865       111     12.865       111     12.865       111     12.865       111     12.865       111     12.9       111     12.9       111     12.9       111     13.865       111     14.0       111     14.0       111     14.0       111     11.9 <th></th> <th></th> <th></th> <th></th> <th></th> <th>Lot RM# Number IN009 SID082022A1</th> <th>s dilute</th> <th>mber: mber: ption:</th> <th>, Inc.</th>						Lot RM# Number IN009 SID082022A1	s dilute	mber: mber: ption:	, Inc.
Instant     Image: Constraint of the con	≥40		140	<b>4</b>	1.393 sec]:58014.D# [Count]	Purity         Uncertainty         Assay           (%)         Purity (%)         (%)           99.999         0.10         14.4	2% 5E-05 Balance Uncertainty 99.48 0.058 Flask Uncertainty		Certified Reference
v: Aleah O'Brady V: Aleah O'Brady CAS# OSHA PEL (TM 919-19-0 2.5 mg/m: 919-19-0 150	N		160	0- 	Linear]	Actual Actual Weight (g) Conc. (Jy/mL) 13.8855 <b>1000.0</b>	Nitric Acid	Nitric A	182
			(*)			(Solvent S CAS# () 18919-19-0	Ped Ped	ha	ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com

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**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.

Son P. Shr

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

* 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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Part # 57014 Lot # 122023



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**Certified Reference Material CRM** 



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

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.

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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).

Part # 58030 Lot # 111623

Image:	TT/Z->	2500	5000	m/z->	500	 1000	N.00 M.4	5.0E4	1. Ammonium dihydrogen phosphate (P) IN008 PvœzoisAi	Compound	Weight shown below was diluted to (mL):	NIST Test Number:	Recommended Storage: Nominal Concentration (ug/mL):	Expiration Date:	Lot Number: Description:	CERTIFIED WEIGHT REPORT: Part Number:	www.absolutestandards.com
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ric Acid Fic Acid Formulated By: Formulated	240			140		40			89.899 0.10 27.5 7.275	Purity Uncertainty Assay (%) Purity (%) (%)	0.058 Flask Uncertainty	5E-05 Balance Uncertainty					00
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2 01 2	<ul> <li>* The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.</li> <li>* Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standard.</li> <li>* All standard containers are meticulously cleaned prior to use.</li> <li>* Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).</li> <li>* Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).</li> <li>* Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.</li> <li>* Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.</li> <li>* All Standards broud by stoud with cases tight and under appropriate laboratory conditions.</li> <li>* All Standards are prepared with cases tight and under appropriate laboratory conditions.</li> <li>* Mucertainty 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).</li> </ul>	this standard.		40/02         Li         T         Nh         40/02         Hr         40/02         And           40/02         Li         An	-MS (µg/mL)	Mass Spectrometry (ICP-MS):	Certified Reference Material CRM
Printed: 6/24/2024, 11:20:08 PM	Ъ.	Sur P. S.	Certified by:	Site         Gall         Tite         Gall         U         Gall         Site         Gall         Tite         Gall         Site         Gall         Si			ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com

Page 1 of 4

ក⁰⁸ = ក្រុងអាស់ ដែល ភ្លេង ភ្ល

Z = 1000BL =  $\sup_{x \in \mathcal{A}} (\pi_x) = O_{CRM/RM} = k \left( u^2_{Char} + u^2_{T}_{bb} + u^2_{T}_{bb} + u^2_{T}_{bb} + u^2_{C}_{bb} \right)^{1/2}$  $\mathsf{M}^{i} = (1/\mathsf{n}^{\mathsf{clust}\,i})^{\Sigma} \setminus (\Sigma(1/(\mathsf{n}^{\mathsf{clust}\,i})_{\Sigma})$ 

nieneity standard uncertain ucherts mort arone enti = a fanta lienegomori etitod,ot etitod = dd^u adria = nost grind = dd^u erita  $\label{eq:spinor} \min \left\{ x \right\} = U_{CRM/RM} = k \left\{ u^2_{char} * u^2_{bb} + u^2_{bb} + u^2_{bb} + u^2_{bb} \right\}^{4}$ 

$$\begin{split} \chi_{CRM,FRM} = & (\chi_{o}) \; (u_{char, o}) \\ \chi_{a} = mean of Assay Method A with ut and a charter of the standard uncertainty of uncertainty of the standard uncertainty$$

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

Certified Value, X_{CRMRM}, where two or more methods of characterization are used is the weighted mean of the results: Characterization of CRM/RM by One Method Characterization of CRM/RM by Two or More Methods

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent to following equations are used in the calculate/K=2.

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

ICP Assay NIST SRM 3162a Lot Number: 130925 1002 ± 4 hg/mL

F# bodteM vssA

g = Jojoej

un pepuedra w

(1x) (1w) = X(wi) (xi)

:noiternotnl ysseA

1.012 g/mL (measured at 20 ± 4 °C) Density: 1002 ± 5 µg/mL sulsV beitified

 $\chi_q = mean of Assay Method I with standard uncertainty updat 1$ w₁ = the weighting factors for each method calculated using the the transmission of the standard s

**CERTIFIED VALUES AND UNCERTAINTIES** 3.0

Starting Material Purity: 99.9975% Starting Material Lot#: 2094 Starting Material: In Metal unineti T 1 000 hg/mL ea: :(s)ətylanA \ əulsV :xinteM

tr. HF 2% (v/v) HNO3 27991717-2T Lot Number: **LITED** Catalog Number: Product Code:

Single Analyte Custom Grade Solution

PRODUCT DESCRIPTION 0.S

Number QSR-1034).

the Competence of Reference Material Producers" and ISO/IEC 17025, "Ceneral Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Vantures is also an ISO 9001 registered manufacturer (QSR Certificate Inorganic Manuel 2014) INORGANIC VENTURES is accredited to ISO 17034, "General Requirements for



ACCREDITATION / REGISTRATION 0.r

300 Technology Drive Christiansburg, VA 24073 USA Christiansburg, VA 24073

R:2/22/24

info@inorganicventures.com E: 240-282-3015 E: 240-282-3030

Refine your results. Redefine your industry. Certificate of Analysis 6657 'SLEST

### 4.0 TRACEABILITY TO NIST

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

## 4.1 Thermometer Calibration

laboratory. - 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

### 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)

.my €.0 a2 M 0732£0.0 > ⊨N O 832000.0 > ⊔∃ M 8€2000.0 > ⊵A M ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to CRMRMs 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 up of the method for each element of the property effection of the method for the met

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			9	0:000536	>	٩٨	Μ	0.004900	>	эS	0	¢77000.0		oM	Μ	892000.0	>	ΞL	Μ
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			8	0.000268	>	Π	Μ	0.000268	>	ЧЫ	Μ	0.027225	>	П	0	297000.0		CL	M
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M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

- For the calibration of analytical instruments and validation of analytical methods as appropriate. 9.0 INTENDED USE

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

Page 2 of 4

### Page 3 of 4

- Chemical Testing - Accredited / A2LA Certificate Number 883.01 "serveter of the second sec

- QSR Certificate Number QSR-1034

nottertizigeA metevs inemegeneM villsuD 100e OSI 1.01

# **WOITATNEMUDOD GRADNATS YTILAUD**

### 0.01

Homogeneity data indicate that the end user should take a minimum server of 0.2 m L or 2.0 m L or 2 - This solution was more according to the superior superior of the form as the solution of the homogeneous. المستحدم المرابعة الم .viienegeneity.

Please refer to the Safety Data Sheet for information regarding this CRMRM. HOMOGENEITY 0'6

### NOITAMAORNI SUOGAASAH 0.8

۲۹۸۱۵۵۲۹۵۵) ۱۹۸۱۶۵۶ ۲۲۵۶ (۱۹۹۵ ۲۲۵۶۶ ۲۲۵۶ ۱۹۵۱ ۱۹۵٫ ۲۶٬۵۲۱ ۱۹۵٫ ۲۶٬۵۲۱	.sselo n r r r	0.0054 / 0.00052 µg/mL 0.0054 / 0.00038 µg/mL 0.0053 / 0.00034 µg/mL 10 not be prepared or stored ir 10N	CP-OES 323.452 nm (CP-OES 334.941 nm (CP-OES 334.941 nm (CP-OES 336.121 nm (CP-OES 336.121 nm (CP-OES 336.121 nm (CP-OES 336.121 nm (CP-OES 336.121 nm (CP-OES 336.121 nm) (CP-OES 34.121 nm) (CP-OES 34.121 nm) (CP-OES 34.121 nm) (CP-OES 34.121 nm)
SET Interferences (underlined indicates severe) 32S160, 32S14N,	Orde A/N	14 pt	ICP-MS 48 amu

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

1:1:1 H2O / HF / H2SO4 or fuse ash with pyrosultate it oxide is as plastic pigment and likely in prookite Notentity: Oxde - low temperature history and sortanty - ineer (sortant in 122) in source heads Notentity: Oxde - low temperature history (-800EC) brookite (fuse in Pto with KS2207); Ores (f TI Containing Samples (Preparation and Solution) - Metal (Soluble in H2O / HF caution -powder reacts violentino: Ovide , Iour Inergene , or entile (Discoluted by Inergene) and Ferdinal Market (Soluble In 1997).

HINGS / LOPE corporations of an LOPE contained, while all solutions as the TI(F)6-2 chemically stable for years in HNOS / Lope container. 1-10,000 ppm single element solutions as the TI(F)6-2 chemically stable for years in TI Containing American and Solutions. 1-Metal (Solution in 2000) the solution and Solutions are the TI(F)6-2 chemically stable for years in 1.000 ppm single element solutions. 1-Metal (Solution in 2000) the solution and Solutions are the TI(F)6-2 chemically stable for years in 1.000 ppm single element solutions. 1-Metal (Solution in 2000) the solution and Solutions are the Solution and Solutions. 1-Metal (Solution in 2000) the solution are the solution and solutions. with a fendency to hydrolyze forming the hydrafied oxide in all dilute acids except HF. **Stability -** 2-100 ppb levels stable (Alone or mixed with all other metals) as the Ti(F)6-2 for months in 1% HNO3 / LDPE container. 1-10.000 point and element solutions as the Ti(F)6-2 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 thansition elements unless they are fluorinated). Stable with more inorganic anions with a tendency to hydrolyze forming the hydrafed oxide in all dilute acids except HF. Chemical Compatibility - Soluble in concentrated HCI, HF, H3PO4 H2SO4 and HVO3. Avoid neutral to basic S-8(T)T 6 4+ 78.74 - noiluite in Solution (Chemical Form in Solution - 47.74 6 T(F)6-5-- For more information, visit www.inorganicventures.com/TCT Afomic Weinher Valence: Coordination Winnher: Chemical Equa

reported density. Do not pipette from the container. Do not return 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° ± 4° C to minimize volumetric dilution error when using the renorted density. To not other from the container. To not return removed alternots to container.

Page some more served to the served to the served to the organization of the concentration(s). It is be the responsibility of the user to account for this effect. When the bottle is weighed both before and after being the responsibility of the user to account for this effect. When the bottle is weighed both before and after being the rescaled to the test to account for this effect. When the bottle is weighed both before and after being the rescaled to the test to account for this effect. When the bottle is weighed both before and after being the rescaled to the test to account for this effect. When the bottle is the active the bottle is the rescaled to the test to account for the test to account to the test to account the test to account to test to account to account to the test to test to acc - While stored in the sealed TCT bag, transpiration of this CRAWRM is negligible. After opening the sealed TCT had transmission of the CDMMAN will occur recutification increase in the source concentration of the is

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

Page 4 of 4

Certifying Officer:

Chairman / Senior Technical Director

NOS Paulo 182

Paul Gaines

-

Thomas Kozikowski Manager, Quality Control

Certificate Approved By:

0.2r

NAMES AND SIGNATURES OF CERTIFYING OFFICERS

- 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.

- Sealed TCT Bag Open Date:

11.3 Period of Validity stability studies conducted on property stored and handled CR/WRMs. 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 CRMMM can be supported by long term

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

- June 17, 2027

11.2 Lot Expiration Date

The cartification 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 if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

June 17, 2022

11.1 Certification Issue Date

CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY 0.11

norganic Ventures, 300 Technicky Drive, Christianeburg, Ve. 24073, USA; Telephone: 800,669,678; 540,585,3030, Fax: 540,562,5015; Innegan

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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

ADSOIUTE STANDARDS, INC. 800-368-1131 www.absolutestandards.com			U	ertified I	Referen	ce Mate	Certified Reference Material CRM	C	1117		•	ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com	ANAB ISO 17034 Accredited AR-1539 Certificate Number ttps://Absolutestandards.com	ccredited Number ards.com
הבמדובובה אובותווד מרמסמד.							4		20	2				
CENTIFIED WEIGHT NET ON	<u>57038</u> 031524			Solvent:		24002546	Nitric Acid				1			
Description:	Strontium (Sr)	(Sr)			700		Nitrio Acid		Comulated Bur	N Dr.	Boncon Chan	to manual state	031504	
Expiration Date: Recommended Storage: Nominal Concentration (µg/mL):	031527 Ambient (20 °C) <b>1000</b>	ŝ					Nume Acid			apy.	Denson crian	La	120100	
NIST Test Number:	6UTB		5E-05 B	5E-05 Balance Uncertainty	uinty				Reviewed By:	By:	Pedro L. Rentas	as	031524	
Weight shown below was diluted to (mL): Lot <u>Compound</u> RM# Number	<b>Is diluted to (mL):</b> Lot RM# Number	2000.07 Nominal Conc. (µg/mL)	0.100 Purity (%)	0.100 Flask Uncertainty Purity Uncertainty Assay (%) Purity (%) (%)	say ()	Target Weight (g) V	Actual Weight (g) C	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS	SDS Information (Solvent Safety Info. On Attached pg.) # OSHA PEL (TWA) LDS	<b>SDS Information</b> Safety Info. On Attachee SHA PEL (TWA)	d pg.) LDSO	NIST
1. Strontium nitrate (Sr)	IN017 SRZ022018A1	1000	68.997	0.10	41.2 4.8	4.85470	4.85502	1000.1	2.0	10042-76-9	NA	orl-ra	ori-rat >2000mg/kg 3153a	3153a
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2.02 2.02														
m/z->- 21	210 220	230	0	240	550	0	260							
oart # 57038 Lot # 031524					Ť	1 of 2				Pri	Printed: 6/7/2024, 3:58:42 PM	4, 3:58:42 F	Wo	

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



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

							Trace M	letals	Verification	ation	by ICP-MS		(ng/mL)						
			四本派出出建	ALCON ST	The second second	A COLUMN TO A	and states in the		Man Landon Martin		A DAMAGE AND	<b>MARCE</b>	A NUTLE STORE	Contraction of the local division of the loc	United in the second	Self-pice	Compare and the second s		States and the
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# **Physical Characterization:**

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

Certified by:

Sur ?

* 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).

1. P 5 * 2962 246 146 **4**• . 12 M 8: 2 1.481¥ *:

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1 of 1



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









Material No.: 9530-33 Batch No.: 24D1562005 Manufactured Date: 2024-03-18 Retest Date: 2029-03-17 Revision No.: 0

# Certificate of Analysis

Test	Specification	Result
ACS – Assay (as HCl) (by acid-base titrn)	36.5 - 38.0 %	37.6 %
ACS – Color (APHA)	≤ 10	5
ACS – Residue after Ignition	≤ 3 ppm	< 1 ppm
ACS - Specific Gravity at 60°/60°F	1.185 - 1.192	1.192
ACS – Bromide (Br)	≤ 0.005 %	< 0.005 %
ACS – Extractable Organic Substances	≤ 5 ppm	< 1 ppm
ACS – Free Chlorine (as Cl2)	≤ 0.5 ppm	< 0.5 ppm
Phosphate (PO4)	≤ 0.05 ppm	0.03 ppm
Sulfate (SO4)	≤ 0.5 ppm	< 0.3 ppm
Sulfite (SO3)	≤ 0.8 ppm	0.3 ppm
Ammonium (NH4)	≤ 3 ppm	< 1 ppm
Trace Impurities – Arsenic (As)	≤ 0.010 ppm	< 0.003 ppm
Trace Impurities - Aluminum (AI)	≤ 10.0 ppb	< 5.0 ppb
Arsenic and Antimony (as As)	≤ 5.0 ppb	< 3.0 ppb
Trace Impurities – Barium (Ba)	≤ 1.0 ppb	< 1.0 ppb
Trace Impurities - Beryllium (Be)	≤ 1.0 ppb	< 1.0 ppb
Trace Impurities – Bismuth (Bi)	≤ 10.0 ppb	< 10.0 ppb
Trace Impurities – Boron (B)	≤ 20.0 ppb	2.2 ppb
Trace Impurities – Cadmium (Cd)	≤ 1.0 ppb	< 1.0 ppb
Trace Impurities – Calcium (Ca)	≤ 50.0 ppb	31.0 ppb
Trace Impurities – Chromium (Cr)	≤ 1.0 ppb	0.5 ppb
Trace Impurities – Cobalt (Co)	≤ 1.0 ppb	0.2 ppb
Trace Impurities – Copper (Cu)	≤ 1.0 ppb	< 0.1 ppb
Trace Impurities – Gallium (Ga)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Germanium (Ge)	≤ 3.0 ppb	< 2.0 ppb
Trace Impurities - Gold (Au)	≤ 4.0 ppb	< 0.2 ppb
Heavy Metals (as Pb)	≤ 100 ppb	< 50 ppb
Trace Impurities – Iron (Fe)	≤ 15 ppb	3 ppb

>>> Continued on page 2 >>>

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





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

Test	Specification	Result
Trace Impurities - Lead (Pb)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities - Lithium (Li)	≤ 1.0 ppb	< 0.1 ppb
Trace Impurities – Magnesium (Mg)	≤ 10.0 ppb	2.2 ppb
Trace Impurities – Manganese (Mn)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Mercury (Hg)	≤ 0.5 ppb	< 0.1 ppb
Trace Impurities – Molybdenum (Mo)	≤ 10.0 ppb	< 5.0 ppb
Trace Impurities – Nickel (Ni)	$\leq$ 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)	$\leq$ 100.0 ppb	2.0 ppb
Trace Impurities – Strontium (Sr)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Tantalum (Ta)	$\leq$ 1.0 ppb	< 0.9 ppb
Trace Impurities - Thallium (TI)	≤ 5.0 ppb	< 2.0 ppb
Trace Impurities - Tin (Sn)	≤ 5.0 ppb	< 0.4 ppb
Trace Impurities – Titanium (Ti)	$\leq$ 1.0 ppb	0.2 ppb
Trace Impurities - Vanadium (V)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Zinc (Zn)	$\leq$ 5.0 ppb	< 0.2 ppb
Trace Impurities – Zirconium (Zr)	≤ 1.0 ppb	< 0.1 ppb

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



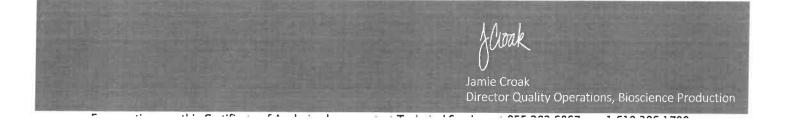


Material No.: 9530-33 Batch No.: 24D1562005

Test	Specification	Result	
	-		

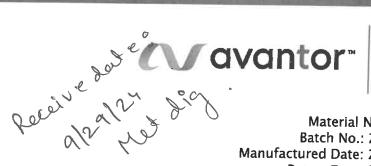
For Laboratory, Research, or Manufacturing Use Product Information (not specifications): Appearance (clear, fuming liquid) Meets ACS Specifications Storage Condition: Store below 25 °C.

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



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







Material No.: 9530-33 Batch No.: 22F0762009 Manufactured Date: 2022-05-10 Retest Date: 2027-05-09 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	1.190
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 (PO4)	≤ 0.05 ppm	< 0.03 ppm
Sulfate (SO4)	≤ 0.5 ppm	< 0.3 ppm
Sulfite (SO3)	≤ 0.8 ppm	0.3 ppm
Ammonium (NH4)	≤ 3 ppm	< 1 ppm
Trace Impurities – Arsenic (As)	≤ 0.010 ppm	< 0.003 ppm
Trace Impurities – Aluminum (Al)	≤ 10.0 ppb	0.8 ppb
Arsenic and Antimony (as As)	≤ 5.0 ppb	< 3.0 ppb
Trace Impurities – Barium (Ba)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Beryllium (Be)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Bismuth (Bi)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Boron (B)	≤ 20.0 ppb	< 5.0 ppb
Trace Impurities – Cadmium (Cd)	≤ 1.0 ppb	< 0.3 ppb
Trace Impurities ~ Calcium (Ca)	≤ 50.0 ppb	14.9 ppb
Trace Impurities – Chromium (Cr)	≤ 1.0 ppb	< 0.4 ppb
Trace Impurities - Cobalt (Co)	≤ 1.0 ppb	< 0.3 ppb
Trace Impurities - Copper (Cu)	≤ 1.0 ppb	< 0.1 ppb
Trace Impurities – Gallium (Ga)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Germanium (Ge)	≤ 3.0 ppb	< 2.0 ppb
Trace Impurities - Gold (Au)	≤ 4.0 ppb	0.2 ppb
Heavy Metals (as Pb)	≤ 100 ppb	< 50 ppb
Trace Impurities – Iron (Fe)	≤ 15 ppb	6 ppb

>>> Continued on page 2 >>>

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





# Material No.: 9530-33 Batch No.: 22F0762009

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	0.8 ppb
Trace Impurities – Manganese (Mn)	≤ 1.0 ppb	< 0.4 ppb
Trace Impurities – Mercury (Hg)	≤ 0.5 ppb	0.1 ppb
Trace Impurities – Molybdenum (Mo)	≤ 10.0 ppb	< 3.0 ppb
Trace Impurities - Nickel (Ni)	$\leq$ 4.0 ppb	< 0.3 ppb
Trace Impurities – Niobium (Nb)	≤ 1.0 ppb	< 0.2 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	1.0 ppb
Trace Impurities – Silver (Ag)	≤ 1.0 ppb	< 0.3 ppb
Trace Impurities – Sodium (Na)	≤ 100.0 ppb	0.7 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	< 0.8 ppb
Trace Impurities – Titanium (Ti)	≤ 1.0 ppb	0.2 ppb
Trace Impurities - Vanadium (V)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Zinc (Zn)	≤ 5.0 ppb	0.8 ppb
Trace Impurities – Zirconium (Zr)	≤ 1.0 ppb	< 0.1 ppb

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

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





Material No.: 9530-33 Batch No.: 22F0762009

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

James Techier

Jamie Ethier Vice President Global Quality

Nitric Acid 69% CMOS



# Receive: a/2a/21 net dig



Material No.: 9606-03 Batch No.: 24B1362001 Manufactured Date: 2024-01-25 Retest Date: 2029-01-23 **Revision No.: 0** 

# Certificate of Analysis

Test	Specification	Result
Assay (HNO3)	69.0 ~ 70.0 %	69.6 %
Appearance	Passes Test	Passes Test
Color (APHA)	≤ 10	5
Residue after Ignition	≤ 2 ppm	< 1 ppm
Chloride (Cl)	≤ 0.08 ppm	< 0.03 ppm
Phosphate (PO4)	≤ 0.10 ppm	< 0.03 ppm
Sulfate (SO4)	≤ 0.2 ppm	< 0.2 ppm
Trace Impurities – Aluminum (Al)	≤ 40.0 ppb	< 1.0 ppb
Arsenic and Antimony (as As)	≤ 5.0 ppb	< 2.0 ppb
Trace Impurities – Barium (Ba)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Beryllium (Be)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities - Bismuth (Bi)	≤ 20.0 ppb	< 10.0 ppb
Trace Impurities - Boron (B)	≤ 10.0 ppb	< 5.0 ppb
Trace Impurities - Cadmium (Cd)	≤ 50 ppb	< 1 ppb
Trace Impurities - Calcium (Ca)	≤ 50.0 ppb	< 0.2 ppb
Trace Impurities - Chromium (Cr)	≤ 30.0 ppb	< 1.0 ppb
Trace Impurities - Cobalt (Co)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Copper (Cu)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities - Gallium (Ga)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Germanium (Ge)	≤ 20 ppb	< 10 ppb
Trace Impurities - Gold (Au)	≤ 20 ppb	< 5 ppb
Heavy Metals (as Pb)	≤ 100 ppb	< 50 ppb
Trace Impurities – Iron (Fe)	≤ 40.0 ppb	< 1.0 ppb
Trace Impurities – Lead (Pb)	≤ 20.0 ppb	< 10.0 ppb
Trace Impurities – Lithium (Li)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Magnesium (Mg)	≤ 20 ppb	< 1 ppb
Trace Impurities – Manganese (Mn)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Nickel (Ni)	≤ 20.0 ppb	< 5.0 ppb

>>> Continued on page 2 >>>





## Material No.: 9606-03 Batch No.: 24B1362001

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

Nitric Acid 69% CMOS





# Material No.: 9606-03 Batch No.: 24B1362001

Test	Specification	Result	

For Microelectronic Use

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



Sr. Manager, Quality Assurance

Nitric Acid 69% CMOS



# Receive: a/2a/21 net dig



Material No.: 9606-03 Batch No.: 24B1362001 Manufactured Date: 2024-01-25 Retest Date: 2029-01-23 **Revision No.: 0** 

# Certificate of Analysis

Test	Specification	Result
Assay (HNO3)	69.0 ~ 70.0 %	69.6 %
Appearance	Passes Test	Passes Test
Color (APHA)	≤ 10	5
Residue after Ignition	≤ 2 ppm	< 1 ppm
Chloride (Cl)	≤ 0.08 ppm	< 0.03 ppm
Phosphate (PO4)	≤ 0.10 ppm	< 0.03 ppm
Sulfate (SO4)	≤ 0.2 ppm	< 0.2 ppm
Trace Impurities – Aluminum (Al)	≤ 40.0 ppb	< 1.0 ppb
Arsenic and Antimony (as As)	≤ 5.0 ppb	< 2.0 ppb
Trace Impurities – Barium (Ba)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Beryllium (Be)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities - Bismuth (Bi)	≤ 20.0 ppb	< 10.0 ppb
Trace Impurities - Boron (B)	≤ 10.0 ppb	< 5.0 ppb
Trace Impurities - Cadmium (Cd)	≤ 50 ppb	< 1 ppb
Trace Impurities - Calcium (Ca)	≤ 50.0 ppb	< 0.2 ppb
Trace Impurities - Chromium (Cr)	≤ 30.0 ppb	< 1.0 ppb
Trace Impurities - Cobalt (Co)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Copper (Cu)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities - Gallium (Ga)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Germanium (Ge)	≤ 20 ppb	< 10 ppb
Trace Impurities - Gold (Au)	≤ 20 ppb	< 5 ppb
Heavy Metals (as Pb)	≤ 100 ppb	< 50 ppb
Trace Impurities – Iron (Fe)	≤ 40.0 ppb	< 1.0 ppb
Trace Impurities – Lead (Pb)	≤ 20.0 ppb	< 10.0 ppb
Trace Impurities – Lithium (Li)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Magnesium (Mg)	≤ 20 ppb	< 1 ppb
Trace Impurities – Manganese (Mn)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Nickel (Ni)	≤ 20.0 ppb	< 5.0 ppb

>>> Continued on page 2 >>>





## Material No.: 9606-03 Batch No.: 24B1362001

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

Nitric Acid 69% CMOS





# Material No.: 9606-03 Batch No.: 24B1362001

Test	Specification	Result	

For Microelectronic Use

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



Sr. Manager, Quality Assurance

_				/			1. Sodium nitrate (Na)	Compound	Description: Expiration Date: Recommended Storage: Nominal Concentration (µg/mL): NIST Test Number: Weight shown below wa	CERTIFIED WEIGHT REPORT: Part Numbei Lot Numbei	Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com
m/z->	N 0 11 0	m/z-≻ 5.0E6	N.5 6	m/z-> 5.0∈6	2.5E5	5.0E5	trate (Na)	đ	Description:       Sodium (         Expiration Date:       12226         Recommended Storage:       Ambient (2         I Concentration (µg/mL):       10000         NIST Test Number:       6UTB         Weight shown below was dliuted to (mL):	<u>VEIGHT RE</u> Part I Lot I	standards.c
						[1] Spec	=		Description: Expiration Date: nended Storage: ntration (µg/mL): htration (µg/mL): T Test Number: ST Test Number:	HT REPORT: Part Number: Lot Number:	om
0		110		10		[1] Spectrum No.1	IN036 NAV01201511	Lot RM# Number	Sodiur 12226 Ambien 10000 6UTB 6UTB	<u>58111</u> 122223	
N N O		120		N. O		-				23	V
230		130		а О			10000 99.999	Nominal Purity Conc. (µg/mL) (%)	5) 3000.4 0.06		RIO
		and here and a starting				8.935 sec]:58111.D# [Count] [Linear]	999 0.10	ity Uncertainty ) Purity (%)	2% 5E-05 Balance Uncertainty 0.06 Flask Uncertainty		Certi
240		140		6		.D# [Cot	26.9	Assay (%)	2% ncertainty ertainty	Solvent:	ified Refu
N U O		150		Ö		unt) [Line	111.5406	Target Weight (g)	60.0 (mL)	Lot # 24002546	erence Mi MSR 0
280		160		0 O		ar]	111.5479	Actual Weight (g)	Nitric Acid	Nitric Acid	Certified Reference Material CRM 5 124 MSR06 MS
				N			10000.7	Actual Conc. (µg/mL)		3	RM 5807
		170		70			20.0	Expanded Uncertainty +/- (µg/mL)	Formulated By:	Allea	
		180		80			7631-99-4	0	By:	aha	
		190		80			5 mg/m3	SUS information (Solvent Safety Info. On Attached pg.) AS# OSHA PEL (TWA) LD50	Aleah O'Brady	Brad	×
		200		100				SUS Information afety Info. On Atta OSHA PEL (TWA)	ady C	All I	ANAB AR-1 https:///
		ŏ		ŏ			orl-rat 3430 mg/kg	ached pg.) سەءە	122223		ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com
							9/kg 3152a	NIST	223		4 Accred cate Num andards.c

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Printed: 12/29/2023 2:56:20 PM	Printed: 12/2					2 of 2							2223	Lot # 122223		# 58111	Part #
	r sed in	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 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).	nts unless oth ity raw materi e to NIST (see the Uncertaint , D.C. (1994).	ements purity ; eable to ing the gton, D.	The certified value is the concentration calculated from gravimetric and volumetric measureme Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest puri 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 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 t Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington,	and the and the ith weig ated. atory co atory co flice,	The certified value is the concentration calculated from gravimetric and volume Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the preparation of all standards. All standard containers are meticulously cleaned prior to use. Standards are prepared gravimetrically using balances that are calibrated with w Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated. All Standards should be stored with caps tight and under appropriate laboratory Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating a Measurement Result," NIST Technical Note 1297, U.S. Government Printing Offi	avimetri ass A g are cali are cali ppropria ernmen	from gra rated Cl ior to us ces that lue, unle under a J.S. Gov	ulated er, calib er, calib er, calib er, calib g baland g baland g baland ght and ght and 1297, L	tion calc zed wat ally usin ally usin of the st and Ku al Note	ncentra ards. meticule 0.5% c 0.5% c lor, B.N Technic	The certified value is the concentration calculated from gravi Purified acids, 18.2 megohm deionized water, calibrated Clas the preparation of all standards. All standard containers are meticulously cleaned prior to use. Standards are prepared gravimetrically using balances that ar Standards are certifed (+/-) 0.5% of the stated value, unless All Standards should be stored with caps tight and under app Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelin Measurement Result," NIST Technical Note 1297, U.S. Gover	value i s, 18.2 ion of e prepa e certifi e certifi Referen it Result	certified preparat preparat dards ar dards ar dards ar tandards suremen	* The * Purif * All s * Stan Mea:	
Certified by:	e e							standard.	on of this	reparati	ed in the j	ts observ	<b>Physical Characterization:</b> Homogeneity: No heterogeneity was observed in the preparation of this standard.	o heterog	<b>Physical Characterization:</b> Homogeneity: No heterogeneity v	Physi Homog	
	-				alyte	(T) = Target analyte	= (T)										
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			(ua/ml)	ומ	rometry (ICP-MS): Verification by ICP-M	ry (ICP		ass Spect Metals	asma Ma Trace	pled Pla	aly Cou	ductiv	sis by In	Analys	umenta	Instra	
ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com	*			al CRM	Certified Reference Material C	ference	tified Re	Cen					s, Inc.	ards.con	Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com	Absolute ( 800-368-1131 www.absolute	800 WWW

	1.057	2.0年7	m/z->	р. С. С. С.	5.0E5	7/2->	N 0 0	5.0E5	1. Antimony (Sb)	Compound	Volume shown below was diluted to (mL):	NIST Test Number:	Recommended Storage: Nominal Concentration (µg/mL):	Expiration Date:	Part Number: Lot Number: Description:	CERTIFIED WEIGHT REPORT:	800-368-1131 www.absolutestandards.com
)			110			10		[1] Spectrum No.1	58151	Part Number	lip sam mo	ber	nL):	ate:	on:		
			12.			NO		40.1	1 100923	Lot r Number	uted to (mL)	6UTB	Ambient (20 °C) 1000	120526	57051 120523 Antimony (Sb)		
									0.1000	Dilution Factor	: 3000.41		20 °C)		w (Sb)		Ri
			130			30		39C]:58	300.0	Initial Vol. (mL)		5E-05					Certifi ( 0 1) 03 ( 2 4
:			140			\$ 0		051.D#	0.084	Uncertainty ) Pipette (mL)		Balance Uncertainty				ł	Certified
			1 80			50		17.964 sec]:58051.D# [Count] [Línear]	1000	Nominal	unty	rteintv		2.0%	24002546	Lot #	Certified Reference Material CRM (芝り MS802 Mら
						Ö		_(near]	10001.4	Initial ) Conc. (µg/ml				(mL)	Nitric Acid	Solvent:	nce Material
			180			80			1000.0	Final nL) Conc. (µg/mL)				Nitric Acid			CRM
			170			70			0 2.1	Expanded Uncertainty mL) +/- (µg/mL)		Reviewe	K	id Formulated By:			UU UU
			180			80			7440-36-0	Ĕ	an of		20	ited By:	Ferre		
			190			0				Solvent Sa CAS# OSH/		Pertr	the second	Lawr	and b		V
						A. and A. and A. and A.			0.5 mg/m3	SDS Information nt Safety Info. On Attac OSHA PEL (TWA)		o I Rentas	SA )	Lawrence Barry	De		Alv AR https
			200			100			orl-rat 7000 mg/kg	SDS Information (Solvent Safety Info. On Attached pg.) # OSHA PEL (TWA) LD50							ANAB ISO 1:/034 Accreated AR-1539 Certificate Number https://Absolutestandards.com
									) mg/kg 3102a	) NIST	120020	120523		120523			tificate l standar

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



**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):

							I race M	etals	Verifica	tion	by ICP-N	IS (II)	g/mL)						
A	B	2	202	2	-	1	MILLION CONTRACTOR	<b>Manual</b>	AND IN THE OWNER.			No. of Lot, No.			Contraction of the local division of the loc	<b>CONTRACTO</b>	AL INCOME		
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		1	20.02	G	20.05	5	20.02	Mo	40.02	7	<b>0</b> 02	S	40.02	6	AN 03	3	33	7	3
G	SUUS	ç	<b>A</b> .02	Au		y	A B	K	200	4	5	2	5	3,			10.00	1	70.02
				I					NAL ON	ļ	44	Ŕ	20.02	12	20.02	11	40.02	2	20.02

(T) = Target analyte

**Physical Characterization:** 

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

Certified by:

In P. S.

* 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

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Part # 57051 Lot # 120523

N 55 10 0	m/z-> 110 5.0E6	រា .0 ៣ ភា	m/≥-> 10	ហ .0 ព	[1] Spectrum No.1 1.0E7	1. Silver nitrate (Ag)	Compound	Part Number:       57047         Lot Number:       122823         Description:       Silver (A         Description:       Silver (A         Expiration Date:       122826         Recommended Storage:       Ambient (;         Nominal Concentration (µg/mL):       1000         NIST Test Number:       6UTB         Weight shown below was diluted to (mL):	Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com CERTIFIED WEIGHT REPORT:
	120		N.		-	5 J0612AGA1	Lot Nor RM# Number Conc. (	57047 122823 Silver (Ag) 122826 Ambient (20 Ambient (20 1000 6UTB 6UTB	*
	130 140		90 40		14.044 sec]:58147.D# [Count] [Linear]	88.8988 0.10	Nominal Purity Uncertainty Assay Conc. (Jug/mL) (96) Purity (96) (96)	*C) 5E-05 Balance Uncertainty	Certified I R 1 8   5   2 4
	1 ភូ- O		50		[Count] [Linear]	6.27992	Target Weight (g)	n <b>t:</b> 24002546 2% 80.0 (mL)	Certified Reference Material
	160 170		60 70			1000.0	Actual Actual U Weight (g) Conc. (µg/mL) +	Nitric Acid	rial CRM M6030
	180		80			<b>2.0</b> 7761-88-8	Expanded Uncertainty (Solv +/- (µg/mL) CAS#	ad By:	)30
	190 200		90 100			10 ug/m3	SDS Information (Solvent Safety Info. On Attached pg.) # OSHA PEL (TWA) LD51	Benson Chan Pedro L. Rentas	http
	ŏ		ŏ				n ached pg.) NIST LD50 SRM	122823	ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com

Part # 57047 Lot # 122823

1 of 2

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

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			The shares of	A COLUMN	Contraction of the	State of	UNIX 2 COL	18 - ¹ 14		100	The state of the state		1.40 . 10 . 10 . 10 E	No.		No.			
A	<0.02	8	<0.02	Dy	<0.02	Hf	<0.02	5	<0.02	N	<0.02	7	<0.02	Se	<0.2	ТЪ	<0.02	W	<0.02
Sb	<0.02	ß	<0.2	막	40.02	Но	<0.02	Lu	<0.02	ĥ	<0.02	Re	<0.02	<u>8</u>	<0.02	Te	<0.02	q	<0.02
As	<b>4</b> 0.2	ĉ	<0.02	땹	<0.02	h	<0.02	Mg	<0.01	õ	<0.02	Rh	<0.02	Ag	T	1	<0.02	<	<0.02
Ba	<0.02	S	<0.02	ନ୍ଥ	<0.02	Ħ	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Ţ	<0.02	YЪ	<0.02
Be	<0.01	Ω	<0.02	ଦ୍ଧ	<0.02	Fe	<0.2	Hg	40.2	p	<0.02	Ru	<0.02	ş	<0.02	Tm	<0.02	×	<0.02
B	<0.02	S	<0.02	ନ୍ନ	<0.02	L	<0.02	Mo	<0.02	Ŗ	<0.02	Sm	<0.02	Ś	<0.02	Sh	<0.02	2	<0.02
μ.	<0.02	ß	<0.02	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<b>40</b> 2	Ş	<0.02	Ta	<0.02	Ð	<0.02	2	<0.02

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

**Physical Characterization:** 

(T)= Target analyte

Certified by:

In & She

* 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.

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800-368-1131 www.absolutestandards.com	CERTIFIED WEIGHT REPORT:	Par Loi De	Expiration Date: Recommended Storage:	NIST Tex	Weight showr		Compound		N. O	1.000	m/z->	1.0E4	5 0 0	m/z->-	1.0世8	5. 0 8	ITVZ->
	E	Part Number: Lot Number: Description:	Expiration Date: nended Storage:	NIST Test Number:	Weight shown below was diluted to (mL):		VIMH.	[1] Spectrum No.1			10			110			012
		<u>57081</u> 062724 Thalllum (TI)	062727 Ambient (20 °C)	6UTB	ed to (mL):	Lot	Number	-			N			120			220
			°C)	58	2000.1 0	Nominal Pi	Conc. (J/g/mL)	14.044 sec			a O			130			230
Certified Refi R ! 8]5]24		Š		5E-05 Balance Uncertainty	0.10 Flask Uncertainty	Purity Uncertainty Assay	(%) PUTTY (%)	14.044 sec]:57081.D# [Count] [Linear]			4. 0			140			240
Certified Reference Material CRM とという		Solvent: 2400	2% 40 (m	pertainty	ainty	y Assay Target	(%) Weight (g)	₩ [Count] [Li			01			150			250
e Material		24002546 Nitric Acid	40.0 Nitric Acid (mL)			get Actual		[Linear]									
<b>СRМ</b> М6023		loid	cid			Actual	Weight (g) Conc. (µg/mL)				8			160			260
23		Alea	Formulated By:	Reviewed By:		Expanded Uncertainty	L) +/- (µg/mL)				70			170			
		20	8			(Solvent	CAS#				80			180			
http		Grandly	Aleah O'Brady	Pedro L. Rentas		SDS Information Safety Info. On Atta	OSHA PEL (TWA)				8			190			
ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com			062724	062724		SDS Information (Solvent Safety Info. On Attached pg.)	DSG1				100			200			
Accredite te Numbe dards.con	٤		4	4	l	NIST	SKM										

Part # 57081 Lot # 062724

1 of 2

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Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com
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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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	<0.02	40.02		40.02	40,02	20.02	3	40.02	<0.02	5			

(I) = Target analyte

# Physical Characterization:

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

Ser P. S.

Certified by:

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

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

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Part # 57081 Lot # 062724

Absolute Standards, Inc. 800-368-1131 www.absolutestandards.com	CERTIFIED WEIGHT REPORT:	Part Number: 57023 Lot Number: 062424 Description: Vanadium (V)	Expiration Date: 062427			Volume shown below was diluted to (mL): 2000.3	Part Lot Dilution	Compound Number Number Factor	1. Ammonium metavanadate (V) 58123 021224 0.1000	[1] Spectrum No.1 [ 34.243 2.0E6		m/z->- 10 20	2.067	1.0巨7	m/z 110 120 1	2.588	
8:81 Ce					5E-05	0.06	Initial		200.0	sec]:58		30			190		200
Certified Reference Material CRM 冬」 シート					Balance Uncertainty	Flask Uncertainty	Uncertainty		0.084	34.243 sec]:58023.D# [Count] [Linear]		4			140		240
eference l	Lot #	24002546	2,0%		inty		Nominal	Conc. (µg/mL)	1000	žount) [Lin		5 0			- 50		2000
Naterial Cl	Solvent:	Nitric Acid	40.0 (mL)				Initial	Conc. (µg/mL)	10000.3	1⊖ar]		60			160		260
<b>MF</b> M6021			Nitric Acid				Final	Con	1000.0						j.		•
21		Alla	Formulated By:	M	Reviewed By:		Expanded		2.2			70			170		
		Alleah & Brack	J By:	2 l	y:		(Solve)		7803-55-6			80			180 0		
ht		Garan	Aleah O'Brady	ento	Pedro L. Rentas		SDS Information It Safety Info. On Atta	OSHA PEL (TWA)	0.05 mg/m3			90			190		
ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com			062424	/	s 062424		<b>SDS Information</b> (Solvent Safety Info. On Attached pg.)	(A) LD50	3 ort-rat 58.1mg/kg			100			200		
Accreditec te Numbe dards.con	1		<u> </u>			ļ	NIST	SRM	3165								

1 of 2

Printed: 8/1/2024, 2:13:49 PM

Part # 57023 Lot # 062424





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

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

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# Physical Characterization:

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

In P. Su

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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# <u>SHIPPING</u> DOCUMENTS

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CHAIN OF CUSTODY RECORD (908) 789-8900 Fax (908) 789-8922 www.chemtech.net							2	COC Number														
CLIENT INFORMATION PROJECT INFORMATION													BII	I IN	G IN	FO	RM/	TION	-			
	Report to be	e sent to:		PROJECT NAME: 120 1	_					BILL TO: EarthEfficient PO#												
COMPANY: EarthEffic	cient			PROJECT #:																		
ADDRESS: 30 W Main	n St			PROJECT MANAGER:																ATE: NY ZIP: 11901		
CITY: Riverhead		STATE: NY	ZIP: 11901	E-MAIL: envteam@earth	efficient.	com				ATTENTION: Pia Tague - pia@earthefficient.com										ZIP; Trac		
ATTENTION: Env Tea		rthefficient.com		PHONE: (631) 209-4245			FAX:			PHONE: (631) 209-4245												
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10/2021 WHITE - CHEMTECH COPY FOR RETURN TO CLIENT						YELLOW - CHEMTECH COPY PINK - SAMPLER COPY																



# Laboratory Certification

Certified By	License No.
CAS EPA CLP Contract	68HERH20D0011
Connecticut	PH-0830
DOD ELAP (ANAB)	L2219
Maine	2024021
 Maryland	296
New Hampshire	255424 Rev 1
New Jersey	20012
New York	11376
Pennsylvania	68-00548
Soil Permit	525-24-234-08441
Texas	T104704488