

Fax: 908 789 8922

Prep Standard - Chemical Standard Summary

Order ID: P2836

Test: Metals CLP Full

Prepbatch ID: PB161766,

Sequence ID/Qc Batch ID: LB131457,LB131513,

Standard ID:

MP80924,MP80925,MP80926,MP80927,MP80928,MP80929,MP80932,MP80933,MP80934,MP80935,MP80942,MP80944, MP81026,MP81119,MP81134,MP81187,MP81208,MP81209,MP81250,MP81288,MP81289,MP81290,MP81291,MP81292, MP81293,MP81294,MP81295,MP81296,MP81297,MP81298,MP81300,MP81301,MP81308,MP81309,MP81311,

Chemical ID:

M4877,M4878,M4881,M4883,M4885,M4888,M4889,M4960,M4961,M5130,M5192,M5200,M5223,M5224,M5227,M5272,M5288,M5289,M5294,M5296,M5298,M5387,M5389,M5395,M5429,M5468,M5473,M5494,M5497,M5498,M5513,M5632,M5658,M5697,M5698,M5747,M5754,M5768,M5769,M5798,M5799,M5800,M5801,M5804,M5815,M5817,M5818,M5819,M5875,M5895,M5912,M5915,M5935,M5940,M5947,M5954,M5959,M5962,W2606,W3112,



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Metals STANDARD PREPARATION LOG

902 ICP AES CAL BLK (SO/ICB/CCB) MP80924 05/30/2024 06/30/2024 Sarabjit Jaswal None None	Recipe ID	NAME	NO.	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipetteID</u>	Supervised By Mohan Bera
	902	ICP AES CAL BLK (SO/ICB/CCB)	MP80924	05/30/2024	06/30/2024	Sarabjit Jaswal	None	None	06/11/2024

FROM 125.00000ml of M5895 + 2350.00000ml of W2606 + 25.00000ml of M5915 = Final Quantity: 2500.000 ml

Recipe				Expiration	Prepared			Supervised By
<u>ID</u>	<u>NAME</u>	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Mohan Bera
1004	ICPAES ISM01.2 (S5)	MP80925	05/30/2024	06/30/2024	Sarabjit Jaswal	None	METALS_PIPE	
							TTE_3 (A)	06/11/2024

FROM

 $0.25000 \text{ml of M5798} + 0.50000 \text{ml of M5429} + 0.50000 \text{ml of M5473} + 0.50000 \text{ml of M5815} + 0.50000 \text{ml of M5817} + \\ 12.50000 \text{ml of M5200} + 12.50000 \text{ml of M5288} + 12.50000 \text{ml of M5698} + 12.50000 \text{ml of M5819} + 13.75000 \text{ml of M5697} + \\ 14.50000 \text{ml of M5289} + 14.50000 \text{ml of M5298} + 14.50000 \text{ml of M5658} + 2.00000 \text{ml of M5513} + 22.50000 \text{ml of M5498} + \\ 22.50000 \text{ml of M5769} + 5.00000 \text{ml of M5272} + 5.00000 \text{ml of M5296} + 5.00000 \text{ml} \text{of M5819} + 5.00000 \text{ml} \text{of M5818} + \\ 5.00000 \text{ml of M5875} + 318.50000 \text{ml of MP80924} = \text{Final Quantity: } 500.000 \text{ ml}$



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Metals STANDARD PREPARATION LOG

Recipe				Expiration	<u>Prepared</u>			Supervised By
<u>ID</u>	<u>NAME</u>	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Mohan Bera
1005	ICPAES ISM01.2(S4)	MP80926	05/30/2024	06/30/2024	Sarabjit Jaswal	None	METALS_PIPE	
							TTE_3 (A)	06/11/2024

FROM	50.00000ml of MP80924 + 50.00000ml of MP80925	= Final Quantity: 100.000 ml
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Recipe				Expiration	Prepared			Supervised By
<u>ID</u>	<u>NAME</u>	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Mohan Bera
1007	ICPAES ISM01.2(S3)	MP80927	05/30/2024	06/30/2024	Sarabjit Jaswal	None	METALS_PIPE	
							TTE_3 (A)	06/11/2024

FROM 25.00000ml of MP80925 + 75.00000ml of MP80924 = Final Quantity: 100.000 ml



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Metals STANDARD PREPARATION LOG

Recipe ID	<u>NAME</u>	NO.	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipettelD</u>	Supervised By Mohan Bera
1008	ICPAES ISM01.2(S2)	MP80928	05/30/2024	06/30/2024	Sarabjit Jaswal	None	METALS_PIPE TTE_3 (A)	06/11/2024

FROM 12.50000ml of MP80925 + 87.50000ml of MP80924 = Final Quantity: 100.000 ml

Recipe				<u>Expiration</u>	<u>Prepared</u>			Supervised By
<u>ID</u>	NAME	NO.	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Mohan Bera
994	ICPAES ISM01.2 S1 (CONC.)	MP80929	05/30/2024	06/30/2024	Sarabjit Jaswal	None	METALS_PIPE	<u> </u>
							TTE_3 (A)	06/11/2024

FROM

 $0.02000 \text{ml of M5815} + 0.03000 \text{ml of M5429} + 0.10000 \text{ml of M4877} + 0.10000 \text{ml of M5798} + 0.14000 \text{ml of M5799} + \\ 0.20000 \text{ml of M4881} + 0.20000 \text{ml of M4885} + 0.20000 \text{ml of M5192} + 0.20000 \text{ml of M5298} + 0.20000 \text{ml of M5473} + \\ 0.20000 \text{ml of M5658} + 0.20000 \text{ml of M5801} + 0.20000 \text{ml of M5817} + 0.30000 \text{ml of M5698} + 0.40000 \text{ml of M5289} + \\ 0.50000 \text{ml of M4889} + 0.50000 \text{ml of M5697} + 0.70000 \text{ml of M4883} + 0.80000 \text{ml of M5494} + 1.00000 \text{ml of M5227} + \\ 1.00000 \text{ml of M5800} + 1.20000 \text{ml of M5224} + 1.20000 \text{ml of M5819} + 10.00000 \text{ml of M5200} + 10.00000 \text{ml of M5288} + \\ 10.00000 \text{ml of M5498} + 10.00000 \text{ml of M5769} + 10.00000 \text{ml of M5818} + 2.00000 \text{ml of M4888} + 4.00000 \text{ml of M5389} + \\ 34.41000 \text{ml of MP80924} = \text{Final Quantity: 100.000} \text{ml}$



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Metals STANDARD PREPARATION LOG

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AME NO. Prep Date Date By ScaleID Pipe	Mohan Bera
CP AES ICSA SOLN MP80932 05/30/2024 06/30/2024 Sarabjit Jaswal None METAL	IPE
TTE_	A) 06/11/2024

FROM	10.00000ml of M5130 + 90.00000ml of MP80924 = Final Quantity: 100.000 ml
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Recipe				Expiration	<u>Prepared</u>			Supervised By
<u>ID</u>	<u>NAME</u>	NO.	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Mohan Bera
905	ICP AES ICSAB SOLN	MP80933	05/30/2024	06/30/2024	Sarabjit Jaswal	None	METALS_PIPE	<u> </u>
							TTE_3 (A)	06/11/2024

FROM 10.00000ml of M5130 + 10.00000ml of M5223 + 80.00000ml of MP80924 = Final Quantity: 100.000 ml



FROM

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Metals STANDARD PREPARATION LOG

Recipe	NAME	NO	Duan Data	Expiration	<u>Prepared</u>	CastalD	DisastalD	Supervised By
<u>ID</u> 1119	NAME ICPAES ISM01.2(CCV)	NO.	Prep Date 05/30/2024		<u>By</u> Sarabiit Jaswal	<u>ScaleID</u> None	PipetteID METALS PIPE	Mohan Bera
1119	TOT ALG TOWN T.Z(GGV)	<u>WII 00934</u>	03/30/2024	00/30/2024	Darabjit Jaswai	None	TTE_3 (A)	06/11/2024

12.25000ml of M5289 + 12.50000ml of M5200 + 12.50000ml of M5298 + 7.50000ml of M5498 + 7.50000ml of M5769 + 125.00000ml of MP80925 + 322.75000ml of MP80924 = Final Quantity: 500.000 ml

Recipe				Expiration	Prepared			Supervised By
<u>ID</u>	<u>NAME</u>	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Mohan Bera
2480	ICP AES STD 6 ISM01.3	MP80935	05/30/2024	06/30/2024	Sarabjit Jaswal	None	METALS_PIPE	
							TTE_3 (A)	06/11/2024

FROM 8.00000ml of M5200 + 8.00000ml of M5289 + 8.00000ml of M5298 + 8.00000ml of M5498 + 8.000000ml of M5498 + 8.000000ml of M5498 + 8.



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Metals STANDARD PREPARATION LOG

Recipe ID	NAME	<u>NO.</u>	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipetteID</u>	Supervised By Mohan Bera
919	ICP AES INTERNAL STD	MP80942	05/30/2024	06/30/2024	Sarabjit Jaswal	None	None	
								06/11/2024

FROM 1.00000ml of M4961 + 10.00000ml of M4960 + 1969.00000ml of W2606 + 20.00000ml of M5915 = Final Quantity: 2000.000 ml

Recipe				Expiration	<u>Prepared</u>			Supervised By
<u>ID</u>	<u>NAME</u>	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Mohan Bera
903	ICP AES RINSE SOLN	MP80944	05/30/2024	06/30/2024	Sarabjit Jaswal	None	None	
								06/11/2024

FROM 200.0000ml of M5915 + 9800.00000ml of W2606 = Final Quantity: 10000.000 ml



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Metals STANDARD PREPARATION LOG

Recipe				Expiration	<u>Prepared</u>			Supervised By
<u>ID</u>	<u>NAME</u>	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Mohan Bera
921	ICPAES SPIKE SOL#6	MP81026	06/10/2024	06/30/2024	Sarabjit Jaswal	None	METALS_PIPE	<u> </u>
							TTE_3 (A)	06/13/2024
							11E_3 (A)	06/13/2024

FROM	0.12500ml of M4883 +	1.25000ml of M5192	+ 25.00000ml of M5754	+ 23.62500ml of MP80924	= Final Quantity: 50.000 ml

Recipe				Expiration	Prepared			Supervised By
<u>ID</u>	NAME	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Sarabjit Jaswal
169	1:1HNO3	MP81119	06/21/2024	10/24/2024	Al-Terek Isaac	METALS_SCA	METALS_PIPE	<u>.</u>
						LE_2 (M SC-2)	TTE_1 (ICP A	06/21/2024

FROM 1250.00000ml of M5935 + 1250.00000ml of W2606 = Final Quantity: 2500.000 ml



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Metals STANDARD PREPARATION LOG

Recipe ID	NAME	NO.	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipettelD</u>	Supervised By Mohan Bera
1122	ICPMS CALIB BLANK(S0/ICB/CCB)	MP81134	06/18/2024	07/12/2024	Sarabjit Jaswal	None	None	06/25/2024

FROM 25.00000ml of M5895 + 4925.00000ml of W2606 + 50.00000ml of M5912 = Final Quantity: 5000.000 ml

Recipe				Expiration	<u>Prepared</u>			Supervised By
<u>ID</u>	<u>NAME</u>	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Sohil Jodhani
994	ICPAES ISM01.2 S1 (CONC.)	MP81187	06/25/2024	06/30/2024	Sarabjit Jaswal	None	None	
								06/28/2024

FROM

 $0.03000 \text{ml of M5429} + 0.10000 \text{ml of M4877} + 0.10000 \text{ml of M5798} + 0.14000 \text{ml of M5799} + 0.20000 \text{ml of M4885} + \\ 0.20000 \text{ml of M5298} + 0.20000 \text{ml of M5473} + 0.20000 \text{ml of M5658} + 0.20000 \text{ml of M5747} + 0.20000 \text{ml of M5801} + \\ 0.20000 \text{ml of M5815} + 0.30000 \text{ml of M5698} + 0.40000 \text{ml of M5289} + 0.50000 \text{ml of M4889} + 0.50000 \text{ml of M5697} + \\ 0.70000 \text{ml of M4883} + 0.70000 \text{ml of M5224} + 0.80000 \text{ml of M5494} + 1.00000 \text{ml of M5192} + 1.00000 \text{ml of M5227} + \\ 1.00000 \text{ml of M5800} + 1.20000 \text{ml of M5817} + 1.20000 \text{ml of M5819} + 10.00000 \text{ml of M5200} + 10.00000 \text{ml of M5288} + \\ 10.00000 \text{ml of M5498} + 10.00000 \text{ml of M5768} + 10.00000 \text{ml} \text{of M5818} + 2.00000 \text{ml of M4888} + 4.00000 \text{ml of M5389} + \\ 32.93000 \text{ml of MP80924} = \text{Final Quantity: } 100.000 \text{ml}$



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Metals STANDARD PREPARATION LOG

Recipe ID	NAME	<u>NO.</u>	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipettelD</u>	Supervised By Mohan Bera
994	ICPAES ISM01.2 S1 (CONC.)	MP81208	06/25/2024	06/30/2024	Sarabjit Jaswal	None	METALS_PIPE TTE_3 (A)	

FROM

0.02000 ml of M5815 + 0.03000 ml of M5429 + 0.10000 ml of M4877 + 0.10000 ml of M5798 + 0.14000 ml of M5799 + 0.20000 ml of M4885 + 0.20000 ml of M5192 + 0.20000 ml of M5298 + 0.20000 ml of M5473 + 0.20000 ml of M5658 + 0.20000 ml of M5747 + 0.20000 ml of M5801 + 0.20000 ml of M5817 + 0.30000 ml of M5698 + 0.40000 ml of M5289 + 0.50000 ml of M4889 + 0.50000 ml of M5697 + 0.70000 ml of M4883 + 0.80000 ml of M5494 + 1.00000 ml of M5227 + 1.00000 ml of M5800 + 1.20000 ml of M5224 + 1.20000 ml of M5819 + 10.00000 ml of M5200 + 10.00000 ml of M5468 + 4.00000 ml of M5497 + 10.00000 ml of M5818 + 2.00000 ml of M4888 + 4.00000 ml of M5387 + 34.41000 ml of MP80924 = Final Quantity: 100.000 ml

Recipe				Expiration	<u>Prepared</u>			Supervised By
<u>ID</u>	NAME	NO.	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Mohan Bera
1003	ICPAES ISM01.2 S1	MP81209	06/25/2024	06/30/2024	Sarabjit Jaswal	None	None	
								06/27/2024

FROM 0.50000ml of MP81208 + 99.50000ml of MP80924 = Final Quantity: 100.000 ml



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Metals STANDARD PREPARATION LOG

Recipe ID	NAME	<u>NO.</u>	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipettelD</u>	Supervised By mohammad
1222	ICV ICPAES	MP81250	06/24/2024	06/30/2024	Sarabjit Jaswal	None	None	ahmed 07/01/2024

FROM	0.25000ml of M4878 + 5.00000ml of M5294 + 44.75000ml of MP80924	= Final Quantity: 50.000 ml

Recipe				Expiration	<u>Prepared</u>			Supervised By
<u>ID</u>	<u>NAME</u>	NO.	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Mohan Bera
902	ICP AES CAL BLK (SO/ICB/CCB)	MP81288	07/01/2024	07/30/2024	Sarabjit Jaswal	None	None	
								07/03/2024

FROM 125.00000ml of M5947 + 2350.00000ml of W3112 + 25.00000ml of M5954 = Final Quantity: 2500.000 ml



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Metals STANDARD PREPARATION LOG

<u>ID</u> NAME	NO.	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Mohan Dara
1004 ICPAES		07/01/2024		Sarabjit Jaswal	None	METALS_PIPE TTE 3 (A)	Mohan Bera 5 07/03/2024

FROM

 $0.25000 \text{ml of M5798} + 0.50000 \text{ml of M5429} + 0.50000 \text{ml of M5473} + 0.50000 \text{ml of M5815} + 0.50000 \text{ml of M5817} + \\ 12.50000 \text{ml of M5200} + 12.50000 \text{ml of M5288} + 12.50000 \text{ml of M5698} + 12.50000 \text{ml of M5819} + 13.75000 \text{ml of M5697} + \\ 14.50000 \text{ml of M5289} + 14.50000 \text{ml of M5298} + 14.50000 \text{ml of M5658} + 2.00000 \text{ml of M5513} + 22.50000 \text{ml of M5769} + \\ 22.50000 \text{ml of M5804} + 5.00000 \text{ml of M5272} + 5.00000 \text{ml of M5296} + 5.00000 \text{ml} \text{of M5875} + 318.50000 \text{ml of MP81288} = \text{Final Quantity: } 500.000 \text{ ml} \\ \\$

Recipe				Expiration	<u>Prepared</u>			Supervised By
<u>ID</u>	NAME	NO.	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Mohan Bera
1005	ICPAES ISM01.2(S4)	MP81290	07/01/2024	07/30/2024	Sarabjit Jaswal	None	None	
								07/03/2024

FROM 250.00000ml of MP81288 + 250.00000ml of MP81289 = Final Quantity: 500.000 ml



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Metals STANDARD PREPARATION LOG

Recipe	NAME	NO	Bron Dato	<u>Expiration</u>	Prepared By	ScaloID	PinottolD	Supervised By
<u>ID</u> 1007		NO. MP81291	Prep Date 07/01/2024		<u>By</u> Sarabjit Jaswal	<u>ScaleID</u> None	PipetteID METALS PIPE	Mohan Bera
	` '				,		TTE_3 (A)	07/03/2024

FROM	25.00000ml of MP81289 + 75.00000ml of MP81288	= Final Quantity: 100.000 ml
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Recipe				Expiration	<u>Prepared</u>			Supervised By
<u>ID</u>	<u>NAME</u>	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Mohan Bera
1008	ICPAES ISM01.2(S2)	MP81292	07/01/2024	07/30/2024	Sarabjit Jaswal	None	METALS_PIPE	
							TTE_3 (A)	07/03/2024

FROM 12.50000ml of MP81289 + 87.50000ml of MP81288 = Final Quantity: 100.000 ml



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Metals STANDARD PREPARATION LOG

994 ICPAES ISM01.2 S1 (CONC.) MP81293 07/01/2024 07/07/2024 Sarabjit Jaswal None None	Recipe ID	NAME	NO.	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipetteID</u>	Supervised By Mohan Bera
	994	ICPAES ISM01.2 S1 (CONC.)	MP81293	07/01/2024	07/07/2024	Sarabjit Jaswal	None	None	07/03/2024

FROM

 $0.02000ml\ of\ M5815+0.03000ml\ of\ M5429+0.10000ml\ of\ M4877+0.10000ml\ of\ M5798+0.14000ml\ of\ M5799+0.20000ml\ of\ M4885+0.20000ml\ of\ M5192+0.20000ml\ of\ M5298+0.20000ml\ of\ M5473+0.20000ml\ of\ M5658+0.20000ml\ of\ M5747+0.20000ml\ of\ M5801+0.20000ml\ of\ M5817+0.30000ml\ of\ M5698+0.40000ml\ of\ M5289+0.50000ml\ of\ M4889+0.50000ml\ of\ M5697+0.80000ml\ of\ M5494+1.00000ml\ of\ M5227+1.00000ml\ of\ M5800+1.20000ml\ of\ M5224+1.20000ml\ of\ M5819+10.00000ml\ of\ M5200+10.00000ml\ of\ M5288+10.00000ml\ of\ M5769+10.00000ml\ of\ M5804+10.00000ml\ of\ M5818+2.00000ml\ of\ M4888+4.00000ml\ of\ M5387+35.11000ml\ of\ MP81288=Final\ Quantity:\ 100.000\ ml$

Recipe				Expiration	<u>Prepared</u>			Supervised By
<u>ID</u>	<u>NAME</u>	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Mohan Bera
1003	ICPAES ISM01.2 S1	MP81294	07/01/2024	07/07/2024	Sarabjit Jaswal	None	METALS_PIPE	<u> </u>
							TTE_3 (A)	07/03/2024

FROM 0.50000ml of MP81293 + 99.50000ml of MP81288 = Final Quantity: 100.000 ml



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Metals STANDARD PREPARATION LOG

Recipe				Expiration	<u>Prepared</u>			Supervised By
<u>ID</u>	<u>NAME</u>	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Mohan Bera
1222	ICV ICPAES	MP81295	07/01/2024	07/28/2024	Sarabjit Jaswal	None	METALS_PIPE	
							TTE_3 (A)	07/03/2024
							_	

Recipe				Expiration	Prepared			Supervised By
<u>ID</u>	<u>NAME</u>	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Mohan Bera
904	ICP AES ICSA SOLN	MP81296	07/01/2024	07/30/2024	Sarabjit Jaswal	None	METALS_PIPE	
							TTE_3 (A)	07/03/2024

FROM 25.00000ml of M5130 + 225.00000ml of MP81288 = Final Quantity: 250.000 ml



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Metals STANDARD PREPARATION LOG

Recipe ID	NAME	NO.	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipetteID</u>	Supervised By Mohan Bera
905	ICP AES ICSAB SOLN	MP81297	07/01/2024	07/30/2024	Sarabjit Jaswal	None	METALS_PIPE TTE_3 (A)	07/03/2024

FROM 25.00000ml of M5130 + 25.00000ml of M5223 + 200.00000ml of MP81288 = Final Quantity: 250.000 ml

Recipe				Expiration	<u>Prepared</u>			Supervised By
<u>ID</u>	<u>NAME</u>	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Mohan Bera
1119	ICPAES ISM01.2(CCV)	MP81298	07/01/2024	07/30/2024	Sarabjit Jaswal	None	METALS_PIPE	
							TTE_3 (A)	07/03/2024

FROM 1.50000ml of M5200 + 1.50000ml of M5497 + 1.50000ml of M5769 + 2.45000ml of M5289 + 2.45000ml of M5298 + 39.55000ml of MP81288 + 50.00000ml of MP81289 = Final Quantity: 50.000 ml



Fax: 908 789 8922

Metals STANDARD PREPARATION LOG

Recipe				Expiration	<u>Prepared</u>			Supervised By
<u>ID</u>	<u>NAME</u>	<u>NO.</u>	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Mohan Bera
919	ICP AES INTERNAL STD	MP81300	07/01/2024	07/30/2024	Sarabjit Jaswal	None	METALS_PIPE	<u> </u>
							TTE_3 (A)	07/03/2024
		•			•			

FROM 1.00000ml of M5959 + 10.00000ml of M4960 + 1969.00000ml of W3112 + 20.00000ml of M5954 = Final Quantity: 2000.000 ml

Recipe				Expiration	<u>Prepared</u>			Supervised By
<u>ID</u>	<u>NAME</u>	NO.	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Mohan Bera
903	ICP AES RINSE SOLN	MP81301	07/01/2024	07/30/2024	Sarabjit Jaswal	None	None	
								07/03/2024

FROM 200.0000ml of M5954 + 9800.00000ml of W3112 = Final Quantity: 10000.000 ml



Fax: 908 789 8922

Metals STANDARD PREPARATION LOG

Recipe				Expiration	Prepared			Supervised By		
<u>ID</u>	NAME	NO.	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Mohan Bera		
2480	ICP AES STD 6 ISM01.3	MP81308	07/01/2024	07/30/2024	Sarabjit Jaswal	None	None			
								07/03/2024		
FROM	FROM 4.00000ml of M5200 + 4.00000ml of M5289 + 4.00000ml of M5298 + 4.00000ml of M5769 + 4.00000ml of M5804 +									

4.00000ml of M5200 + 4.00000ml of M5289 + 4.00000ml of M5298 + 4.00000ml of M5769 + 4.00000ml of M5804 + 30.0000ml of MP81288 = Final Quantity: 50.000 ml

Recipe				Expiration	Prepared			Supervised By
<u>ID</u>	<u>NAME</u>	NO.	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Mohan Bera
957	CR 100.0PPM	MP81309	07/03/2024	07/30/2024	Sarabjit Jaswal	None	None	
								07/04/2024

FROM 1.00000ml of M5658 + 9.00000ml of MP81288 = Final Quantity: 10.000 ml



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

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Metals STANDARD PREPARATION LOG

Recipe ID	NAME	NO.	Prep Date	Expiration Date	Prepared By	<u>ScaleID</u>	<u>PipetteID</u>	Supervised By Mohan Bera
1905	TL 10PPM	MP81310	07/03/2024	07/12/2024	Sarabjit Jaswal	None	None	
								07/04/2024
					-			

Recipe				Expiration	Prepared			Supervised By
<u>ID</u>	<u>NAME</u>	NO.	Prep Date	<u>Date</u>	<u>By</u>	<u>ScaleID</u>	<u>PipetteID</u>	Mohan Bera
1883	SE 10PPM	MP81311	07/02/2024	07/12/2024	Sarabjit Jaswal	None	None	
								07/04/2024

FROM 0.10000ml of M5962 + 9.90000ml of MP81134 = Final Quantity: 10.000 ml



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	072821	07/28/2024	08/06/2021 / jaswal	08/05/2021 / jaswal	M4877
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	072821	07/28/2024	08/06/2021 / jaswal	08/05/2021 / jaswal	M4878
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened /	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57082 / Pb, 1000 PPM, 125 ml	062221	06/22/2024	08/06/2021 / jaswal	08/05/2021 / jaswal	M4881
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	070221	07/02/2024	08/06/2021 / jaswal	08/05/2021 / jaswal	M4883
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	072921	07/29/2024	08/06/2021 / jaswal	08/05/2021 / jaswal	M4885
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened /	Received Date /	Chemtech Lot #
Absolute Standards, Inc.	57022 / Ti, 1000 PPM, 125 ml	070721	07/07/2024	08/06/2021 / jaswal	08/05/2021 / jaswal	M4888



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	073021	07/30/2024	08/06/2021 / jaswal	08/05/2021 / jaswal	M4889
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CGIN10-5 / INDIUM 1 x 500 ml	100721	10/07/2024	10/09/2021 / jaswal	10/08/2021 / jaswal	M4960
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58139 / Y, 10000 PPM, 500 ml	052521	06/25/2024	10/09/2021 / jaswal	01/25/2019 / jaswal	M4961
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date /	Chemtech Lot #
EPA	PART A / ICSA (ICP) STOCK SOLN	ICSA-1211	11/19/2024	05/20/2024 / jaswal	04/20/2021 / bin	M5130
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date /	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 /	Chemtech Lot #
Absolute Standards, Inc.	58111 / Na, 10000 PPM, 500 ml	092121	09/21/2024	06/23/2022 / bin	10/05/2021 / bin	M5200



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 / jaswal	04/20/2021 / bin	M5223
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	101521	10/15/2024	06/29/2022 / bin	10/18/2021 / bin	M5224
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date /	Chemtech Lot #
Absolute Standards, Inc.	57023 / V, 1000 PPM, 125 ml	100121	10/01/2024	07/01/2022 / bin	10/18/2021 / bin	M5227
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date /	Chemtech Lot #
Absolute Standards, Inc.	/ Antimony (Sb)	051822	05/18/2025	05/10/2023 / bin	08/24/2022 / jaswal	M5272
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date /	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 /	Received Date /	Chemtech Lot #
Absolute Standards, Inc.	58113 / Aluminum (AI) 10,000PPM	070622	07/06/2025	09/02/2022 / jaswal	07/12/2022 / jaswal	M5289



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	01/01/2025	12/13/2023 / bin	02/20/2020 / bin	M5294
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 /	Chemtech Lot #
Absolute Standards, Inc.	58126 / Fe, 10000 PPM, 500 ml	020422	02/04/2025	05/02/2023 / jaswal	06/15/2022 / jaswal	M5298
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date /	Chemtech Lot #
Absolute Standards, Inc.	57056 / Ba, 1000 PPM, 125 ml	072122	07/21/2025	11/01/2022 / jaswal	09/18/2022 / jaswal	M5387
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	04/29/2024 / kareem	09/18/2022 / bin	M5389
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	01/30/2024 / bin	09/19/2022 / bin	M5395



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.	58112 / Mg, 10000 PPM, 500 ml	120922	12/09/2025	03/14/2023 / jaswal	03/14/2023 / jaswal	M5468
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57138 / Sr, 10000 PPM, 125 ml	082922	08/29/2025	03/16/2023 / jaswal	03/16/2023 / jaswal	M5473
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57028 / Ni, 1000 PPM, 125 ml	011223	01/12/2026	01/20/2023 / bin	01/19/2023 / bin	M5494
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened /	Received Date /	Chemtech Lot #
Absolute Standards, Inc.	58120 / Ca, 10000 PPM, 500 ml	031523	03/15/2026	03/18/2023 / bin	03/17/2023 / bin	M5497
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date /	Chemtech Lot #
Absolute Standards, Inc.	58120 / Ca, 10000 PPM, 500 ml	031523	03/15/2026	08/15/2023 / jaswal	03/17/2023 / bin	M5498



Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57182 / Pb, 10000 PPM, 125 ml	061522	06/15/2025	03/19/2023 / bin	03/17/2023 / bin	M5513
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
PCI Scientific 1403 / Hydrogen Peroxide, 30% 1 gal		820803	08/31/2024	01/03/2024 / jaswal	08/03/2022 / Al-Terek	M5632
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 /	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 /	Received Date /	Chemtech Lot #
Absolute Standards, Inc.	58025 / Mn, 1000 PPM, 500 ml	102623	10/26/2026	04/18/2024 / jaswal	10/27/2023 / jaswal	M5698
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date /	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.	52166 / ICP-AES Spike sample water matrix (18 comp.)	112823	11/28/2026	05/01/2024 / jaswal	12/15/2023 / jaswal	M5754
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	01/08/2024 / bin	01/03/2024 / bin	M5768
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date /	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 /	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 /	Chemtech Lot #
Absolute Standards, Inc.	57050 / Sn, 1000 PPM, 125 ml	071123	07/11/2026	02/09/2024 / bin	02/09/2024 / bin	M5799
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date /	Chemtech Lot #
Absolute Standards, Inc.	57027 / CO, 1000 PPM, 125 ml	091923	09/19/2026	02/09/2024 / 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.	58120 / Ca, 10000 PPM, 500 ml	122223	12/22/2026	07/01/2024 / kareem	01/03/2024 / jaswal	M5804
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date /	Chemtech Lot #
Absolute Standards, Inc.	57115 / P, 10000 PPM, 125 ml	041723	04/17/2026	05/21/2024 / Jaswal	02/09/2024 / jaswal	M5815
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57116 / S, 10000 PPM, 125 ml	071123	07/11/2026	03/01/2024 / jaswal	02/09/2024 / jaswal	M5817
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date /	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 /	Received Date /	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 #
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	BA-9530-33 / Hydrochloric Acid, Instra-Analyzed (cs/6x2.5L)	240415	11/06/2024	06/04/2024 / Al-Terek	05/07/2024 / Al-Terek	M5895
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	BA-9598-34 / Nitric Acid, Instra-Analyzed (cs/4x2.5L)	24D1062002	11/29/2024	06/05/2024 / Al-Terek	05/24/2024 / Al-Terek	M5912
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	BA-9598-34 / Nitric Acid, Instra-Analyzed (cs/4x2.5L)	24D1062002	11/29/2024	05/30/2024 / Al-Terek	05/24/2024 / Al-Terek	M5915
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened /	Received Date /	Chemtech Lot #
Seidler Chemical	BA-9598-34 / Nitric Acid, Instra-Analyzed (cs/4x2.5L)	24D1062002	12/08/2024	06/21/2024 / Al-Terek	06/07/2024 / Al-Terek	M5935
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened /	Received Date /	Chemtech Lot #
Seidler Chemical	BA-9598-34 / Nitric Acid, Instra-Analyzed (cs/4x2.5L)	24D1062002	12/20/2024	06/21/2024 / Al-Terek	06/18/2024 / Al-Terek	M5940



Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	BA-9530-33 / Hydrochloric Acid, Instra-Analyzed (cs/6x2.5L)	22G2862015	12/27/2024	06/27/2024 / Al-Terek	06/23/2024 / Al-Terek	M5947
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	BA-9598-34 / Nitric Acid, Instra-Analyzed (cs/4x2.5L)	24D1062002	01/02/2025	07/01/2024 / Al-Terek	06/25/2024 / Al-Terek	M5954
Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened /	Received Date /	Chemtech Lot #
Inorganic Ventures	CGY10-1 / YTTRIUM 125mL 10,000ug/mL	V2-Y740548	02/20/2029	07/01/2024 / Jaswal	06/14/2024 / Jaswal	M5959
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 /	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 /	Received Date /	Chemtech Lot #
Seidler Chemical	DIW / DI Water	Daily Lab-Certified	07/03/2029	07/03/2024 / Iwona	07/03/2024 / Iwona	W3112

Absolute Standards, Inc. 800-368-1131

www.absolutestandards.com



Certified Reference Material CRM M5884 M5805

12/24

Solvent: 24002546

Nitric Acid

Lot #

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

CERTIFIED WEIGHT REPORT:

Part Number: Lot Number:

Description:

58120 122223

Calcium (Ca)

Expiration Date: 122226

2%

Nitric Acid

Formulated By:

Giovanni Esposito

122223

giovanne

Desert of

(III) 80.0

Nominal Concentration (µg/mL): **NIST Test Number: 6UTB** 10000

Recommended Storage:

Ambient (20 °C)

Weight shown below was diluted to (mL): 4000.0

Compound

쭚

Number Ĕ

Conc. (µg/mL)

3

Purity (%)

3

Nominal

5E-05 Balance Uncertainty 0.06 Flask Uncertainty

Purity Uncertainty Assay

Weight (g) Target Actual

Actual

Uncertainty Expanded

Reviewed By:

Pedro L. Rentas

122223

ente

Weight (g) Canc. (µg/mL) +/- (µg/mL) CAS# (Solvent Safety Info. On Attached pg.)

OSHA PEL (TWA) LD50 OSHA PEL (TWA) **SDS Information** NIST SRM

m/z->	5.OE4	1.005	m/z->	2.5E4	5.0E4	m/z->	1.0E4	2.0≡4	
									[1] Sp
210			110			10			[1] Spectrum No.1
220			120			N 0			_
									12.51
230			130			3. 0			4 sec]:
N									58120.
N 40			140			6			.D# [C
250			150			5.0			12.514 sec]:58120.D# [Count] [Linear]
			0						Linear
N O			160			60			er]
						4			
			170			6			
			ad.			M			
			180			80			
			190			90			
			200			100			
									i di

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

	Al Sb As Ba Be
	40.02 40.02 40.02 40.02
	58585
	40.02 40.02 40.02
	돌유요요요 말 다 맛
	8888888
	######################################
	4000 4000 4000 4000 4000 4000 4000
	Mo Hg Kg
(T = T	40,02 40,02 40,02 40,02 40,02 40,02
Target analyte	A P P R S S R R
alvte	8
	Sc Ru Ru Sc
	40.02 40.02 40.02 40.02 40.02 40.02
	Na A A
	0.02 0.02 0.02 0.02 0.02
	The Tree San
	4000 4000 4000 4000 4000
	½
	40.02 40.02 40.02 40.02 40.02

Physical Characterization:

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

Certified by:

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

* All standard containers are meticulously cleaned prior to use.

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

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

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

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



Certificate of Analysis

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

1.0 ACCREDITATION / REGISTRATION

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



2.0 PRODUCT DESCRIPTION

Product Code: Multi Analyte Custom Grade Solution

Catalog Number: 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, Molybdenum,

Silicon, Tin,

Titanium

3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE CERTIFIED VALUE ANALYTE CERTIFIED VALUE Boron, B $1\ 000\pm 6\ \mu g/mL$ Molybdenum, Mo $1\ 000\pm 6\ \mu g/mL$ Silicon, Si $1\ 000\pm 7\ \mu g/mL$ Tin, Sn $1\ 000\pm 6\ \mu g/mL$

Titanium, Ti $1000 \pm 7 \mu g/mL$

Density: 1.030 g/mL (measured at 20 \pm 4 °C)

Assay Information:

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
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 Characterization of CRM/RM by One Method Certified Value, X_{CRM/RM}, where two or more methods of characterization are 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} Xa = mean of Assay Method A with $\mathbf{w_i}$ = the weighting factors for each method calculated using the inverse square of u_{char a} = the standard uncertainty of characterization Method A $\mathbf{w_i} = (1/u_{\text{char i}})^2 / (\Sigma (1/(u_{\text{char i}})^2)$ CRM/RM Expanded Uncertainty (±) = $U_{CRM/RM}$ = k ($u_{char}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2$)^{1/2} CRM/RM Expanded Uncertainty (±) = $U_{CRM/RM} = k (u_{char}^2 a + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$ k = coverage factor = 2 k = coverage factor = 2 $\mathbf{u_{char}} = \left[\sum ((\mathbf{w_i})^2 (\mathbf{u_{char}}_i)^2)\right]^{1/2}$ where $\mathbf{u_{char}}_i$ are the errors from each characterization method u_{char a} = the errors from characterization ubb = bottle to bottle homogeneity standard uncertainty $\mathbf{u_{bb}}$ = bottle to bottle homogeneity standard uncertainty u_{lts} = long term stability standard uncertainty (storage) u_{lts} = long term stability standard uncertainty (storage) uts = transport stability standard uncertainty u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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

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 $20^{\circ} \pm 4^{\circ}$ 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

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

- Sealed TCT Rag Open Date:

- 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

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This CDM/DM should not be us	and langer than one year (or civ	months in the case	of a 20 m

- Inis 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.

Michael 2 Booth

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Michael Booth Director, Quality Control

Certifying Officer:

Paul Gaines

Chairman / Senior Technical Director

Paul R Sains



Certificate of Analysis

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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, Potassium, Magnesium, Sodium,

2 000 μg/mL ea:

Aluminum, Barium,

1 000 µg/mL ea:

Iron,

500 μg/mL ea:

Nickel, Vanadium, Zinc, Cobalt,

Manganese, 250 μg/mL ea:

Silver, Copper,

200 μg/mL ea: Chromium, 50 μg/mL ea: Beryllium

3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE Aluminum, Al	CERTIFIED VALUE 2 000 ± 7 μg/mL	ANALYTE Barium, Ba	CERTIFIED VALUE 2 000 ± 9 μg/mL
Beryllium, Be	50.00 ± 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:

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	ANALYTE	METHOD	NIST SRM#	SRM LOT#
	Ag	ICP Assay	3151	160729
	Ag	Volhard	999c	999c
	Al	ICP Assay	3101a	140903
	Al	EDTA	928	928
	Ва	ICP Assay	3104a	140909
	Ва	Gravimetric		See Sec. 4.2
	Ве	ICP Assay	3105a	090514
	Ве	Calculated		See Sec. 4.2
	Ca	ICP Assay	3109a	130213
	Ca	EDTA	928	928
	Co	ICP Assay	3113	190630
	Co	EDTA	928	928
	Cr	ICP Assay	3112a	170630
	Cr	Calculated		See Sec. 4.2
	Cu	ICP Assay	3114	121207
	Cu	EDTA	928	928
	Fe	ICP Assay	3126a	140812
	Fe	EDTA	928	928
	K	ICP Assay	3141a	140813
	K	Gravimetric		See Sec. 4.2
	Mg	ICP Assay	3131a	140110
	Mg	EDTA	928	928
	Mn	ICP Assay	3132	050429
	Mn	EDTA	928	928
	Na	ICP Assay	3152a	120715
	Na	Gravimetric		See Sec. 4.2
	Ni	ICP Assay	3136	120619
	Ni	EDTA	928	928
	V	IC Assay	3165	160906
	V	EDTA	928	928
	Zn	ICP Assay	3168a	120629
	Zn	EDTA	928	928

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

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

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

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

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

8.0 HAZARDOUS INFORMATION

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

9.0 HOMOGENEITY

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

10.0 QUALITY STANDARD DOCUMENTATION

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- QSR Certificate Number QSR-1034

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

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

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Thomas Kozikowski Manager, Quality Control

Certifying Officer:

Paul Gaines

Chairman / Senior Technical Director

20178Ci



Certificate of Analysis

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2.0 PRODUCT DESCRIPTION

Product Code: Multi Analyte Custom Grade Solution

CLPP-CAL-3 Catalog Number: T2-MEB714159 Lot Number: Matrix: 7% (v/v) HNO3 Value / Analyte(s):

> Arsenic, Lead, Selenium, Thallium,

500 µg/mL ea: Cadmium

1 000 µg/mL ea:

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

ANALYTE CERTIFIED VALUE ANALYTE CERTIFIED VALUE 1 000 ± 8 µg/mL Cadmium, Cd $500.0 \pm 2.1 \, \mu g/mL$ Arsenic, As Lead, Pb 1 000 ± 5 µg/mL Selenium, Se 1 000 ± 8 µg/mL

Thallium, TI 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
TI	ICP Assay	3158	151215

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

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6.0 INTENDED USE

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7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

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- 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

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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:	
· Sealeo TCT Bao Oberi Dale	

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

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Thomas Kozikowski Manager, Quality Control

Certifying Officer:

Paul Gaines

Chairman / Senior Technical Director

20178Ci

www.absolutestandards.com

CERTIFIED WEIGHT REPORT:



Certified Reference Material CRM



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

	Volume shown below was diluted to (mL):	NIST Test Number:	Nominal Concentration (µg/mL):	Recommended Storage:	Expiration Date:		Description:	Lot Number:	Part Number:	ERTIFIED WEIGHT REPORT:
	diluted to (mL): 2000.02	6UTB	1000	Ambient (20 °C)	072824		Cadmium (Cd)	<u>072821</u>	57048	
	0.058 Flask Uncertainty	5E-05 Balance Uncertainty				2.0%			20370011	Lot #
					(mL)	40.0			Nitric Acid	Solvent:
						Nitric Acid				
Expanded		Reviewed By:	Tuna.	1)	Formulated By:	ě	Treverse	• * *	
SDS Information		Pedro L. Rentas	Juna	R		Giovanni Esposito		でもなるが	+	
		072821				072821				

Compound

Part Number

Lot Number

Vol. (mL) Pipette (mL) Conc. (µg/mL)

Conc. (µg/mL) Conc. (µg/mL)

Uncertainty +/- (µg/mL)

CAS#

OSHA PEL (TWA)

LD50

(Solvent Safety Info. On Attached pg.)

SRM SRM

Dilution Factor

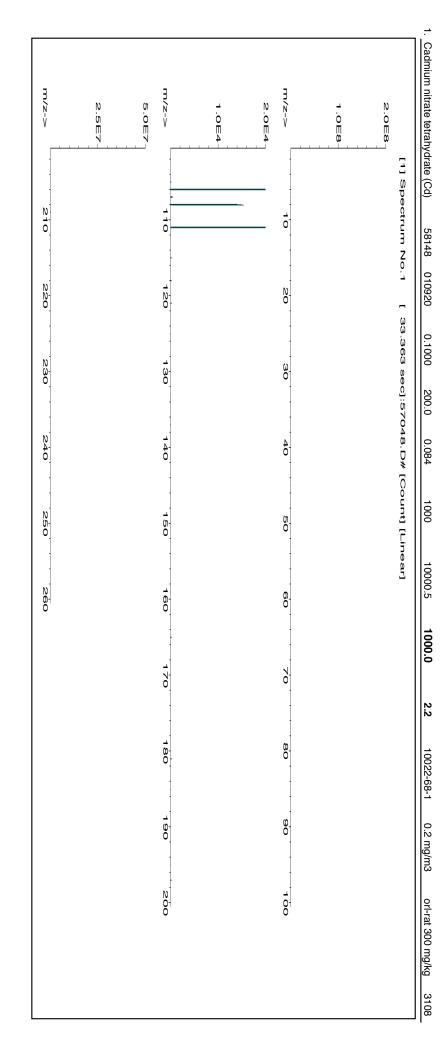
Initial

Uncertainty

Nominal

Initial

Final





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

							Trace M	etals	Verificati	tion	by ICP-N	94) SI	ያ/mL)						
												;							
Al	< 0.02	СС	T	Dy	< 0.02	Hf	<0.02	Li	< 0.02	N:	<0.02	Pr	<0.02	Se	<0.2	ďТ	<0.02	W	<0.02
Sb	< 0.02	Ca	<0.2	다	<0.02	Но	<0.02	Lu	<0.02	Ŗ	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	□	<0.02
As	<0.2	Се	< 0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	< 0.02	1	<0.02	<	<0.02
Ва	< 0.02	Cs	< 0.02	Gd	< 0.02	ŀ	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Υb	<0.02
Ве	< 0.01	Çŗ	< 0.02	Ga	< 0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Υ	<0.02
Bi	< 0.02	င္ပ	< 0.02	Ge	< 0.02	La	<0.02	Мо	<0.02	P	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
В	< 0.02	Си	< 0.02	Au	<0.02	РЬ	<0.02	Z	<0.02	Χ.	<0.2	Sc	<0.02	Ta	< 0.02	T:	<0.02	Zr	<0.02

(T)= Target analyte

Physical Characterization:

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

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

- * 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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SESTIM



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CERTIFIED WEIGHT REPORT: Nominal Concentration (µg/mL): Recommended Storage: Volume shown below was diluted to (mL): **NIST Test Number: Expiration Date:** Part Number: Description: Lot Number: 57042 072821 **BTU9** 1000 072824 Ambient (20 °C) Molybdenum (Mo) 2000.02 0.058 5E-05 Balance Uncertainty Flask Uncertainty MKBQ8597V Ammonium hydroxide Lot # 0.5% Solvent: (ME) 10.0 Ammonium hydroxide Formulated By: Reviewed By: Dievanie LASSEL Giovanni Esposito Pedro L. Rentas 072821 072821

Compound

Number Part

Number Lot

Vol. (ml.) Pipette (ml.) Conc. (µg/ml.)

Conc. (µg/mL)

Conc. (µg/mL)

Dilution Factor

Initial

Uncertainty

Nominal

Initial

Final

Uncertainty +/- (µg/mL)

(Solvent Safety Info. On Attached pg.)

SDS Information

CAS#

OSHA PEL (TWA)

LD50

TSIN SRM

Expanded

1.0E6	2.0€6	m/z->	1000	2000	m/z-y	1.0E5	N.OE5	
							[1] Sp	
		110			0		[1] Spectrum No.1	
							Z 0.1	
		120			20		. 8	
		130			30		.594 s	
		ŏ			0		ec]:570	
		140			40		8.594 sec]:57042.D# [Count] [Linear]	
							(Cour	
		150			50		it] [Line	
		_			0		ear]	
		160			60			
		170			70			
		180			80			
		190			90			
		20			10			
		200			100			

Part # 57042

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

		_	Ве					Care Branch Present		NAME AND ADDRESS OF TAXABLE PARTY.
	40.02	40.02	40.01	<0.02	<0.2	40.02	<0.02			The state of the s
	Cr	င္ပ	ζ.	S	င့	Ca	CO			NAME AND ADDRESS OF TAXABLE PARTY.
	<0.02	<0.02	<0.02	<0.02	<0.02	<0.2	<0.02			Committee of the Committee of the Committee of
	Au	ဂ္ဂ	Ga	ପ୍ର	Eu	ဌ	Dy			
The second name of the least of	<0.02	<0.02	40.02	<0.02	40.02	<0.02	<0.02			
	Pb	La	Fe	Ιτ	'n	Но	ЭH			
CONTROL SALES AND ADDRESS OF THE PERSON NAMED IN COLUMN NAMED	<0.02	<0.02	<0.2	<0.02	<0.02	<0.02	<0.02		Trace M	
	Nd	Mo	Hg	Mn	Mg	Lu	Ľ		/letals	-
THE REAL PROPERTY AND ADDRESS OF THE PERSON NAMED IN COLUMN 1	<0.02	Н	<0.2	<0.02	40.01	<0.02	<0.02		Verifica	
	×	7	P	Pd	o _s	Š	ĭ		tion	
	<0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		oy ICP-M	
	Sc	Sm	Ru	Rb	Rh	Re	Pr		S (µg	
	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		J/mL)	
	Ta	s	Sr	Na	Ag	Si	Se			
	<0.02	<0.02	<0.02	40.2	<0.02	<0.02	40.2			
	71	Sn	Tm	긁	=======================================	Te	т			
	<0.02	40.02	40.02	40.02	40.02	40.02	<0.02			The second secon
	Zr	Zn	×	4,4	<	C	W			
	<0.02	40.02	<0.02	40.02	40.02	<0.02	<0.02			

(1)= larger arrange

Physical Characterization:

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

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

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

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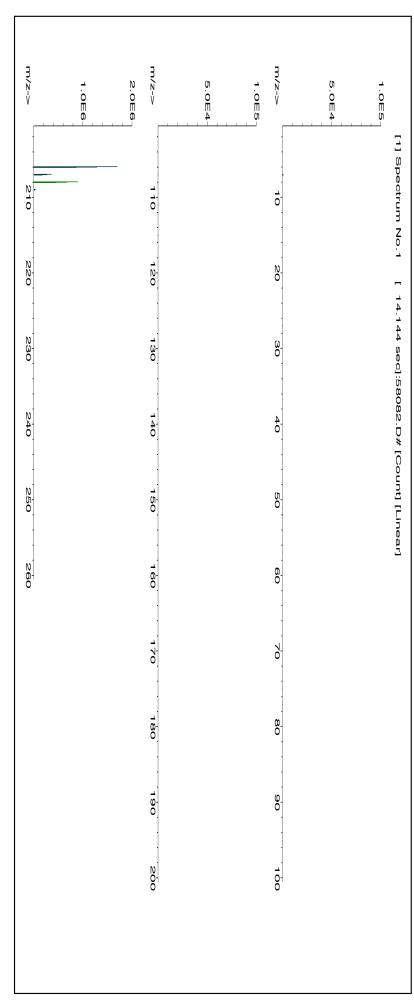


CERTIFIED WEIGHT REPORT: Nominal Concentration (µg/mL): Recommended Storage: Volume shown below was diluted to (mL): NIST Test Number: **Expiration Date:** Part Number: **Lot Number:** Description: 57082 062221 Lead (Pb) 1000 062224 Ambient (20 °C) 2000.02 5E-05 0.058 Flask Uncertainty Balance Uncertainty 20370011 Lot # 2.0% Nitric Acid Solvent: (mL)40.0 Nitric Acid Formulated By: Reviewed By: Pedro L. Rentas Lawrence Barry 062221 062221

	Part	Part Lot	Dilution		Initial Uncertainty Nominal	Nominal	Initial	Final	Final Uncertainty	(Solve	(Solvent Safety Info. On Attached pg.)	Attached pg.)	NIST
Compound	Number	Number	Factor	Vol. (mL)	Pipette (mL)	Conc. (µg/mL)	Number Number Factor Vol. (mL) Pipette (mL) Conc. (µg/mL) Conc. (µg/mL) Cor	Conc. (µg/mL)	nc. (μg/mL) +/- (μg/mL)		CAS# OSHA PEL (TWA)	LD50	SRM
1. Lead (II) Nitrate (Pb)	58182	032321	0.1000	200.0	0.084	58182 032321 0.1000 200.0 0.084 1000	10000.1	1000.0	2.2	10099-74-8	0.05 mg/m3	2.2 10099-74-8 0.05 mg/m3 intrvns-rat 93 mg/kg 3128	g 3128

Expanded

SDS Information







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

							Trace M	etals	Verifica:	tion k	ງy ICP-№	IS (µç)/mL)						
Al	< 0.02	СЧ	<0.02	Dy	<0.02	Hf	< 0.02	Li	<0.02	N:	< 0.02	Pr	<0.02	Se	<0.2	Тъ	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Но	< 0.02	Lu	<0.02	Nb	< 0.02	Re	<0.02	Si	< 0.02	Te	<0.02	U	<0.02
As	<0.2	Се	<0.02	Eu	<0.02	h	< 0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	< 0.02	T	<0.02	٧	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	ŀ	< 0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	ΥЪ	<0.02
Ве	<0.01	Ç	<0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	< 0.02	Tm	<0.02	Υ	<0.02
B:	<0.02	Со	<0.02	Ge	<0.02	La	< 0.02	Мо	<0.02	Ρt	<0.02	Sm	<0.02	S	< 0.02	Sn	<0.02	Zn	<0.02
В	<0.02	Cu	<0.02	Au	<0.02	Pb	T	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	< 0.02	Ti	<0.02	Zr	<0.02
									(T)- T	(T)- Tamet analyte	alvto								

(I)= larget analyte

Physical Characterization:

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

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

 * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
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- * Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated.
- * All standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

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Volume shown below was diluted to (mL): 2000.02	NIST Test Number:	Hecommended Storage: Nominal Concentration (µg/mL):	Expiration Date:		Lot Number: Description:	Part Number:	CERTIFIED WEIGHT REPORT:
iluted to (mL): 2000.0	6UTB	Ambient (20°C) 1000	070224		070221 Selenium (Se)	<u>57034</u>	
2 0.058 Flask Uncertainty	5E-05 Balance Uncertainty			2.0%		20370011	Lot #
			(mL)	40.0		Nitric Acid	Solvent:
				Nitric Acid			-
Expanded	Reviewed By:	Hedro		Formulated By:	Liverne	'n	
SDS Information	Pedro L. Rentas	tento		Giovanni Esposito	2 Apresius		
	070221			070221			

Compound

Number Part

Number

Vol. (mL) Pipette (mL) Conc. (µg/mL)

Conc. (µg/mL) Conc. (µg/mL)

+/- (µg/mL) Uncertainty Expanded

CAS#

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

LD50

NIST SRM

Lot

Dilution Factor

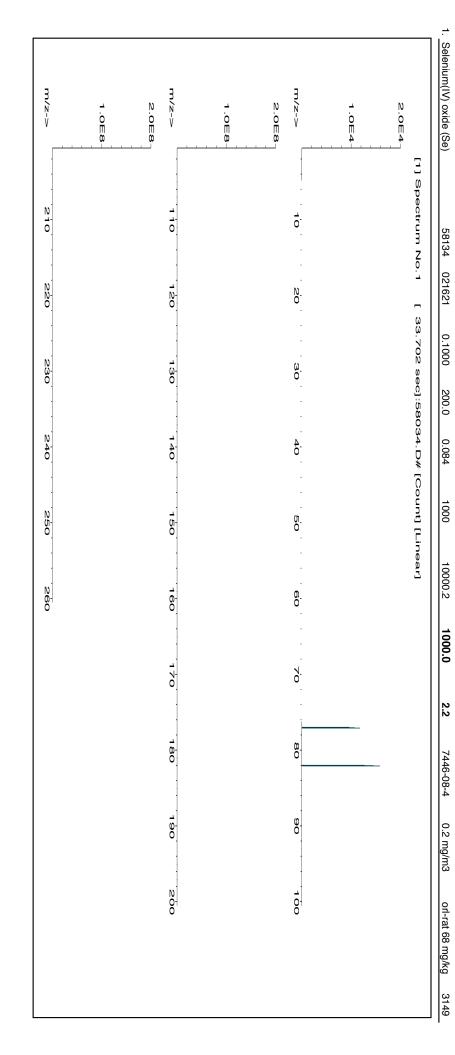
Initial

Uncertainty

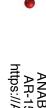
Nominal

Initial

Final



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

								Trace M	etals	Verifica	tion l	oy ICP-N	S (μς	₃/mL)						
>		<0.02	Cd	<0.02	Dν	<0.02	Hf	<0.02	Li	<0.02	N:	<0.02	Pr	<0.02	Se	T	- dT	<0.02	W	
Sb	ъ	< 0.02	Ca	<0.2	Εr	< 0.02	Но	<0.02	Lu	<0.02	N _P	< 0.02	Re	< 0.02	S:	<0.02	Te	< 0.02	U	
⊳	S	<0.2	Се	< 0.02	Eu	< 0.02	Īn	<0.02	Mg	<0.01	Os	< 0.02	Rh	<0.02	Ag	<0.02	TI	< 0.02	<	
В	<u>8</u> 2	<0.02	Cs	<0.02	Gd	<0.02	ŀ	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	ΥЪ	
В	ė.	<0.01	Cr	<0.02	Ga	<0.02	Fe	<0.2	$_{\mathrm{Hg}}$	<0.2	P	<0.02	Ru	<0.02	S_{Γ}	<0.02	Tm	<0.02	Y	
В	<u>27.</u>	<0.02	Со	< 0.02	Ge	< 0.02	La	< 0.02	Mo	< 0.02	P	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	
H	-	<0.02	Cu	< 0.02	Au	< 0.02	Рь	<0.02	Nd	< 0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	
ľ	ŀ						l			<u> </u>										

(T)= Target analyte

Physical Characterization:

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



- * The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- * All standard containers are meticulously cleaned prior to use.
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CERTIFIED WEIGHT REPORT: Nominal Concentration (µg/mL): Recommended Storage: Volume shown below was diluted to (mL): NIST Test Number: **Expiration Date:** Part Number: **Lot Number:** Description: 57047 072921 Silver (Ag) 072924 1000 Ambient (20 °C) 2000.02 0.058 5E-05 Balance Uncertainty Flask Uncertainty 20370011 Lot # 2.0% Nitric Acid Solvent: (mL)40.0 Nitric Acid Formulated By: Reviewed By: Giovannie Laperthe L Pedro L. Rentas Giovanni Esposito ento 072921 072921

Part Number

Lot Number

Vol. (mL)

Uncertainty
Pipette (mL)

Conc. (µg/mL)

Conc. (µg/mL)

Conc. (µg/mL)

Expanded
Uncertainty
+/- (µg/mL)

CAS#

OSHA PEL (TWA)

LD50

SRM SRM

(Solvent Safety Info. On Attached pg.)

SDS Information

Nominal

Initial

Final

Dilution Factor

Initial

m/z->	N.5E6-	5.0E6	m/z->	2.555	5.0E5	m/z->	 1000-	2000	
N10			110			10			[1] Spectrum No.1
N N O			120			N ₀			
NG0 0			130			30			0.014 sec]:
ν 040			140			4.			[10.014 sec]:58047.D# [Count] [Linear]
N (50)			150			50			Count] [Line
N 00			160			60			ear]
			170			70			
			180			80			
			190			90			
			200			100			

Part # 57047

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

							Trace M	etals	Verifica	tion	oy ICP-N	IS (µo	J/mL)						
		2		,		777				X 7:		,		ñ		3	8	777	
Al	< 0.02	С	< 0.02	Dy	<0.02	Нf	< 0.02	Li	< 0.02	N:	<0.02	Pr	< 0.02	Se	<0.2	ďТ	<0.02	M	< 0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Но	< 0.02	Lu	<0.02	Np	<0.02	Re	<0.02	S:	<0.02	Te	<0.02	U	< 0.02
As	<0.2	Се	< 0.02	Eu	<0.02	In	<0.02	Mg	< 0.01	Os	<0.02	Rh	<0.02	Ag	Т	11	<0.02	٧	< 0.02
Ba	<0.02	Cs	< 0.02	Gd	<0.02	ŀ	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	ΥЬ	< 0.02
Ве	< 0.01	Ωr	< 0.02	Ga	<0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Υ	< 0.02
Bi	<0.02	Со	< 0.02	Ge	<0.02	La	<0.02	Мо	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	< 0.02
В	< 0.02	Cu	< 0.02	Au	<0.02	Рь	< 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.

- * 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.
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CERTIFIED WEIGHT REPORT: Nominal Concentration (µg/mL): Recommended Storage: Volume shown below was diluted to (mL): NIST Test Number: **Expiration Date:** Part Number: **Lot Number:** Description: 070724 1000 57022 070721 Ambient (20 °C) Titanium (Ti) 2000.02 0.058 5E-05 Flask Uncertainty Balance Uncertainty 20370011 Lot # 2.0% Nitric Acid Solvent: (mL) 40.0 Nitric Acid Formulated By: Reviewed By: Expanded Pedro L. Rentas ento Lawrence Barry SDS Information 070721 070721

1. Ammonium hexafluorotitanate (Ti)

58122

070120

0.1000

200.0

0.084

1000

10000.1

1000.0

2.2

16962-40-6

2.5 (F) mg/m3

Ϋ́

3162a

Compound

Number

Number Lot

Vol. (mL)

Pipette

Conc. (µg/mL)

Conc. (µg/mL) Conc. (µg/mL)

+/- (µg/mL) Uncertainty

CAS#

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

LD50

NIST SRM

Final

Part

Dilution Factor

Initial

Uncertainty

Nominal

m/x>	2.507	5.0E7	1.0E8-	2.0E8	5.0E4-	1.0E5
מ		110		10		
N N O		120		20		
230		130		30		
040		140		40		
250		150		50		
ν 60		160		60		
		170 1		70		
		180 19		9		
		190 200		90 100		



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

							Trace M	letals	Verifica:	tion	oy ICP-N	ir) SV	₃/mL)						
Al	< 0.02	Cd	< 0.02	Dy	<0.02	Ή	<0.02	Li	<0.02	Ni	<0.02	Pr	<0.02	Se	<0.2	ф	<0.02	W	< 0.02
Sb	<0.02	Ca	<0.2	땹	<0.02	Но	<0.02	Lu	<0.02	В	<0.02	Re	<0.02	S:	<0.02	Te	<0.02	U	<0.02
As	40.2	Се	<0.02	Eu	<0.02	Ín	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	TI	<0.02	<	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	ŀ	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Υь	<0.02
Ве	<0.01	Cr	< 0.02	Ga	<0.02	Fe	<0.2	$_{ m Hg}$	<0.2	P	< 0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Со	<0.02	Ge	<0.02	La	<0.02	Mo	<0.02	Ρt	<0.02	Sm	<0.02	s	<0.02	Sn	<0.02	Zn	<0.02
В	<0.02	Cu	<0.02	Au	<0.02	Рь	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	Τ	Zr	< 0.02
) I										

(T)= Target analyte

Physical Characterization:

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

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

 * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in
- the preparation of all standards.* All standard containers are meticulously cleaned prior to use.
- * 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.
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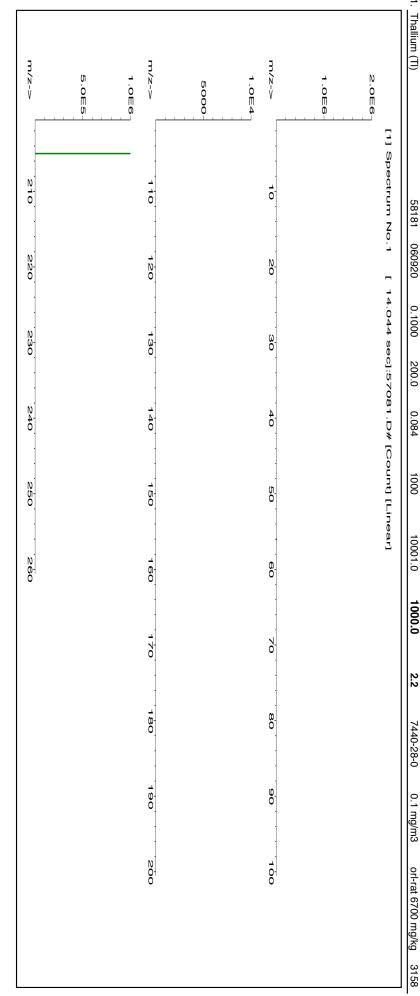


Certified Reference Material CRM



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

1. Thallium (TI)	Compound	Volume	NIS	Recommended Storage: Nominal Concentration (µg/mL):	F					CERTIFIED WEIGHT REPORT:	
51	Z	Volume shown below was diluted to (mL):	NIST Test Number:	Recommended Storage: I Concentration (µg/mL):	Expiration Date:		Description:	Lot Number:	Part Number:	<u>ORT:</u>	
58181 060920	Part Number	diluted	: . 6	≟ ≥	0		ı	9 19	וֹנ		(
060920	Lot Number	to (mL):	6UTB	Ambient (20 °C) 1000	073024		Гhallium (TI	073021	7081		
0 1000	Dilution Factor	2000.02		°C)			E				
	Initial Vol. (mL)	0.058									
0 00 4	Initial Uncertainty ol. (mL) Pipette (mL)	Flask Uncertainty	Balance Uncertainty								
1000	Nominal Conc. (µg/mL)	ıtγ	tainty			2.0%		0	20370011	Lot#	
10001.0	Initial Conc. (µg/mL)				(mL)	40.0			Nitric Acid	Solvent:	
1000.0	Initial Uncertainty Nominal Initial Final Uncertainty Vol. (mL) Pipette (mL) Conc. (µg/mL) Conc. (µg/mL) Conc. (µg/mL) +/- (µg/mL)					Nitric Acid					
2.2	Uncertainty +/- (µg/mL)	Expanded	Reviewed By:	M	\	Formulated By:	2	1°			
7440-28-0	(Solv			16 V	7	y:	1	Jack S			•
0.1 mg/m3	(Solvent Safety Info. On Attached pg.) # OSHA PEL (TWA) LD50	SDS Information	Pedro L. Rentas	tenta		Giovanni Esposito	-	Taracter.	•		1
orl-rat 6700 mg/kg	Attached pg.) LD50	tion	073021			073021					
3158	NIST SRM			•			1		!		





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

							Trace M	letals	Verificatio	tion	by ICP-N	id) SV	g/mL)					
Al	< 0.02	СА	< 0.02	Dy	< 0.02	Нf	<0.02	Ŀ	<0.02	Z:	<0.02	Pr	<0.02	Se	<0.2	Ть		<0.02
Sb	< 0.02	Ca	<0.2	Ę	< 0.02	Но	< 0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	S:	<0.02	Te	<u>^</u>).02
As	<0.2	Се	< 0.02	Eu	< 0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	<u>T</u> 1	. 1	Г
Ва	< 0.02	Cs	< 0.02	Gd	< 0.02	ŀ	<0.02	Mn	<0.02	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.0	ß
Ве	< 0.01	Cr	< 0.02	Ga	< 0.02	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	< 0.02	Ö
Bi	< 0.02	င္ပ	< 0.02	Ge	< 0.02	La	< 0.02	Мо	<0.02	P	<0.02	Sm	<0.02	S	<0.02	Sn	<0.0	ß
В	<0.02	Cu	<0.02	Au	< 0.02	Рь	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.	02
									(T) - Target applicate	2501.40								

(I)= larget analyte

Physical Characterization:

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



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

 * Standards are certifed (+/-) 0.5% of the stated value, unless otherwise stated.
- * All Standards should be stored with caps tight and under appropriate laboratory conditions.
- * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

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CERTIFIED WEIGHT REPORT:

Part Number: Lot Number: Description:

58149

R: 10/08/

Lot #

Solvent: 20370011 Nitric Acid

Dievannie

specific

5%

Nitric Acid

(III) 25.0

> Formulated By: Giovanni Esposito

> > 100721

Nominal Concentration (µg/mL): NIST Test Number:

10000

Ambient (20 °C)

Recommended Storage:

Expiration Date:

100724

Indium (In) 100721

Weight shown below was diluted to (mL):

500.06

0.058 Flask Uncertainty 5E-05 Balance Uncertainty

RM#

Number Lot

Conc. (µg/mL)

(%)

Purity (%)

8

Weight (g)

Weight (g) Conc. (μg/mL) +/- (μg/mL)

CAS#

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

NIST SRM

OSHA PEL (TWA)

Target

Actual

Actual

Uncertainty Expanded

Nominal

Purity Uncertainty Assay

Reviewed By:

Pedro L. Rentas

100721

SDS Information

2.5E6	5.0E6	m/z->	1.0E6	2.0E6	m/z->	2.5E7	5.0E7	1. Indium Oxide (In)
							[1] 8	
		110			10		[1] Spectrum No.1	
		and his part to a mage.					n No.	IN086 W1096A
		120			20			1096A
							12.965	10000
		130			30		sec]:5	99.999
		1			4		[12.965 sec]:57049.D# [Count] [Linear]	0.10
		140			0		D# [Co	82.6
		150			50		It (true	6.05408
							_inear]	11
		160			60			6.05441
								10000.6
		170			70			3 20.1
		180			80			11
		ŏ			0			1312-43-2
		190			90			
								NA
		200			100			
								NA NA
								3124a

m/z->

210

220

230

240

250

260



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

	-		-				
₩	Bi	Ba	As	Sb	A		
40.02	♦ 0.01	40.02	0.2	<0.02	<0.02		
Cr.	ರಿ ರ	S	င့	Ca	ß		
<0.02	<0.02	<0.02	<0.02	40.2	<0.02		
<u>≱</u>	ද ව	8	Eu	甲	Dy		
<0.02	<0.02 0.02	<0.02	<0.02	<0.02	<0.02		
P	L F	F	In	Но	Hf		
<0.02	40,02	<0.02	7	<0.02	<0.02	I acc ivid	Trace Ma
Z S	M _o	M	Mg	Lu	<u>L</u> .	icrais	2+2/2
40.02 K	402	<0.02	40.01	<0.02	<0.02	ACHICA	Vorificat
R :	Ā Þ	Pd	õ	S	Z		2
	<0.02 €0.02	<0.02	<0.02	<0.02	<0.02	y ICF-IVIO	WICD MC
Sc S	S P	R _b	Rh.	Re	꾸	649	
40.02	A 0.02	<0.02	<0.02	<0.02	<0.02		1
ia o	Sr.	N _a	Ag	Si	Se		
40.02	A 0.02	0.2	<0.02	40.02	40.2		
=1 }	S T	ħ	Ħ	Te	Тb		
40.02	A A.02	<0.02	<0.02	<0.02	40.02		
7.7	7 4	4,4	<	c	W		
<0.02	A 0.02	<0.02	<0.02	<0.02	<0.02		

(I)= larger analyte

Physical Characterization:

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

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

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

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

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

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

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

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CERTIFIED WEIGHT REPORT:



Certified Reference Material CRM



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

180/08 Lot #

Part Number: Lot Number: Description: 052521 Yttrium (Y) 58139

Solvent: 20370011

Nitric Acid

2%

Nitric Acid

Formulated By:

Lawrence Barry

052521

052521

Lumine

40.0

Expiration Date: 052524

Nominal Concentration (µg/mL): Recommended Storage: **6UTB** 10000 Ambient (20 °C)

Weight shown below was diluted to (mL): **NIST Test Number:** 2000.02 0.058 Flask Uncertainty 5E-05 Balance Uncertainty Reviewed By: Expanded Pedro L. Rentas SDS Information

-	II.	
Yttrium (III) Oxide (Y)	Compound	
IN087	RM#	
IN087 YV012015B1	Number	Lot
10000	er Conc. (µg/mL) (%) Purity (%) (%) \	Nominal
99.999	(%)	Purity
0.10	Purity (%)	Uncertainty
77.9	(%)	Assay
77.9 25.6744 25.6745	Weight (g)	Target
25.6745	Weight (g)	Actual
10000.0	Conc. (µg/mL)	Actual
20.0 1314-36-9	onc. (µg/mL) +/- (µg/mL) CAS#	Uncertainty
1314-36-9	CAS#	(Solv
NA	OSHA PEL (TWA)	(Solvent Safety Info. On Attached pg.)
N	LD50	thed pg.)
N N	SRM	NIST

m/z->	1.0E5	2.0E5	m/z->	2.5E4	m/z->	1.0E6	2.0E6
210			110		10		
N			 		N		
220			120		20		
230			130		30		
240			140		6		
250			150		50		
O.							
260			160		60		
			170		70		
			0		,		
			180		80		
			1.0		0		
			190		90		
			200		100		

Part # 58139

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

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

(i)= larget analyte

Physical Characterization:

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

Certified by:

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

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

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

Part # 58139





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.

CAUTION: Read instructions carefully before opening bottle(s) and proceeding with the

analyses.

Contains Heavy Metals
HAZARDOUS MATERIAL

Safety Data Sheets Available Upon Request

(A) SAMPLE DESCRIPTION

Enclosed is a set of one (1) or more bottles of Aqueous Reference Material, each composed of metals at various concentrations and prepared with nitrate salts and oxy-acids of the respective elements in a 5% nitric acid matrix. For the reference material source in reporting ICSA and ICSAB mixture use "USEPA". For the reference material lot number for the ICSA use "ICSA-1211" and for the ICSAB mixture use "ICSA-1211+ICSB-0710".

<u>CAUTION:</u> The bottle(s) should be protected from light during storage to ensure the stability of silver which is contained in the ICSB solution. The bottle(s) should be stored at room temperature. **Do not allow the solution(s) to freeze.**

(B) BREAKAGE OR MISSING ITEMS

Check the contents of the shipment carefully for any broken, leaking, or missing items. Check that the seal is intact on each bottle. Refer to the enclosed chain of custody record. Report any problems to Mr. Keith Strout, APTIM Federal Services, LLC, at (702) 895-8722. If requested, return the chain-of-custody record with appropriate annotations and signatures to the address provided below.

QUALITY ASSURANCE TECHNICAL SUPPORT LABORATORY
APTIM Federal Services, LLC
2700 Chandler Avenue - Building C
Las Vegas, NV 89120

(C) ANALYSIS OF SAMPLES

The interference check sample set is to be used to verify inter-element and background correction factors of inductively-coupled plasma (ICP) spectrometers. This reference material set consists of two (2) concentrated solutions. The ICSA solution contains the four (4) interferent elements: Al, Ca, Fe, and Mg. The ICSB solution contains the analytes: Ag, As, Sb, Ba, Be,







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

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. "CERTIFIED VALUES" FOR INTERFERENCE CHECK SAMPLE ICP-AES ICSA-1211,
AND ICSA-1211 MIXED WITH ICSB-0710

Element	CRQL	Part A (µg/L)	Low Limit (µg/L)	High Limit (µg/L)	Part A +Part B (µg/L)	Low Limit (µg/L)	High Limit (µg/L)
Al	200	255000	216000	294000	247000	209000	285000
Sb	60	(0.0)	-60.0	60.0	618	525	711
As	10	(0.0)	-10.0	10.0	104	88.4	120
Ba	200	(6.0)	-194	206	(537)	337	737
Be	5.0	(0.0)	-5.0	5.0	495	420	570
Cd	5.0	(1.0)	-4.0	6.0	972	826	1120
Ca	5000	245000	208000	282000	235000	199000	271000
Cr	10	(52.0)	42.0	62.0	542	460	624
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
Mn	15	(7.0)	-8.0	22.0	507	430	584
Ni	40	(2.0)	-38.0	42.0	954	810	1100
Se	35	(0.0)	-35.0	35.0	(46.0)	11.0	81.0
Ag	10	(0.0)	-10.0	10.0	201	170	232
TI	25	(0.0)	-25.0	25.0	(108)	83.0	133
V	50	(0.0)	-50.0	50.0	491	417	565
Zn	60	(0.0)	-60.0	60.0	952	809	1095

ICSA M5126 M5127 M5128 M5129 M5130

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.

value \pm 15 percent of the listed certified value.

ICSB

M5219

M5220

M5221

M5222

M5223

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Certified Reference Material CRM

M.5192 R: 06/17/2

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

CERTIFIED WEIGHT REPORT: Ammonium molybdate (Mo) Compound Nominal Concentration (µg/mL): m/z-> M/z-> Recommended Storage: m/z-> Volume shown below was diluted to (mL): 2.0E6 1.0E6 1.0E5 2.0E5 2000 1000 **NIST Test Number: Expiration Date:** Part Number: Lot Number: Description: [1] Spectrum No.1 110 210 0 58142 Number Part **BTU9** 1000 57042 Ambient (20 °C) 051722 051725 Molybdenum (Mo) 022222 Fot 120 220 20 [8.594 sec]:57042.D# [Count] [Linear] 3000.41 0.1000 Factor Dilution 130 230 30 5E-05 300.0 Vol. (mL) 0.058 Initial Flask Uncertainty Balance Uncertainty Pipette (mL) Conc. (µg/mL) Uncertainty 0.084 240 140 40 MKBQ8597V Ammonium hydroxide Nominal Lot # 0.5% 1000 250 150 50 Conc. (µg/mL) 10001.0 Initial (III) 15.0 160 260 60 Conc. (µg/mL) Ammonium hydroxide 1000.0 Final 170 70 Formulated By: Reviewed By: Uncertainty +/- (µg/mL) Expanded 2.1 180 80 13106-76-8 (Solvent Safety Info. On Attached pg.) Lawrence Barry OSHA PEL (TWA) Pedro L. Rentas 5 mg(Mo)/m3 190 90 SDS Information 200 100 orl-rat 333 mg/kg 051722 051722 3134 SRM TSIN

Printed: 6/16/2022, 1:36:08 PM

Certified Reference Material CRM



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

		ш	-	D.	Ве	Ва		D 6	Sb	A	-		
		-	-		10.0					-			
		.02	70.	3 :	0	22	1	5	8	.02	The second second		
		5	8	,	?	င္ပ	6	,	<u>ٿ</u>	8	The second second		
		40.02	20.02	0 0	3	40.02	20.02	2	402	40.02			
		Au	Ç	2	3 -	වු	ᄪ	į	Ţ.	Dy			
		0.02	<0.02	20.02	3	<0.02	<0.02	20.02	3	<0.02			
		3	7	7	71 1	='	Б	110	F	斯			
	10102	9	∆ 0.02	202	000	9	40.02	20.02	3	40.02		1 000	Trace V
		Ę	Mo	9H		5	Mg	F	1 !	=		וכימוס	otolo otolo
(T)=1	10.07	3	-	40.2	20.02	3	40.01	20.02	000	A) 02			Varifica
(T)= Target analyte	,	۲ :	¥	ď	2	2	ဝွ	8	1 2	N.		בוכו	±.
nalyte	7.05	2 5	3	40.02	20.02	3	40.02	40.02	10.04	A003		DY ICT-IVIC	20 2
	36	3 6	Si .	Ru	KO	2 :	R _r	Re	7	P		in Chi	2
	20.02	10.01	3	<0.02	20.02	000	4000	40.02	20.02	000		9/1111	~ / /
	la	1 6	2	Sr	Na	. 6	Δσ	S:	×	2			
	<0.02	20.02	3	40.02	40.2	20.02	3	40.02	2.0				
	11	JI.	,	Ī	H	=	3	E.	10				
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	Z	9	1 ,	~	4,4	<	=	_	*				
	<0.02	<0.02		A000	<0.02	20.02	5	40.02	<0.02				The second secon

Physical Characterization:

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

Certified by:

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

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

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CERTIFIED WEIGHT REPORT:

Part Number: Lot Number:

Lot #

Solvent: 20370011 Nitric Acid

2%

60.0 (IE)

Nitric Acid

Formulated By:

Giovanni Esposito

092121

Pedro L. Rentas

092121

SDS Information

Giranie

rapider

Description: Sodium (Na)

092121 58111

Recommended Storage: **Expiration Date:** 092124

Ambient (20 °C)

Nominal Concentration (µg/mL): 10000

Weight shown below was diluted to (mL): **NIST Test Number: 6UTB** Lot 3000.41 Nominal 0.058 Flask Uncertainty 5E-05 Balance Uncertainty Purity Uncertainty Assay Target Actual Actual Uncertainty Reviewed By: Expanded

											-			
kg 3152a	orl-rat 3236 mg/kg 3152a	5 mg/m3	7631-99-4	20.0	10001.4	111.1433	111.1274 111.1433	27.0	0.10	99.999	10000 99.999	IN036 NAV01201511	IN036	1. Sodium nitrate (Na)
SRM	LD50	OSHA PEL (TWA)	CAS#	+/- (µg/mL)) Conc. (µg/mL) +/- (µg/mL) CAS#	Weight (g)		(%)	Purity (%)	11 -	Conc. (µg/mL)	Number	RM#	Compound
NIST	tached pg.)	(Solvent Safety Info. On Attached pg.)	(So	Uncertainty	Actual	Actual	Target	Assay	Purity Uncertainty Assay		Nominal	Lot	!	

							-
m/z->	2.5E6	m/z-> 5.0E6	2.506	m/z-> 5.0E6	2.5E5	5.085	. Cocioin inuale (Na)
						SE	
210		1 0		10		[1] Spectrum No.1	
						Z 0	INU36 NAV01201511
220		120		<i>N</i> 0			V012015I1
				14.5 (00.8 - 5.000 0.000 0.000		8.93	0000
230		130		30		5 sec]	
						:5811	99.999
240		140		40		[8.935 sec]:58111.D# [Count] [Linear]	0.10
				(40)		[Coun	27.0
250		150		O		4) [C	111,1274
				34 147		ear]	11
260		160		60			111.1433
	•						10001.4
		170		70			
							20.0
		180		80			7631-99-4
		4		to.			
		190		90			5 mg/m3
		200		100			
		ŏ		ŏ			orl-rat 3236 mg/kg 3152
							5

Part # 58111



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

T _a	, 00	Be	В	A	S	A			
F	_	. 10	ш	On.					
20.02	40.02	40.01	<0.02	40.2	<0.02	<0.02			
5	. S	τ	S	೮	ಬ	2			
<0.02	<0.02	<0.02	<0.02	<0.02	<0.2	<0.02			
Au	ල	Ga	G	Eu	덕	Dy	J.		
<0.02	<0.02	< 0.02	40.02	<0.02	<0.02	<0.02			
Pb	5	Fe	F	In	Н	Hf			
<0.02	<0.02	40.2	<0.02	<0.02	<0.02	<0.02		Irace M	
Nd	Mo	Hg	Mn	Mg	L	Li		letals	-
<0.02	40.02	<0.2	<0.02	40.01	40.02	<0.02		Verifica	
K	Pt	P	Pd	S _O	S	Z		tion	
<0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		by ICP-N	
Sc	Sm	Ru	Rb	Rh	Re	Pr		d) SV	
<0.02	40.02	<0.02	40.02	<0.02	<0.02	<0.02		g/mL)	
Ta	S	Sr	Na	Ag	Si	Se			
<0.02	<0.02	<0.02	H	<0.02	<0.02	40.2			
Ti	Sn	Ħ	7	∄	F	7			NAME OF STREET
<0.02	40.02	<0.02	40.02	40.02	<0.02	<0.02			THE REAL PROPERTY.
Zr	Zn	×	۲ ₄	<	c	W			
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02			

Physical Characterization:

(I)= Target analyte

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 NIŞT (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).





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.

CAUTION: Read instructions carefully before opening bottle(s) and proceeding with the

analyses.

Contains Heavy Metals
HAZARDOUS MATERIAL

Safety Data Sheets Available Upon Request

(A) SAMPLE DESCRIPTION

Enclosed is a set of one (1) or more bottles of Aqueous Reference Material, each composed of metals at various concentrations and prepared with nitrate salts and oxy-acids of the respective elements in a 5% nitric acid matrix. For the reference material source in reporting ICSA and ICSAB mixture use "USEPA". For the reference material lot number for the ICSA use "ICSA-1211" and for the ICSAB mixture use "ICSA-1211+ICSB-0710".

<u>CAUTION:</u> The bottle(s) should be protected from light during storage to ensure the stability of silver which is contained in the ICSB solution. The bottle(s) should be stored at room temperature. **Do not allow the solution(s) to freeze.**

(B) BREAKAGE OR MISSING ITEMS

Check the contents of the shipment carefully for any broken, leaking, or missing items. Check that the seal is intact on each bottle. Refer to the enclosed chain of custody record. Report any problems to Mr. Keith Strout, APTIM Federal Services, LLC, at (702) 895-8722. If requested, return the chain-of-custody record with appropriate annotations and signatures to the address provided below.

QUALITY ASSURANCE TECHNICAL SUPPORT LABORATORY
APTIM Federal Services, LLC
2700 Chandler Avenue - Building C
Las Vegas, NV 89120

(C) ANALYSIS OF SAMPLES

The interference check sample set is to be used to verify inter-element and background correction factors of inductively-coupled plasma (ICP) spectrometers. This reference material set consists of two (2) concentrated solutions. The ICSA solution contains the four (4) interferent elements: Al, Ca, Fe, and Mg. The ICSB solution contains the analytes: Ag, As, Sb, Ba, Be,







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

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. "CERTIFIED VALUES" FOR INTERFERENCE CHECK SAMPLE ICP-AES ICSA-1211,
AND ICSA-1211 MIXED WITH ICSB-0710

Al 200 255000 216000 294000 247000 2090	
	711
Sb 60 (0.0) -60.0 60.0 618 529) /
As 10 (0.0) -10.0 10.0 104 88.	4 120
Ba 200 (6.0) -194 206 (537) 33	7 737
Be 5.0 (0.0) -5.0 5.0 495 420	570
Cd 5.0 (1.0) -4.0 6.0 972 820	3 1120
Ca 5000 245000 208000 282000 235000 1990	00 271000
Cr 10 (52.0) 42.0 62.0 542 460	624
Co 50 (0.0) -50.0 50.0 476 404	1 548
Cu 25 (2.0) -23.0 27.0 511 43	588
Fe 100 101000 85600 116500 99300 8440	00 114500
Pb 10 (0.0) -10.0 10.0 (49.0) 39.	59.0
Mg 5000 255000 216000 294000 248000 2100	00 286000
Mn 15 (7.0) -8.0 22.0 507 430	584
Ni 40 (2.0) -38.0 42.0 954 810	1100
Se 35 (0.0) -35.0 35.0 (46.0) 11.	0 81.0
Ag 10 (0.0) -10.0 10.0 201 170) 232
TI 25 (0.0) -25.0 25.0 (108) 83.	0 133
V 50 (0.0) -50.0 50.0 491 41	7 565
Zn 60 (0.0) -60.0 60.0 952 809	1095

ICSA M5126 M5127 M5128 M5129 M5130

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.

value \pm 15 percent of the listed certified value.

ICSB

M5219

M5220

M5221

M5222

M5223

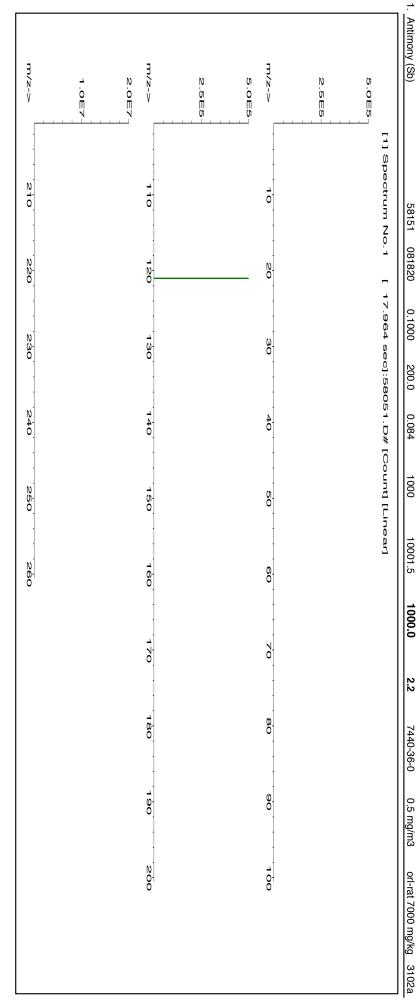
CEF EF www.absolutestandards.com



Certified Reference Material CRM

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

m/z->	8.5E5		1. Antimony (Sb)	Compound		Volume s	NIST	Nominal Concentration (μg/mL):	Recommer	Ę				-	ERTIFIED WEIGHT REPORT:	
10		[1] Spectrum No.1				Volume shown below was diluted to (mL):	NIST Test Number:	ation (µg/mL):	Recommended Storage:	Expiration Date:		Description:	Lot Number:	Part Number:	I∺	
		um No	58151 081820	Part Number		as dilutec	6	_	>	_		.	I — I	lon		
N. O			081820	Lot Number		to (mL):	6UTB	1000	Ambient (20 °C)	101524		Antimony (Sb)	101521	57051		
30		17.964 sı	0.1000	Dilution Factor		2000.25			°C)			(Sb)				
		ec]:580	200.0	Initial Vol. (mL)		0.116	5E-05									
40)51.D#[0.084	Uncertainty Pipette (mL)		Flask Uncertainty	Balance Uncertainty									
50		[17.964 sec]:58051.D# [Count] [Linear]	1000	Initial Uncertainty Nominal Vol. (mL) Pipette (mL) Conc. (µg/mL)		ıţy	tainty				2.0%			20370011	Lot #	
60		near]	10001.5	Initial Conc. (µg/mL)						(mL)	40.0			Nitric Acid	Solvent:	
70			1000.0	Initial Final Conc. (µg/mL)		·					Nitric Acid					
			2.2	Uncertainty +/- (µg/mL)	Expanded		Reviewed By:	tun		.\	Formulated By:		Trava	10		
80			7440-36-0	(Solv				10	, (7	.:		tieranne 2	0		
90			0.5 mg/m3	(Solvent Safety Info. On Attached pg.) # OSHA PEL (TWA) LD50	SDS Information		Pedro L. Rentas	unio	A Company)	Giovanni Esposito	,	LASSANT.	+		Titlos
100			orl-rat 7000 mg/kg 3102a	Attached pg.) LD50	ion		101521				101521					III.lps://Absolutestallualus.com
			3102a	NIST		1									•	ards.com



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

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						<u> </u>	ること		<u>†</u> .		<u> </u>	T 5000 K							

(T)= Target analyte

Physical Characterization:

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



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

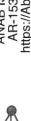
 * Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, D.C. (1994).

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		200	Giovanni Esposito	1 /3	Pedro L. Rentas		SDS Information	OSHA PEL (TWA)	1.0 mg/m3				0			00			
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Instrumental Analysis by Inductively Coupled Plasma Mass Spectroscopy (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 preparation of all standards.

^{*} 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.

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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).

Certified Reference Material CRM

MS272

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CERTIFIED WEIGHT REPORT: Part Number: 57051 051822 Lot # Solvent:

20370011 Nitric Acid

Expiration Date: Description: 051825 Antimony (Sb) 2.0% 60.0

Nitric Acid

Formulated By:

Giovanni Esposito

051822

Diovanne

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Lot Number:

Nominal Concentration (µg/mL): Recommended Storage: 6UTB 1000 Ambient (20 °C) 5E-05 Balance Uncertainty (mL)

Compound

Number

Number

Factor Dilution

Initial

Uncertainty

Nominal

Initial

Final

Vol. (mL) Pipette (mL) Conc. (µg/mL)

Conc. (µg/mL) Conc. (µg/mL)

+/- (µg/mL) Uncertainty

CAS#

OSHA PEL (TWA)

LD50

TSIN SRM

(Solvent Safety Info. On Attached pg.)

051822

Volume shown below was diluted to (mL): NIST Test Number: Part Lot 3000.41 0.058 Flask Uncertainty Reviewed By: Expanded Pedro L. Rentas SDS Information

m/z->	1.007	m/z-> 2.0E7	P. 55 E. 5	m/≥-> 5.0≣5	P. 5 E. 5	5.OE5	1. Antimony (Sb)
20 10		110		0		[1] Spectrum No.1	58151
N N O		120		N.			061021
230		130		a .		[17.964 sec]:58051.D# [Count] [Linear]	0.1000
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Instrumental Analysis by Inductively Coupled Plasma Mass Spectrometry (ICP-MS):

Ph	A1 Sb Ba
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	Mg Mg Mg Nd
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40.02	40.02 40.02 40.02

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

Certified by:

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Certified Reference Material CRM

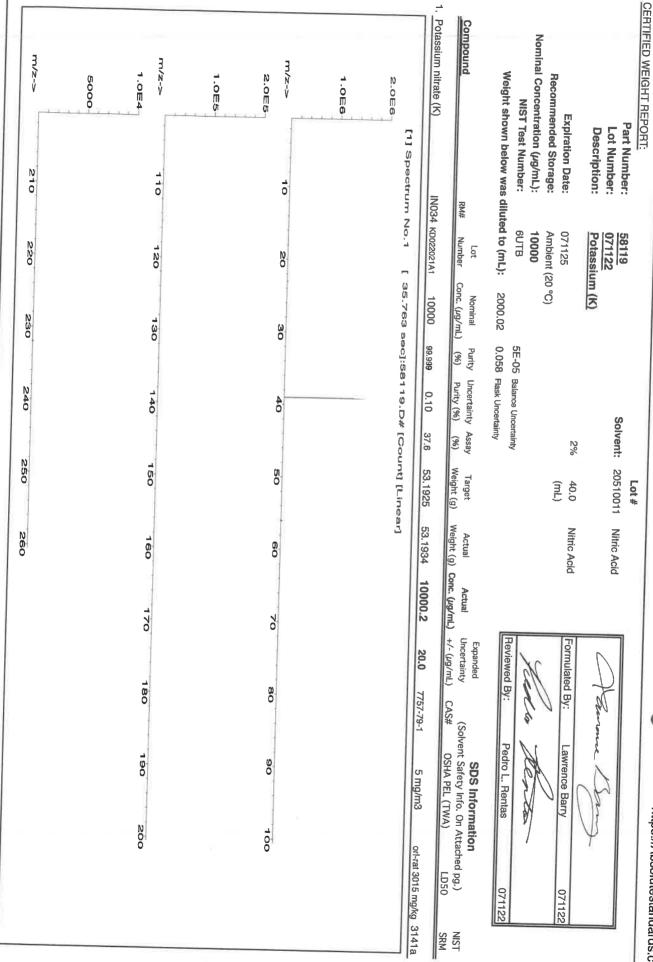
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ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com



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

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

Physical Characterization:	Al <0.02 Cd <0.02 Dy Sb <0.02 Ca <0.02 Er As <0.2 Ce <0.02 En Ba <0.02 Cs <0.02 Gd Be <0.01 Cr <0.02 Ga Bi <0.02 Cu <0.02 Ga Bi <0.02 Cu <0.02 Ga	
23 10,002 12	<0.022 Hf <0.022 Li <0.022 Ni <0.022 Pr <0.023 Se <0.22 Tb <0.022 W <0.022 <0.022	Trace Metals Verification by ICP-MS (ug/ml)

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.

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

7	Tb <0.02 W
_	A 0.02
	3 :
	3 1
	2 :
	Ti <0.02 Zr
	Se <0.2 Si <0.02 Ag <0.02 Na <0.02 Si <0.02 Si <0.02 Ag <0.02 Si <0.02

Physical Characterization:

(I)= larger analyte

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

Certified by:

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

2 of 2



QUALITY ASSURANCE TECHNICAL SUPPORT LABORATORY "An ISO 9001:2015 Certified Program" R: 4120/21

Instructions for QATS Reference Material: Inorganic ICV Solutions

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

These instructions are for advisory purposes only. If any apparent conflict exists between these instructions and the analytical protocol or your contract, disregard these instructions.

APPLICATION: For use with the CLP SFAM01.0 SOW and revisions.

CAUTION: Read instructions carefully before opening bottle(s) and proceeding with

the analyses.

Contains 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 µg/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% (y/y) nitric acid.

Page 1 of 2



RMs ICV 1, 5, 6 SFAM.docx



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

Instructions for QATS Reference Material: Inorganic ICV Solutions

ICV1-1014

For ICP-MS analysis, use a 50-fold dilution by pipetting 2 mL of the ICV1 concentrate into a 100 mL volumetric flask and dilute to volume with 1% (v/v) nitric acid.

ICV5-0415

For the cold vapor analysis of mercury by AA, use a 100-fold dilution by pipetting 1 mL of the ICV5 concentrate into a 100 mL volumetric flask and dilute to volume with 2% (v/v) nitric acid. The ICV5 concentrate is prepared in 0.05% (w/v) K₂Cr₂O₇ and 5% (v/v) nitric acid.

ICV6-0400

For the analysis of cyanide, use a 100-fold dilution by pipetting 1 mL of the ICV6 concentrate into a 100 mL volumetric flask and dilute to volume with Type II water. Distill this solution along with the samples before analysis. The cyanide concentrate is prepared from K₃Fe(CN)₆, Type II water, and 0.1 % sodium hydroxide, and will 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)
Al	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

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



Certified Reference Material CRM

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

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		INI INI	NIST	g 3126a		
		020422	ned pg.) LD50	orl-rat 7500mg/kg		
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	The state of the s	Giovanni Esposito	SDS Information (Solvent Safety Info. On Attached pg.) # OSHA PEL (TWA) LDSG	5 mg/m3		
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	iovannie	ž () ::	(So CAS#	7782-61-8	08	
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	`			15	170	
	_	_	Actual Conc. (ug/1	10001.5		
	Nitric Acid	Nitric Acid	Actual Actual Weight (g) Conc. (ug/mL)	30.0090	160	260
	Lot # 20370011	(mL)	Target Weight (g)	30.0044	150	250
	Solvent:	5.0% srtainty uinty	Assay (%)	100.0		
	Ø.	5.0% Balance Uncertainty Flask Uncertainty	Uncertainty Assay Purity (%) (%)	0.10	04 641	240
	86	5E-05 B	Purity L	99.999		
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	<u>152</u> (Fe)	020425 Ambient (20 °C) 10000 6UTB ed to (mL): 3	Lot Number C	221035107	20 20 120	FEV
	58126 020422 Iron (Fe)	020425 Ambient 10000 6UTB			30.763 sec	
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]ac	Part Number: Lot Number: Description:	Expiration Date: 020425 Recommended Storage: Ambient (20 Nominal Concentration (µg/mL): 10000 NIST Test Number: 6UTB Weight shown below was diluted to (mL):		1. Iron(III) nitrate nonahydrate (Fe)	[1] Spectr	
CEBTIFIED WEIGHT BEDORT	0 7 2	Explommenc ncentrati NIST Te		nonahy	2.0E4 1.0E4 1.0E8 1.0E8 1.0E8 1.0E8 1.0E8	
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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):

3533553	Trace Metals Verification by CP-MS (µc 0.02 Li 0.02 Ni 0.010 Ni 0.02 Re 0.02 Li 0.02 Ni 0.02 Re 0.02 Co 0.02 Re 0.02 Co 0.02 Re 0.02 Co 0.02 Co 0.02 Re 0.02 Co 0.03 C	C.O. T. A.O.O. T	Au < 0.02 Pb < 0.02 Nd < 0.03 Pt
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(T)= Target analyte

Physical Characterization:

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



Certified by:

Printed: 2/16/2022, 11:15:09 PM

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CERTIFIED WEIGHT REPORT:

Part Number:

57056

Solvent:

20510011

Nitric Acid

200

40.0

Nitric Acid

Description: Lot Number:

072122 Barium (Ba)

Certified Reference Material CRM

Riograph 33

Lot #

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

Formulated By: Liovannie Giovanni Esposito appeal 2

072122

Reviewed By: Pedro L. Rentas 072122

IN023 BAD022019A1 RM# Number 5 Conc. (µg/mL) Nominal 1000 99.999 Purity 8 Uncertainty Assay Purity (%) 0.10 52.3 <u>8</u> Weight (g) 3.82417 Target Weight (g) Conc. (µg/mL) 3.82426 Actual 1000.0 Actual +/- (µg/mL) Uncertainty Expanded 2.0 10022-31-8 CAS# (Solvent Safety Info. On Attached pg.) OSHA PEL (TWA) SDS Information 0.5 mg/m3 orl-rat 355 mg/kg 3104a SRM TSIN

1. Barium nitrate (Ba)

Nominal Concentration (µg/mL):

1000

Ambient (20 °C) 072125

NIST Test Number:

Recommended Storage:

Expiration Date:

Weight shown below was diluted to (mL):

2000.02

0.058 Flask Uncertainty

5E-05 Balance Uncertainty

m/z-> **1/2-**2 17/2-Y 2.5E6 5.0E6 2.0E5 1.0ES 2.0E6 1.OE6 [1] Spectrum No.1 210 110 0 220 120 N O [12.514 sec]:58156.D# [Count] [Linear] 130 230 30 140 240 4 250 150 Ö. 160 260 00 170 8 180 80 190 90 200 100

Certified Reference Material CRM



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

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

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Physical Characterization:

(T)= Target analyte

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



Certified by:

2 of 2

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CERTIFIED WEIGHT REPORT:

Part Number:

57056

Solvent:

20510011

Nitric Acid

200

40.0

Nitric Acid

Description: Lot Number:

072122 Barium (Ba)

Certified Reference Material CRM

Riograph 33

Lot #

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

Formulated By: Liovannie Giovanni Esposito appeal 2

072122

Reviewed By: Pedro L. Rentas 072122

IN023 BAD022019A1 RM# Number 5 Conc. (µg/mL) Nominal 1000 99.999 Purity 8 Uncertainty Assay Purity (%) 0.10 52.3 <u>8</u> Weight (g) 3.82417 Target Weight (g) Conc. (µg/mL) 3.82426 Actual 1000.0 Actual +/- (µg/mL) Uncertainty Expanded 2.0 10022-31-8 CAS# (Solvent Safety Info. On Attached pg.) OSHA PEL (TWA) SDS Information 0.5 mg/m3 orl-rat 355 mg/kg 3104a SRM TSIN

1. Barium nitrate (Ba)

Nominal Concentration (µg/mL):

1000

Ambient (20 °C) 072125

NIST Test Number:

Recommended Storage:

Expiration Date:

Weight shown below was diluted to (mL):

2000.02

0.058 Flask Uncertainty

5E-05 Balance Uncertainty

m/z-> **1/2-**2 17/2-Y 2.5E6 5.0E6 2.0E5 1.0ES 2.0E6 1.OE6 [1] Spectrum No.1 210 110 0 220 120 N O [12.514 sec]:58156.D# [Count] [Linear] 130 230 30 140 240 4 250 150 Ö. 160 260 00 170 8 180 80 190 90 200 100

Certified Reference Material CRM



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

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

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Physical Characterization:

(T)= Target analyte

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Certified by:

2 of 2

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Certified Reference Material CRM
[N 403 | 20 | 128 | 125 | 1

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

070622 070622 Pedro L. Rentas Lawrence Barry Formulated By: Reviewed By: Nitric Acid Nitric Acid 20510011 Fot # 20.0 (mL) Solvent: 2% 0.058 Flask Uncertainty 5E-05 Balance Uncertainty 1000.12 Ambient (20 °C) Lithium (Li) Weight shown below was diluted to (mL): 57103 070622 070625 10000 **6UTB** Nominal Concentration (µg/mL): NIST Test Number: Lot Number: Description: Expiration Date: Recommended Storage: Part Number: CERTIFIED WEIGHT REPORT:

Γ						ar]	[9.619 sec]:58103.D# [Count] [Linear]	# [C	58103.D	sec]::	_	No.1	ctrum	[1] Spectrum No.1	
5	Byfill 0241 ischin	2					1000								
MA	0.10 10.0 100.0134 100.0173 10000.4 20.0 7790-69-4 5 ma/m3 nd-sat 1428 ma/m NA	5 ma/m3	7790-69-4	20.0	10000.4	100.0173	100.0134	10.0	0.10	99.999	10000 89.889 0.	IN019 UZ042018A1	IN019		Lithium nitrate (Li)
SEM	LD50	RM# Number Conc. (µg/mL) (%) Purity (%) (%) Weight (g) Conc. (µg/mL) +/- (µg/mL) CAS# OSHA PEL (TWA) LD50	CAS#	+/- (ug/mL)	Conc. (ug/mL)	Weight (g)	Weight (g)	(%)	Purity (%)	(%)	Conc. (µg/mL)	Number	RM#		БПроппа
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Certified Reference Material CRM



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

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Physical Characterization:

(T)= Target analyte

Certified by:

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

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MSYCK

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

CERTIFIED WEIGHT REPORT: Magnesium nitrate hexahydrate (Mg) IN030 момпакта. Compound Nominal Concentration (µg/mL): Weight shown below was diluted to (mL): Recommended Storage: **NIST Test Number: Expiration Date:** Part Number: Lot Number: Description: 58112 120922 6UTB Ambient (20 °C) 10000 120925 Magnesium (Mg) 텇 Conc. (µg/mL) 3000.41 10000 Nominal 0.058 Flask Uncertainty 89.999 0.10 5E-05 Balance Uncertainty Purity Uncertainty Assay 3 Purity (%) Solvent: 3 6.74 343.2213 343.2669 10001.3 20510011 Weight (g) (m) 0.00 Nitric Acid Nitric Acid Weight (g) Conc. (µg/mL) Actual Actual +/- (µg/mL) Formulated By: Reviewed By: Uncertainty Expanded 20.0 Diovanie 13446-18-9 CAS# (Solvent Safety Info. On Attached pg.)
OSHA PEL (TWA) LD50 Giovanni Esposito Pedro L. Rentas greats OSHA PEL (TWA) SDS Information ort-rat 5440 mg/kg 3131a

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Certified Reference Material CRM



Absolute Standards, Inc. 300-368-1131

www.absolutestandards.com



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

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As	40.2	ප	<0.02	쿕	ZO:02	믜	<0.02	Mg	Ţ	ő	<0.02	됩	<0.02	Ag	<0.02	F	40.02	>	000
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Be	<0.01	ర	40.02	g	<0.02	Fe	<0.2	H	40.2	۵,	<0.05	-R	40.02	Š	₹0.02 40.02	٤, :	2005	; >	200
Ä	<0.02	රි	<0.02	පී	<0.02	្ន	<0.02	Mo	<0.02	盂	<0.02	Sm	<0.02	92	20.05	S	5	70	8
В	<0.02	ð	<0.02	Αn	<0.02	26	<0.02	Ř	<0.02	×	40.2	သွ	40.02	Ta	40.02	F	40.02	7	2000
																	and or	1	*0.0

(T) = Target analyte

Physical Characterization:

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



Certified by:

2 of 2

Lot # 120922

^{*} 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.

All standard containers are meticulously cleaned prior to use. the preparation of all standards.

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

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

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

CERTIFIED WEIGHT REPORT:

M5494 Certified Reference Material CRM



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m/z->	1.0E7 5.0E6	m/z-> 1	8	m/2->	1.0E5	[1] Spec	Nickel(II) nitrate hexahydrate (Ni)	Compound	Volume shown below was diluted to (mL):	NIST Test Number:	Recommended Storage: Nominal Concentration (µg/mL):	Expiration Date:	Lot Number: Description:	Part Number:	CERTIFIED WEIGHT REPORT:
0		110	i			[1] Spectrum No.1	58128 (Part Number	was diluted	60			100		
220		120	8	8		Г	033122	Lot Number	to (mL):	60ТВ	Ambient (20 °C)	011226	011223 Nickel (Ni)	57028	
230		130	Q	3		.135 se	0.1000	Dilution	2000.02		Ö				
						c]:5802	200.0	Initial Vol. (mL)	0.058 F	5E-05 E					
240		140	5			8.D# [C	0.084	Uncertainty Pipette (mL)	Flask Uncertainty	Balance Uncertainty					
250		150	5 O			9.135 sec]:58028.D# [Count] [Linear]	1000	Initial Uncertainty Nominal Vol. (mL) Pipette (mL) Conc. (µg/mL)	Q	ainty		2.0%		20510011	Lot #
200		160	0 0			ear]	10000.9	Initial Conc. (µg/mL)				40.0		Nitric Acid	Solvent:
		170	70				1000.0	Initial Final Conc. (µg/mL) Conc. (µg/mL)				Nitric Acid			
		ò	0				2.2	Expanded Uncertainty +/- (µg/mL)		Reviewed By:	W	Formulated By:	\$.		7
		180	80				13478-00-7	CAS		< (10	Ву:	Diovannie		
		190	90				1	SDS Information (Solvent Safety Info. On Attached pg.) # OSHA PEL (TWA) LD50	. one of the man	Padro I Ran		Giovanni Esposito	Capacito	1	
		200	100					SDS Information Safety Info. On Attacl SHA PEL (TWA)		200	/	osito	B		
			·				orl-rat 1620 mg/kg 3136	hed pg.) NIST	011220	011223		011223			

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

	-	υ D	ьe	Ва	As	. 8	2 ≥		I	
	20.02	8 6 8	6 0.01	<0.02	8 22	<0.02	\$0.02 20.02			
	3	ි දි	, t	, Ç	, Ç	C C	. C		l	
	20.02	\$0.02 20.02	40.02	<0.02	<0.02	40.2	< 0.02			
	Au	දි	G	8		耳	ъy			
	<0.02		40.02	<0.02	<0.02	<0.02	<0.02			
	29	La	Fe	lr	ħ	Но	Hf			
	<0.02	<0.02	40.2	<0.02	<0.02	<0.02	<0.02		I race M	
	Z	Mo	Нg	Mn	Mg	Lu	Ľ	2	etais	1111
(T) = Target analyte	<0.02	<0.02	<0.2	<0.02	<0.01	<0.02	<0.02		verifica	17:
et analy	×	Pt	P	Ы	°S	₽	Z		מסח	
тe	<0.2	<0.02	<0.02	<0.02	<0.02	40.02	Т		DY ICP-N	
	Sc	Sm	Ru	Rb	R.h	Re	Pr		ST CHIC	5
	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		J/mL)	
	Ta	S	Sr	Na	Ag	Si	Se			ı
	<0.02	<0.02	<0.02	<0.2	<0.02	<0.02	<0.2			
	Η	Sn	Tm	∄	1	Te	Tb	I		
	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02			
	Zr	Zn	Y	۲	<	d	W			
	<0.02	40.02	<0.02	<0.02	<0.02	<0.02	<0.02			

Physical Characterization:

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

Certified by:

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

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

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

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ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com 031523 031523 Giovanni Esposito Pedro L. Rentas Liovanni Formulated By: Reviewed By: Certified Reference Material CRM Nitric Acid Nitric Acid Solvent: 21110221 Lot # 60.0 (mL) % 5E-05 Balance Uncertainty 0.058 Flask Uncertainty 3000.41 Ambient (20 °C) Calcium (Ca) Weight shown below was diluted to (mL): 031523 031526 10000 **6UTB** Recommended Storage: Nominal Concentration (µg/mL): Part Number: Lot Number: Description: **Expiration Date:** NIST Test Number: CERTIFIED WEIGHT REPORT:

Compound	RM#	Lot Number	Nominal Purity Conc. (µg/mL) (%)	Punty (%)	Purity Uncertainty Assay (%) Purity (%) (%)		Target Weight (g)	Actual Weight (g)	Expanded Actual Actual Uncertainty (Sc Weight (g) Conc. (µg/mL) +/- (µg/mL) CAS#	Expanded Uncertainty +/- (ug/mL)	(Solv	SDS Information (Solvent Safety Info. On Attached pg.) NS# OSHA PEL (TWA) LD50	Attached pg.) LD50	NIST
1. Calcium carbonate (Ca)	IN014	INO14 caboragezat	10000 99.999	666.66	0.10	38.9	75.1990	75.2093	10001.4	20.0	471-34-1	5 mg/m3	ort-rat	3109a
[1] S ₁	[1] Spectrum No.1		4.00	8ec]:6	12.514 sec]:58120.D# [Count] [Linear]	<u> </u>	unti (Line	ari						
1.0E4														
m/z->	0	. O		000	.4	400400	0	0	2		0		001	
2. 4 4														
m/z->	0	120		90	140		150	160	071	0	180	190		
6.0E4														
m/z->	019	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 Me	tals	Verificat	ioi	by ICP-N	MS ($(\mu g/m\Gamma)$		r				
SHEW SHEET	STATE OF THE PARTY OF				SIGNATURE .	STON SAFETY SAGE	S. Parlie	THE SHARE SHARE	Series .		Sec.	STREET, STREET	THE PERSON	THE PERSON NAMED IN	THE PERSON			
707	ප	<0.02	δ	40.05	H	<0.02	II.	<0.02	Z	<0.02	ď	<0.02	Se	<0.2	13	<0.02	≥	<0.02
700	రో	H	卢	₹0.02	윒	20.02	3	<0.02	ź	<0.02	2	<0.02	ន	<0.02	Į.	40.02	Þ	₹0.05
07	පී	40.02	超	<0.02	Я	<0.02	Mg	40.01	ő	<0.02	쥪	<0.02	Ag	<0.02	F	<0.02	>	<0.02
707	ర	<0.02	පි	<0.02	片	<0.02	Mn	<0.02	Z	<0.02	2	<0.02	ž	<0.2	Ę	<0.02	¥9	40.02
100	Ö	<0.02	ජි	40.02	Ŗ	<0.2	Hg	40.2	م	<0.02	æ	<0.02	స	<0.02	Ę,	<0.02	¥	₹0.05
707	රි	40.02	පි	₹0.02	3	20.0≥	Wo	<0.02	五	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	2	₹0.02
707	♂	<0.02	Αū	<0.02	2	<0.02	PN	<0.02	×	40.2	S	<0.02	Ta	<0.02	Ξ	<0.02	Z	40.02
	6.00 6.00 6.00 6.00 6.00 6.00		3 5 5 5 5 5	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	Cd	Cd	Cd	Cd	Cd	Cd -0.02 Dy -0.02 Hf -0.02 Li -0.02 Ca T En -0.02 Ho -0.02 Li -0.02 Ce -0.02 Eu -0.02 in -0.02 Mg -0.02 Cr -0.02 Gd -0.02 Fe -0.02 Mn -0.02 Co -0.02 Ge -0.02 Fe -0.02 Mo -0.02 Cu -0.02 Au -0.02 Fe -0.02 Mo -0.02	Cd -60.02 Dy -60.02 Hf -60.02 Li -60.02 Ni Ca T En -60.02 Ho -60.02 Lu -60.02 Nh Ca -60.02 Eu -60.02 In -60.02 Mn -60.02 Pd Cr -60.02 Ga -60.02 Fe -60.2 Hg -60.2 Pr Co -60.02 Ga -60.02 La -60.02 Rr -60.02 Rr Cu -60.02 Au -60.02 Pr -60.02 Rr	Cd -6.002 Dy -6.002 Hf -6.002 Li -6.002 Ni -6.002 Ca T En -6.002 Ho -6.002 Lu -6.002 Nh -6.002 Ce -6.002 Eu -6.002 In -6.002 Mg -6.012 Nh -6.002 Cr -6.002 Gd -6.002 Fe -6.02 Mn -6.02 Pd -6.02 Cr -6.002 Gg -6.002 Fe -6.02 Hg -6.02 Pr -6.02 Cu -6.002 Au -6.002 In -6.002 R -6.002 Cu -6.002 Au -6.002 Ph -6.002 R -6.002	Cd -6.002 Dy -6.002 Hf -6.002 Li -6.002 Ni -6.002 Pr Ca T Ea -6.002 Ho -6.002 Lu -6.002 Nb -6.002 Rc Ce -6.002 Eu -6.002 Ir -6.002 Mn -6.002 Rb -6.002 Rb Cr -6.002 Ga -6.002 Fe -6.02 Hg -6.02 Pr -6.02 Ru Co -6.002 Ga -6.002 La -6.002 Rr -6.002 Rr Co -6.002 Ga -6.002 Pr -6.002 Rr -6.002 Rr Cu -6.002 Au -6.002 Pr -6.002 Rr -6.002 Sr	Cd -0.02 Dy -0.02 Hf -0.02 Li -0.02 Ni -0.02 Pr -0.02 Ca T Ba -0.02 Ho -0.02 Lu -0.02 Nb -0.02 Rb -0.02 Ce -0.02 Bu -0.02 Ir -0.02 Mg -0.01 Os -0.02 Rb -0.02 Cr -0.02 Ga -0.02 Mn -0.02 Pr -0.02 Rb -0.02 Cr -0.02 Ga -0.02 Hg -0.22 Pr -0.02 Ru -0.02 Cr -0.02 Ga -0.02 Hg -0.02 Pr -0.02 Ru -0.02 Cu -0.02 Au -0.02 Nd -0.02 Rr -0.02 Cu -0.02 Au -0.02 Nd -0.02 Rr -0.02 Cu -0.02 Au -0.02 Nd -0.02<	Cd -d002 Dy -d002 Hf -d002 Li -d002 Ni -d002 Re -d002 Si Ca T Ea -d002 Ho -d002 Lu -d002 Nb -d002 Re -d002 Si Ca -d002 Ea -d002 Hr -d002 Mn -d002 Rh -d002 Na Cr -d002 Ga -d002 Hg -d02 Pr -d002 Ru -d002 Na Co -d002 Ga -d002 Hg -d002 Rr -d002 Sr -d002 Sr Co -d002 Ga -d002 Hg -d002 Rr -d002 Sr -d002 Sr Cu -d002 Au -d002 Nd -d002 Rr -d002 Sr -d002 Sr -d002 Sr	Cd -0.02 Dy -0.02 Hf -0.02 Li -0.02 Ni -0.02 Pr -0.02 Se -0.02 Ca T Eu -0.02 Ho -0.02 Lu -0.02 Nb -0.02 Rb -0.02 Si -0.02 Ce -0.02 Eu -0.02 In -0.02 Mn -0.02 Rb -0.02 Na -0.02 Ca -0.02 Gd -0.02 Ir -0.02 Mn -0.02 Rb -0.02 Na -0.02 Ca -0.02 Ga -0.02 Hg -0.02 Ru -0.02 Sr -0.02 Ca -0.02 Ga -0.02 Hg -0.02 Rr -0.02 Sr -0.02 Ca -0.02 Au -0.02 Nd -0.02 Rr -0.02 Sr -0.02 Ca -0.02 Au -0.02 Nd -0.02 Sr	Cd 4002 Dy 4002 H 4002 Li 4002 Ni 4002 Pr 4002 Se 402 Th Ca T Ea 4002 Ha 4002 Lu 4002 Nb 4002 Rb 4002 Tr Ca 4002 Eu 4002 Ha 4002 Pd 4002 Rb 4002 Tr Cr 4002 Ga 4002 Hg 402 Pr 4002 Ru 4002 Tr Cr 4002 Ga 4002 Hg 402 Pr 4002 Ru 4002 Tr Cr 4002 Ga 4002 Hg 402 Pr 4002 Sr 4002 Tr Cr 4002 Au 4002 Rr 4002 Rr 4002 Sr 4002 Sr 4002 Cu 4002 Au 4002 Rr 4002 Rr 4002

(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

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

^{*} 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.

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ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com 031523 031523 Giovanni Esposito Pedro L. Rentas Liovanni Formulated By: Reviewed By: Certified Reference Material CRM Nitric Acid Nitric Acid Solvent: 21110221 Lot # 60.0 (mL) % 5E-05 Balance Uncertainty 0.058 Flask Uncertainty 3000.41 Ambient (20 °C) Calcium (Ca) Weight shown below was diluted to (mL): 031523 031526 10000 **6UTB** Recommended Storage: Nominal Concentration (µg/mL): Part Number: Lot Number: Description: **Expiration Date:** NIST Test Number: CERTIFIED WEIGHT REPORT:

Compound	RM#	Lot Number	Nominal Purity Conc. (µg/mL) (%)	Punty (%)	Purity Uncertainty Assay (%) Purity (%) (%)		Target Weight (g)	Actual Weight (g)	Expanded Actual Actual Uncertainty (Sc Weight (g) Conc. (µg/mL) +/- (µg/mL) CAS#	Expanded Uncertainty +/- (ug/mL)	(Solv	SDS Information (Solvent Safety Info. On Attached pg.) NS# OSHA PEL (TWA) LD50	Attached pg.) LD50	NIST
1. Calcium carbonate (Ca)	IN014	INO14 caboragezat	10000 99.999	666.66	0.10	38.9	75.1990	75.2093	10001.4	20.0	471-34-1	5 mg/m3	ort-rat	3109a
[1] S ₁	[1] Spectrum No.1		4.00	8ec]:6	12.514 sec]:58120.D# [Count] [Linear]	<u> </u>	unti (Line	ari						
1.0E4														
m/z->	0	.0		000	.4	400400	0	0	2		0		001	
2. 4 4														
m/z->	0	120		90	140		150	160	071	0	180	190		
6.0E4														
m/z->	019	220		230	240		250	260						





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

						Trace Me	tals	Verificat	ioi	by ICP-N	MS ($(\mu g/m\Gamma)$		r				
SHEW SHEET	STATE OF THE PARTY OF				SIGNATURE .	STON SAFETY SAGE	S. Parlie	THE SHARE SHARE	Series .		Sec.	STREET, STREET	THE PERSON	THE PERSON NAMED IN	THE PERSON			
707	ප	<0.02	δ	40.05	H	<0.02	II.	<0.02	Z	<0.02	ď	<0.02	Se	<0.2	13	<0.02	≥	<0.02
700	రో	H	卢	₹0.02	윒	20.02	3	<0.02	ź	<0.02	2	<0.02	ន	<0.02	Į.	40.02	Þ	₹0.05
07	පී	40.02	超	<0.02	Я	<0.02	Mg	40.01	ő	<0.02	쥪	<0.02	Ag	<0.02	F	<0.02	>	<0.02
707	ర	<0.02	පි	<0.02	片	<0.02	Mn	<0.02	Z	<0.02	2	<0.02	ž	<0.2	Ę	<0.02	¥9	40.02
100	Ö	<0.02	ජි	40.02	Ŗ	<0.2	Hg	40.2	م	<0.02	æ	<0.02	స	<0.02	Ę,	<0.02	¥	₹0.05
707	රි	40.02	පි	₹0.02	3	20.0≥	Wo	<0.02	五	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	2	₹0.02
707	♂	<0.02	Αū	<0.02	2	<0.02	PN	<0.02	×	40.2	S	<0.02	Ta	<0.02	Ξ	<0.02	Z	40.02
	6.00 6.00 6.00 6.00 6.00 6.00		3 5 5 5 5 5	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	Cd	Cd	Cd	Cd	Cd	Cd -0.02 Dy -0.02 Hf -0.02 Li -0.02 Ca T En -0.02 Ho -0.02 Li -0.02 Ce -0.02 Eu -0.02 in -0.02 Mg -0.02 Cr -0.02 Gd -0.02 Fe -0.02 Mn -0.02 Co -0.02 Ge -0.02 Fe -0.02 Mo -0.02 Cu -0.02 Au -0.02 Fe -0.02 Mo -0.02	Cd -60.02 Dy -60.02 Hf -60.02 Li -60.02 Ni Ca T En -60.02 Ho -60.02 Lu -60.02 Nh Ca -60.02 Eu -60.02 In -60.02 Mn -60.02 Pd Cr -60.02 Ga -60.02 Fe -60.2 Hg -60.2 Pr Co -60.02 Ga -60.02 La -60.02 Rr -60.02 Rr Cu -60.02 Au -60.02 Pr -60.02 Rr	Cd -6.002 Dy -6.002 Hf -6.002 Li -6.002 Ni -6.002 Ca T En -6.002 Ho -6.002 Lu -6.002 Nh -6.002 Ce -6.002 Eu -6.002 In -6.002 Mg -6.012 Nh -6.002 Cr -6.002 Gd -6.002 Fe -6.02 Mn -6.02 Pd -6.02 Cr -6.002 Gg -6.002 Fe -6.02 Hg -6.02 Pr -6.02 Cu -6.002 Au -6.002 In -6.002 R -6.002 Cu -6.002 Au -6.002 Ph -6.002 R -6.002	Cd -6.002 Dy -6.002 Hf -6.002 Li -6.002 Ni -6.002 Pr Ca T Ea -6.002 Ho -6.002 Lu -6.002 Nb -6.002 Rc Ce -6.002 Eu -6.002 Ir -6.002 Mn -6.002 Rb -6.002 Rb Cr -6.002 Ga -6.002 Fe -6.02 Hg -6.02 Pr -6.02 Ru Co -6.002 Ga -6.002 La -6.002 Rr -6.002 Rr Co -6.002 Ga -6.002 Pr -6.002 Rr -6.002 Rr Cu -6.002 Au -6.002 Pr -6.002 Rr -6.002 Sr	Cd -0.02 Dy -0.02 Hf -0.02 Li -0.02 Ni -0.02 Pr -0.02 Ca T Ba -0.02 Ho -0.02 Lu -0.02 Nb -0.02 Rb -0.02 Ce -0.02 Bu -0.02 Ir -0.02 Mg -0.01 Os -0.02 Rb -0.02 Cr -0.02 Ga -0.02 Mn -0.02 Pr -0.02 Rb -0.02 Cr -0.02 Ga -0.02 Hg -0.22 Pr -0.02 Ru -0.02 Cr -0.02 Ga -0.02 Hg -0.02 Pr -0.02 Ru -0.02 Cu -0.02 Au -0.02 Nd -0.02 Rr -0.02 Cu -0.02 Au -0.02 Nd -0.02 Rr -0.02 Cu -0.02 Au -0.02 Nd -0.02<	Cd -d002 Dy -d002 Hf -d002 Li -d002 Ni -d002 Re -d002 Si Ca T Ea -d002 Ho -d002 Lu -d002 Nb -d002 Re -d002 Si Ca -d002 Ea -d002 Hr -d002 Mn -d002 Rh -d002 Na Cr -d002 Ga -d002 Hg -d02 Pr -d002 Ru -d002 Na Co -d002 Ga -d002 Hg -d002 Rr -d002 Sr -d002 Sr Co -d002 Ga -d002 Hg -d002 Rr -d002 Sr -d002 Sr Cu -d002 Au -d002 Nd -d002 Rr -d002 Sr -d002 Sr -d002 Sr	Cd -0.02 Dy -0.02 Hf -0.02 Li -0.02 Ni -0.02 Pr -0.02 Se -0.02 Ca T Eu -0.02 Ho -0.02 Lu -0.02 Nb -0.02 Rb -0.02 Si -0.02 Ce -0.02 Eu -0.02 In -0.02 Mn -0.02 Rb -0.02 Na -0.02 Ca -0.02 Gd -0.02 Ir -0.02 Mn -0.02 Rb -0.02 Na -0.02 Ca -0.02 Ga -0.02 Hg -0.02 Ru -0.02 Sr -0.02 Ca -0.02 Ga -0.02 Hg -0.02 Rr -0.02 Sr -0.02 Ca -0.02 Au -0.02 Nd -0.02 Rr -0.02 Sr -0.02 Ca -0.02 Au -0.02 Nd -0.02 Sr	Cd 4002 Dy 4002 H 4002 Li 4002 Ni 4002 Pr 4002 Se 402 Th Ca T Ea 4002 Ha 4002 Lu 4002 Nb 4002 Rb 4002 Tr Ca 4002 Eu 4002 Ha 4002 Pd 4002 Rb 4002 Tr Cr 4002 Ga 4002 Hg 402 Pr 4002 Ru 4002 Tr Cr 4002 Ga 4002 Hg 402 Pr 4002 Ru 4002 Tr Cr 4002 Ga 4002 Hg 402 Pr 4002 Sr 4002 Tr Cr 4002 Au 4002 Rr 4002 Rr 4002 Sr 4002 Sr 4002 Cu 4002 Au 4002 Rr 4002 Rr 4002

(T) = Target analyte

Physical Characterization:

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



Certified by:

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800-368-1131 www.absolutestandards.com	100	<u> </u>		•	Sertified .	Refere	Since Mai	Certified Reference Material CRM	1/203 (~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		ANAB ISO 17034 Accredited AR-1539 Certificate Number https://Absolutestandards.com	ANAB ISO 17034 Accredited AR-1539 Certificate Number ttps://Absolutestandards.com	credited Number rds.com
CERTIFIED WEIGHT REPORT:						1	Lot#			る				
Fart Number: Lot Number: Description:		57182 061522 Lead (Pb)			Solvent:		20510011	Nitric Acid		Hieram	ranvie Ed	peate		
Expiration Date:		081525				%	40.0	Nitric Acid		Formulated By:	Giovann	Giovanní Esposito	061522	
Recommended Storage: Nominal Concentration (µg/mL):		Ambient (20 °C) 10000	Ő				(TE)			Ph	May 1	C/S		
NIST Test Number: 6UTB Weight shown below was diluted to (mL):	r: 6U as diluted		2000.02	5E-05 B 0.058 FI	5E-05 Balance Uncertainty 0.058 Flask Uncertainty	inty f				Reviewed By:	Pedro L	Pedro L. Rentas	061522	
Compound	RM#	Lot Number C	Lot Nominal Purity Uncertaint Number Conc. (µg/ml.) (%) Purity (%)	Purity (×	- 1	Target Weight (g)	Expanded Actual Actual Uncertainty Weight (g) Conc. (µg/mL) +/- (µg/mL)	Actual	Expanded Uncertainty (4+-(µg/mL) CAS#	SD: (Solvent Safe S# OSHA	SDS information (Solvent Safety Info. On Attached pg.) # OSHA PEL (TWA) LDSC	l pg.) LD50	NIST

SRM

1. Lead(II) nitrate (Pb)	INO29 PBD122016A1	10000	88.888	0.10	62.5	32.0006	32.0041 10001.1		20.0	10099-74-8	0.05 mg/m3	intryne-rat 83 mo/kg 3128	3128
1.0E7	[1] Spectrum No.1	17.284 sec]:58182.D# [Count] [Linear]	ec]:58	82.D*	Cour	nt] [Line		1				p h	
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m/z->>	0 P	O		.0		0.00	9	02		08	0	100	
1.0E6													
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5.0ES													
Å	220	230		240		250	260						

Lot # 061522

Certified Reference Material CRM



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

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

						Ī	Trace Me	stals	Verifica	tion	by ICP-	SM	(ma/m)		,				
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Physical Characterization:

(T)= Target analyte

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



Certified by:

Lot # 061522

^{*} 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.

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

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

CORCO CHEMICAL CORPORATION

Manufacturers of ACS Reagents and Semiconductor Grade Chemicals

CERTIFICATE OF ANALYSIS

Date: 8/3/2022

MS631 MS632 MS633 MS634

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 meg/g	< .0006 meq/g
Chloride (CI)	2 ppm	< 1 ppm
Nitrate (NO ₃)	2 ppm	< 1 ppm
Phosphate	2 ppm	< 1 ppm
Sulfate (SO ₄)	5 ppm	<.5 ppm
Ammonium (NH ₄)	5 ppm	< 1 ppm
Heavy Metals (as Pb)	1 ppm	< .1 ppm
Iron (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

Gina M. Rambo-Office Manager

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Certified Reference Material CRM

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CERTIFIED WEIGHT REPORT: Part Number: Lot Number: Description: 58024 060523 Chromium (Cr) 21110221 Lot # Nitric Acid Solvent: Lavense

2.0% 40.0 Nitric Acid

(III)

Formulated By:

Lawrence Barry

060523

060523

Nominal Concentration (µg/mL): Recommended Storage: **Expiration Date:** 1000 Ambient (20 °C) 060526

Compound Volume shown below was diluted to (mL): NIST Test Number: Number Part **BTU9** Number Lot 2000.02 Factor Dilution Vol. (mL) Pipette (mL) Conc. (µg/mL) 0.058 5E-05 Initial Flask Uncertainty Balance Uncertainty Uncertainty Nominal Conc. (µg/mL) Conc. (µg/mL) Initial Final Reviewed By: +/- (µg/mL) Uncertainty Expanded CAS# (Solvent Safety Info. On Attached pg.) OSHA PEL (TWA) Pedro L. Rentas **SDS Information**

P20

TSIN SRM

3112a

 Chromium(III) nitrate nonahydrate (Cr) 58124 071122 0.1000 200.0 0.084 1000 10000.1 1000.0 12 7789-02-8 0.5 mg(Cr)/m3 ort-rat 3250 mg/kg

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

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(I)= larget analyte

Physical Characterization:

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

Certified by:

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Certified Reference Material CRM

M5697 B: 10/27/23

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

CERTIFIED WEIGHT REPORT:	l 						Lot #	Solvent:						L:
- P	Part Number: Lot Number: Description:	O look life	58029 102523 Copper (Cu)	9			24002546	Nitric Acid						
							2,0%	40.0	Nitric Acid	Formulated By:	y:	Benson Chan	102523	-
Exp	Expiration Date:		102526	2				(mL)			0	D		
Nominal Concentration (µg/mL):	Concentration (µg/mL):	<u></u> >	1000	S						M	N	tento		
NIST	NIST Test Number:	0	втв		5E-05	Balance Uncertainty	inty			Reviewed By:		Pedro L. Rentas	102523	
Volume sh	Volume shown below was diluted to (mL):	diluted	1 to (mL):	2000.02	0.058	Flask Uncertainty								Ĺ
										Expanded		SDS Information	tion	
Compound	z	Part	Lot	Dilution	Initial Vol. (ml.)	Uncertainty Piperta (ml.)	Nominal	Initial	Final	Uncertainty	(Solv	(Solvent Safety Info. On Attached pg.)	Attached pg.)	NIST
		1400 HOCK	reamber	1 00000	AOF (THE)	voir (nint) riporte (nint) (Conc. (Agrant)	Conc. (July 1982)	Contra (ug/mic)	+/= (Jg/10L)	50#	OSHA FEL (TWA)	E	MANC
1. Copper(II) nitrate trihydrate (Cu)		58129	100223	0.1000	200.0	0.084	1000	10000.1	1000.0	N N	10031-43-3	1 mg/m3	orl-rat 794 mg/kg	3114
1.006	[1] Spectrum No.1	Z Z	_	3.422 s	əc]:58(33.422 sec]:58029.D# [Count] [Linear]	Sount] [Lir	near]	2004					
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									din diministrativa di mandini na di mandini					
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2.5E7														
m/z-v	110		120	130		140	150	160	170		180	190	200	
2.0€7														
1.0€7														
m/z->	N 10		200	230		N 40	250	260						

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

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1.1

Physical Characterization:

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

Certifled by:

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ırt # 58029

2 of 2

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Certified Reference Material CRM

M5648 8: 10/23/23

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

CERTIFIED WEIGHT REPORT: 1. Manganese(II) nitrate tetrahydrate (Mn) Compound Nominal Concentration (µg/mL): m/z-> m/z-> M/Z-V 5.OE7 1.0≣8 5.0厘7 1,0E8 2.5E6 5.0E6 Recommended Storage: Volume shown below was diluted to (mL): **NIST Test Number: Expiration Date:** Part Number: [1] Spectrum No.1 Lot Number: Description: 110 210 0 58125 Number Part 58025 102623 **BTUB** 1000 Ambient (20 °C) 102626 Manganese (Mn) 071123 120 Number 20 Ĕ [34.243 sec]:57025.D# [Count] [Linear] 3000.41 0.1000 Factor Dilution 130 30 Vol. (mL) Pipette (mL) Conc. (µg/mL) 300.0 0.058 5E-05 Initial Flask Uncertainty Balance Uncertainty 240 140 Uncertainty 40 0.084 24002546 Nominal 2.0% Lot # 1000 250 150 0 Conc. (µg/mL) Conc. (µg/mL) Nitric Acid Solvent: 10000.1 Initial <u>a</u> 60.0 260 160 00 Nitric Acid 1000.0 Final 170 0 Formulated By: Reviewed By: +/- (µg/mL) Uncertainty Expanded <u>2</u> 180 80 20694-39-7 CAS# (Solvent Safety Info. On Attached pg.) 190 OSHA PEL (TWA) 90 Pedro L. Rentas Benson Chan SDS Information 5 mg/m3 200 100 ort-rat >300mg/kg D50 102623 102623 3132 SRM

Printed: 10/26/2023, 1:20:32 PM



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

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						J/mL)	in Chi	by ICP-N	נוסח	Verifica	letals	I race N							Γ
								950											

Physical Characterization:

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

Certified by:

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Certified Reference Material CRM MSTHT

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

CERTIFIED WEIGHT REPORT: Part Number: R: 12/20/23 Lot #

Nitric Acid

Solvent: 24002546

2%

Nitric Acid

Formulated By:

Lawrence Barry

100923

60.0

Lot Number: Description: 57082 100923 Lead (Pb)

Expiration Date: 100926

Recommended Storage: **NIST Test Number:** BIN9 1000 Ambient (20 °C)

Nominal Concentration (µg/mL): Weight shown below was diluted to (mL): 3000.41 0.06 Flask Uncertainty 5E-05 Balance Uncertainty Reviewed By:

Cot

Nominal

Purity

Uncertainty Assay

|--|--|--|

Target Weight (a) Con Actual Actual Uncertainty +/- (ua/mL) Expanded #SAC SDS Information
(Solvent Safety Info. On Attached pg.)
(SONA PEL (TWA) TSIN

Pedro L. Rentas

100923

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₫,02	40.02	₫.02	△0.02	40.02	40.02	20.02	2003			

Physical Characterization:

(1)= Target analyte

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

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CERTIFIED WEIGHT REPORT:

Part Number:



Certified Reference Material CRM

Lot # M5752 M5753 Solvent:

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

, 12/15/23

24002546

Nitric Acid

18 Components - Water Matrix ILM 05.3 ICP-AES Spike Sample

5.0%

(mL)

Nitric Acid

Formulated By:

Giovanni Esposito

112823

Divarrie

absolute L

Ambient (20 °C) 112826

Recommended Storage:

Expiration Date:

Description: Lot Number:

Nominal Concentration (µg/mL): Volumes shown below were diluted to (mL): **NIST Test Number:** ana ana Varied 500.06 0.058 5E-05 Flask Uncertainty **Balance Uncertainty** Reviewed By: Pedro L. Rentas

Compound

Number Part

5

Dilution Factor

hitial

Uncertainty

Nominal

Vol. (ml.) Pipette (ml.) Conc. (µg/ml.)

Conc. (µg/ml.) Conc. (µg/ml.)

+/- (µg/mL)

CAS#

OSHA PEL (TWA)

P20

SRY NIST

112823

Firma Uncertainty Expanded (Solvent Safety Info. On Attached pg.) SDS Information

- 4	18. Zinc nitrate hexahvdrate (7n)	17. Ammonium metavanadata (V	16. Thallium nitrate (TI)	15. Silver nitrate (Ag)	Selenium(IV) oxide (Se)	i.d. Nickei(ii) nitrate hexahydrate (Ni)	. marganese(ii) nitrate tetranydrate (Mn)	10 Manager (FO)	11 padill parets (Dr.)	10. Iron (F.e.)	Copper(II) nitrate trihvdrate (Cu)	 Cobalt(II) nitrate hexa 	Criromium(iii) nitrate nonahydrate (Cr)	7 Charles in an equalydials (Cd)	6. Cadmirim nitrata tetra	5. Beryllium nitrate (Be)	Barium nitrate (Ba)	J. AISBING (AS)	and the state of t	Aluminum nitrate nonahydrate (Al) Antimony (St.)
(mary)	ate (Zn)	data (V)			Se)	ihydrate (Ni)	tetranydrate (Mn)				vdrate (Cu)) nitrate hexahydrate (Co)	nonahydrate (Cr)	anyurate (Ca)	shudento (Od)					nahydrate (Al)
0	20120	59193	57081	57047	57034	58128	58125	5/282	00120	70400	57020	58127	57024	2/048		2200	58156	57033	5/051	58113
000000	02020	202022	061300	071123	040123	062023	071123	101223	C2C1C0	05050	100503	050923	060523	0/1123	102020	100500	050222	090723	041823	071123
0.0000	0.000	0.000	0.0000	0.0050	0.0050	0.0050	0.0050	0.0200	0.0100	00200	3000	0.0050	0.0200	0.0050	0.0000	0.000	0.000	0.0040	0.0100	0.0200
2,50	2.50	200	מונים	2 10	300	2.50	2.50	10.0	5.00	20.21	5000	275	10.0	2.50	2.50		100	2.00	5.00	10.0
0.017	710.0	0.017	0.017	0.047	2500	0.017	0.017	0.042	0.017	0.084		717	0.042	0.017	710.0	0.042	000	0.017	0.017	0.042
50	50	g	0	1 0		3	50	2	8	25	8	3	20	CII	CIT	282	3	4	ö	200
10000.0	10000.0	0.000	1000.6	1000.0	1.000.1	10000	10000.1	100.0	10001.5	1000.0	10000.0	10000	1000.0	1001.5	1000.0	1.00001	10000	10000	1000.0	10000.1
50.0	50.0	5.00	5.00	5.00	70.0	50	50.0	2.00	100.0	25.0	0.00		20.0	5.00	5.00	0.002	200	48	10.0	200.0
0.7	0.7	0.07	0.07	0.07	9.7	2	0.7	0.02	0.7	0.3	0.7		0 17	0.07	0.07	1.7	0.00	0 00	0.07	1.7
10196-18-6	7803-55-6	10102-45-1	7761-88-8	7446-08-4	1-04/6-00-/	1000000	20604-30-7	10099-74-8	7439-89-6	10031-43-3	10026-22-9	0-30-0011	9-00-0877	10022-68-1	13597-99-4	10022-31-8	7-00-0447	74.0000	7440-36-0	7784-27-2
1 mg/m3	0.05 mg/m3	5 mg/m3	10 ug/m3	0.2 mg/m3	mg/m3	Cuilifill	S malma	0.05 mo/m3	5 mg/m3	1 mg/m3	0.02 mg/m3	can/in/ling	Of malestan	0.01 mo/m3	0.2ug/m3	0.5 mg/m3	Con to to	o de la constantina	O S modera	2 mo/m3
orl-rat 1190mg/kg	orl-rat 58.1mg/kg	orl-rat 6700 mg/kg	NA	orl-rat 68 mg/kg	ort-rat 1620 mg/kg	By/Bunnec mi-to	Aufin company	Budget 20 ter sandri	orl-rat 7500mo/kn	ori-rat 794 mo/kg	orl-rat 691 mg/kg	on-rat 3250 mg/kg	Bydilleroo melio	orient an amaka	intryns-rat 3.16ma/ko	orl-rat 355 mg/kg	orl-rat 763 mg/kg	Byffin ovo retain	Burkin the market	ori-rat 3671 mo/ko
3168	3165	3158	3151	3149	3136	3132		Т	31069	3114	3113	31128	2100	- 1	NA	3104a	3103a	L	1	31015

Certified Reference Material CRM

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

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

m/z->	2.5E4	m/2-> 5.0E4	2500	m/z->	2500	5000
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Physical Characterization:

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

3 of 3

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^{*} 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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M5768 [M576] (B) R:1/3/24 Certified Reference Material CRM



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

CERTIFIED WEIGHT REPORT: Magnesium nitrate hexahydrate (Mg) IN030 марозгозат Compound Nominal Concentration (µg/mL): m/z-> M/2-> m/z-> Weight shown below was diluted to (mL): Recommended Storage: 2.0≡4 1.0E4 5.0E5 1.0E6 1000 2000 NIST Test Number: **Expiration Date:** Part Number: Lot Number: Description: [1] Spectrum No.1 110 210 0 쭕 **BTUB** 58112 091823 10000 Ambient (20°C) (M5+18), (M5+16) 091826 Magnesium (Mg) Number 120 ğ 20 [19.923 sec]:58112.D# [Count] [Linear] Conc. (µg/mL) 2000.02 0.058 Flask Uncertainty 10000 Nominal 130 230 30 5E-05 Balance Uncertainty 99.999 Purity Uncertainty Assay 8 Purity (%) (%) 140 0.10 240 40 Solvent: 24002546 Nitric Acid 8.51 150 234.9118 Weight (g) Target Lot # Ē Weight (g) Conc. (µg/mL) 234.9126 Nitric Acid Actual 160 260 0 10000.0 Actual 170 6 +/- (µg/mL) Expanded Uncertainty Reviewed By: Formulated By: 20.0 180 80 13446-18-9 (Solvent Safety Info. On Attached pg.)
OSHA PEL (TWA) LD50 Pedro L. Rentas Lawrence Barry 190 **SDS Information** Ö Z 200 100 orl-rat 5440 mg/kg 3131a 091823 091823 SRM



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

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

	555	В	Ве	Ва	As	Sb	A		
						_			
	∆0.02	0.02	40.01	<0.02	∆0.2	<0.02	<0.02		
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	∆ 0.02	<0.02	<0.02	<0.02	40.02	40.2	<0.02		
	Αu	င္စာ	က္အ	8	탇	耳	Dy		
	₹0,02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		
	73	L ₂	Fe	F	ħ	Ho	Hf		ı
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)	<0.02	<0.02	<0.2	<0.02	⊷]	<0.02	<0.02	Verifica	No.
	×	7.	Р	Pd	S _O	Ş	Z.		
	40.2	40.02	40.02	<0.02	<0.02	40.02	<0.02	יטע וכד-ו	3
	Sc	Sm	Ru	Rb	Rh	Re	Pr	S CE	
	<0.02	<0.02	<0.02	40.02	40.02	<0.02	<0.02	g/mL)	
	Ta	CO.	Sr	Na	δķ	Σ:	Se		١
	<0.02	<0.02	<0.02	<0.2	<0.02	<0.02	40.2		
	Ti	Sn	Im	Th	∄	Te	-Tι-		
	<0.02	0.02	0.02	40.02	40.02	40.02	<0.02		
	Zr	Z	ĸ	4,4	٧	u	¥		
	<0.02	40.02	40.02	40.02	A).02	<0.02	40.02		

(1) = larget analyte

Physical Characterization:

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

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M5768 [M576] (B) R:1/3/24 Certified Reference Material CRM



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

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OSHA PEL (TWA) LD50 Pedro L. Rentas Lawrence Barry 190 **SDS Information** Ö Z 200 100 orl-rat 5440 mg/kg 3131a 091823 091823 SRM



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

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

	555	В	Ве	Ва	As	Sb	A		
						_			
	∆0.02	0.02	40.01	<0.02	∆0.2	<0.02	<0.02		
	Ĉ.	ဝ	Ω	Ŝ	ද	ದ್	Ω		
	∆ 0.02	<0.02	<0.02	<0.02	40.02	40.2	<0.02		
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	40.2	40.02	40.02	<0.02	<0.02	40.02	<0.02	יטע וכד-ו	3
	Sc	Sm	Ru	Rb	Rh	Re	Pr	S CE	
	<0.02	<0.02	<0.02	40.02	40.02	<0.02	<0.02	g/mL)	
	Ta	CO.	Sr	Na	δķ	Σ:	Se		١
	<0.02	<0.02	<0.02	<0.2	<0.02	<0.02	40.2		
	Ti	Sn	Im	Th	∄	Te	-Tι-		
	<0.02	0.02	0.02	40.02	40.02	40.02	<0.02		
	Zr	Z	ĸ	4,4	٧	u	¥		
	<0.02	40.02	40.02	40.02	A).02	<0.02	40.02		

(1) = larget analyte

Physical Characterization:

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

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Certified Reference Material CRM



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

CERTIFIED WEIGHT REPORT: Part Number: 57004 102523 02/09/24 Lot # Solvent:

24002546 Nitric Acid

2.0%

Nominal Concentration (µg/mL):

NIST Test Number:

BTU₉ 1000

Volume shown below was diluted to (mL):

2000.02

0.058

Flask Uncertainty Balance Uncertainty

5E-05

Number

Number Lot

Vol. (mL.)

Part

Dilution Factor

hitia

Uncertainty

Recommended Storage:

Ambient (20 °C) 102526

Expiration Date:

Lot Number: Description:

Beryllium (Be)

40.0

Nitric Acid

Benson Chan

102523

Formulated By:

Reviewed By:

Pedro L. Rentas 102523

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





800-368-1131



Certified Reference Material CRM

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

							Trace M	etals	Verificat	cation	by ICP-M	(J) S	ua/mL)						
	TATES AND AND		District Color	STATE OF THE PERSON		Senter and		SOMETHINGS.	NAME OF STREET	SAMOOGE STATE	SECOND SPINSO	No. of Concession, Name of Street, or other Persons and Street, or other P	. 18						
F	<0.02	3	<0.02	Ďλ	<0.02	HL	<0.02	Li	<0.02	z	<0.02	Ā	<0.02	Se	<0.2	T.	<0.02	M	<0.02
Sp	<0.02	ථ	40.2	占	₹0.02	He	<0.02	3	<0.02	£	<0.02	Re	<0.02	Š	<0.02	ę	₹0.02	Þ	<0.02
As	<0.7	ඊ	<0.02	립	₩	ដ	€0.02	Mg	10.0>	ő	<0.02	Rh	<0.02	Ag	<0.02	F	<0.02	>	40.02
Ba	<0.02	ర	<0.02	3	<0.02	ㅂ	<0.02	Mn	<0.02	2	<0.02	8	<0.02	ž	40.2	Ħ	<0.02	2	<0.02
æ	Т	Ç	40.02	ő	40.02	£	<0.7	Hg	<02	Δ,	<0.02	Ru	<0.02	š	<0.02	Tm	₹0.02	×	40.02
洒	<0.02	රි	<0.02	ප	<0.02	ឌ	40.02	Mo	<0.02	武	<0.02	Sm	<0.02	S	<0.02	S	<0.02	2	<0.02
æ	<0.02	ರೆ	<0.02	Au	<0.02	£	₹0.02	PK	<0.02	M	<0.2	S	40.02	Ta	<0.02	F	<0.02	Z	40.02

(T) = Target analyte

Physical Characterization:

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

Certified by:



All standard containers are meticulously cleaned prior to use.

2 of 2

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

CERTIFIED WEIGHT REPORT:

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

Salvents: 21110221

Nitric Acid Hydrochloric acid

Lot #

22D0562008

Nominal Concentration (µg/mL): Recommended Storage: **NIST Test Number:** Expiration Date: 1000 Ambient (20 °C) 071126

Weight shown below was diluted to (mL): **BTU9** 499.93

RM#

Number

Conc. (µg/mL) Nominal

(%)

Uncertainty Assay
Purity (%) (%)

Weight (g)

Target

ρţ

0.058 Flask Uncertainty 5E-05 Balance Uncertainty

> 10.0 30.0

3 6%

Nitric Acid

Formulated By:

Benson Chan

071123

Hydrochloric acid

Reviewed By:

Pedro L. Rentas

071123

Weight (g)	ACTUAL	
Conc. (µg/ml.)	Actual Ur	
'- (µg/mL)	certainty	xpanded
CAS# OSHA PEL (TWA) LD50	(Solvent Safety	SUS
PEL (TWA)	y Info. On Attache	Information
LD50	d pg.)	
SRM	TSIN	

1. Ammonium hexafluorostannate(IV) (Sn) m/z-> ---X/m --Z/111 2.5E4 5.0E4 1.0ES 2.0E6 2.5E5 S.OEG [1] Spectrum No.1 210 110 0 IN010 SND042023A1 120 220 N [15.034 sec]:58150.D# [Count] [Linear] 1000 230 130 8 240 140 0.10 40 44.2 250 150 Ö 1.13107 1.13286 160 260 60 1001.6 170 70 2.0 180 80 16919-24-7 190 90 7 mg/m3 200 100 ₹ 3161a

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(I) = larget analyte

Physical Characterization:

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

Certified by:

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

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

Certified Reference Material CRM

R: 02109124





ANAB ISO 17034 Accredited AR-1539 Certificate Number https:///Absolutestandards.com 091923 091923 (Solvent Safety Info On Attach SDS Information Pedro L. Rentas Lawrence Barry Formulated By: Reviewed By: Expanded Nitric Acid Final Nitric Acid 40.0 (III) hital 24002546 2.0% Nominal Balance Uncertainty Flask Uncertainty 5E-05 0.058 Initial 2000.02 Dilution Ambient (20 °C) Cobalt (Co) Volume shown below was diluted to (mL): 57027 091923 091926 ĕ 1000 **6UTB** Part Description: **Expiration Date:** Recommended Storage: Nominal Concentration (ug/mL): NIST Test Number: Part Number: Lot Number: CERTIFIED WEIGHT REPORT:

						TANK BURNE	10000	CHICAGO CONTROL CONTRO	URCEI LABILLY	ianioc)	(Solvent Safety Into, On Attached pg.)	rttached pg.)	202
Compound	Number	Number	Factor	Vol. (mL)	Pipette (mL) C	conc. (ug/ml.)	Conc. (µg/mL)	Conc. (ug/ml.)	+/- (ng/mL)	CAS#	Number Number Factor Vol. (mL) Pipette (mL) Conc. (µg/mL) Conc. (µg/mL) +/- (µg/mL) CAS# OSHA PEL (TWA)	1050	SRM
Cobatt(II) nitrate hexahydrate (Co) 58127 050923 0.1000 200.0	58127	050923	0.1000		0.084	1000	10000	100001	9.0	10008.000	000	700	- 5
							20000		7:5	100c0-22-9	O.UZ ING/ITIS	STEE 10020-22-9 0.02 mg/ms on-rat 691 mg/kg 3113	3113
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Lot # 091923

250

240

230

220

010

W/Z->

Certified Reference Material CRM





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

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

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(T)= Target analyte

Physical Characterization:

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



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



Lot # 091923

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

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

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

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Certified Reference Material CRM

M5801



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

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

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Physical Characterization:

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

Certified by:



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Certified Reference Material CRM

R102109124

MURIC

Solvent: 21110221

Nitric Acid

Lot #

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

CERTIFIED WEIGHT REPORT:

Part Number: **Lot Number:**

57115 041723

Description:

Phosphorous (P)

Expiration Date:

041726

Nominal Concentration (µg/mL): Recommended Storage: NIST Test Number: 10000 Ambient (20 °C)

BTUB

5E-05 Balance Uncertainty

Weight shown below was diluted to (mL): 2000.02

Number 5 Conc. (µg/mL) Nominal 0.058 Flask Uncertainty Purity 3 Uncertainty Assay Purity (%) E Target

1. Ammonium dihydrogen phosphate (P)

IN008 PV082019A1

10000

99,999

0.10

27.5

RM#

Compound

22%

40.0

Nitric Acid

Formulated By:

Lawrence Barry

041723

into

Reviewed By:

Pedro L. Rentas

Expanded SDS Information 041723

Weight (g) 72.7287 Weight (g) Conc. (ug/mL) 72.7289 Actual 10000.0 Actual +/- (µg/mL) Uncertainty 20.0 7722-76-1 CAS# (Solvent Safety Info. On Attached pg.)

OSHA PEL (TWA) LD50 5 mg/m3 orl-rat >2000mg/kg 3186 NIST SRM

Part # 57115

1 of 2

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(I)= larget analyte

Physical Characterization:

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

Certified by:

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2 of 2

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Certified Reference Material CRM

109/24

M5817

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CERTIFIED WEIGHT REPORT:

Part Number: Lot Number: 071123 57116

Solvent:

071123

ASTM Type 1 Water

Burense

Formulated By:

Lawrence Barry

071123

Lot #

Expiration Date: Description: 071126 Sulfur (S)

Nominal Concentration (µg/mL): NIST Test Number: 10000 Ambient (20 °C)

Recommended Storage:

EU1B

Weight shown below was diluted to (mL): 1999.48 Nominal 0.058 Flask Uncertainty 5E-05 Balance Uncertainty Reviewed By: Pedro L. Rentas SDS Information

 Ammonium sulfate (S) IN117 SLBR7225V 10000 99.9 0.10 24.3 82.4675 82,4682 10000.1 20.0 7783-20-2 Z orl-rat 4250mg/kg 3181

Number Ĕ Conc. (µg/mL) Purity 8 Uncertainty Assay Purity (%) 8 Weight (g) Target Weight (g) Conc. (µg/mL) Actual Actual +/- (µg/mL) OSHA PEL (TWA)

Expanded

071123

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

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Physical Characterization:

(1)= larger analyte

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

Certified by:

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Certified Reference Material CRM

109124 M.5818

Solvent: 24002546 Nitric Acid

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CERTIFIED WEIGHT REPORT:

Part Number:

Lot Number: Description: 57014 122023

Silicon (SI)

Nominal Concentration (µq/mL): Recommended Storage: 1000 Ambient (20 °C)

Expiration Date:

122026

2%

40.0 (mL)

Nitric Acid

Formulated By:

Aleah O'Brady

122023

122023

Areah o Brasky

Compound			Weight shown below was diluted to (mL): 1999.48 0.058 Flask Uncertainty	NIST Test Number	The second secon
RM#			elow was diluted	Number:	
Number	Lot		d to (mL):	8TUB	
Conc. (µg/mL)	Nominal		1999.48		
(%)	Purity		0.058	5E-05	
Purity (%)	Nominal Purity Uncertainty Assay		Flask Uncerta	5E-05 Balance Uncertainty	
8	Assay		unty	artainty	
Weight (g)	Target				
Weight (g)	Actual				
Conc. (ug/mL)	Actual				
+/- (ug/mL)	Uncertainty	Expanded		Reviewed By:	/
CAS#	(Solve				
OSHA PEL (TWA)	Lot Nominal Purity Uncertainty Assay Target Actual Actual Uncertainty (Solvent Safety Info. On Attac	SDS Information		Pedro L. Rentas	1

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*	orl-mus 70 mg/kg	2.5 mg/m3	2.0 16919-19-0	2.0	1000.0	13.8855	13.8854	14.4	0.10	99.999	1000	IN009 SID082022A1	Ammonium hexafluorosilicate (Si) IN009 sido82022A1 1000 99.999 0.10 14.4 13.8854 13.8855 1000.0
	Esc		CAS#	(ASA) +/- (ASA)	רטות. (ששיוור)	(A) THENDAM	(B) Millione	(101)	fact frience	(00)	400	(A) mediu (A) many (sa) (sa) (sa) mediu (A) mediu (A) conc.	

92 II	CAS#		CAS# OSHA PEL (TWA) LD50 SRM 1919-19-0 2.5 mg/m3 orl-mus 70 mg/kg NA	1. Ammonium hexafluorosilicate (Si) IN009 siposzozza1 1000 98.899 0.10 14.4 13.8854 13.8855 1000.0 2.0 169	Compound RM# Number Conc. (µg/mL) (%) Purity (%) (%) Weight (g) Weight (g) Conc. (µg/mL) +/- (µg/mL)
		Conc. (µg/mL) +/- (µg/mL) CAS# OSHA PEL (TWA) 1000.0 2.0 16919-19-0 2.5 mg/m3	Conc. (µg/mL) +/- (µg/mL) CAS# OSHA PEL (TWA) 1000.0 2.0 18919-19-0 2.5 mg/m3	10 14.4 13.8	(%) (%) Weigh
Conc. (µg/mL) +/- (µg/mL) 1000.0 2.0 10	Conc. (µg/mL) +/- (µg/mL) CAS# 1000.0 2.0 16919-19-0			3854 13.8855	ht (g) Weight (g)
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Part # 57014

1 of 2



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(T) = Target analyte

Physical Characterization:

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

Certified by:

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

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Certified Reference Material CRM

2 02/na

ング

Solvent: 24002546

Nitric Acid

F Lot #

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

CERTIFIED WEIGHT REPORT

Part Number: Lot Number: 58030

Description:

111623 Zinc (Zn)

Ambient (20 °C) 111626

Expiration Date:

Nominal Concentration (µg/mL): Recommended Storage:

NIST Test Number:

BTU9 1000

5E-05 Balance Uncertainty 0.06 Flask Uncertainty

Weight shown below was diluted to (mL):

3000.4

5

Nominal

Purity

Uncertainty Assay

Target

Actual

Actual

Uncertainty

Expanded

84 60.0 <u>a</u>

Nitric Acid

Formulated By: Benson Chan

111623

Reviewed By: Pedro L. Rentas

111623

Zinc nitrate hexahydrate (Zn) Compound [1] Spectrum No.1 [31.103 sec]:58130.D# [Count] [Linear] IN016 ZNE032021A1 RM# Number Conc. (µg/ml.) 1 000 99.999 8 Purity (%) 0.10 24.3 3 Weight (g) 12.3475 Weight (g) Conc. (µg/ml.) 12.3502 1000.2 +/- (µg/mL) 2.0 10196-18-6 CAS# OSHA PEL (TWA) orl-rat 1190mg/kg 3168



(Solvent Safety Info. On Attached pg.)
OSHA PEL (TWA) LD50 **SDS** Information SRM SRM

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(I) = larget analyte

Physical Characterization:

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

Certified by:

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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).

	2		





MS947 MS948 MS949 MS950 MS951 MS952

Material No.: 9530-33 Batch No.: 22G2862015 Manufactured Date: 2022-06-15 Retest Date: 2027-06-14

Revision No.: 0

Certificate of Analysis

Test	Specification	Result
ACS - Assay (as HCl) (by acid-base titrn)	36.5 - 38.0 %	
ACS - Color (APHA)	≤ 10	37.9 %
ACS - Residue after Ignition	≤ 3 ppm	5
ACS - Specific Gravity at 60°/60°F	1.185 – 1.192	< 1 ppm
ACS - Bromide (Br)	≤ 0.005 %	1.191
ACS – Extractable Organic Substances	≤ 5 ppm	< 0.005 %
ACS - Free Chlorine (as Cl ₂)		< 1 ppm
Phosphate (PO ₄)	≤ 0.5 ppm	< 0.5 ppm
Sulfate (SO ₄)	≤ 0.05 ppm	< 0.03 ppm
Sulfite (SO ₃)	≤ 0.5 ppm	< 0.3 ppm
Ammonium (NH ₄)	≤ 0.8 ppm	0.3 ppm
Trace Impurities – Arsenic (As)	≤ 3 ppm	< 1 ppm
Trace Impurities – Aluminum (AI)	≤ 0.010 ppm	< 0.003 ppm
	≤ 10.0 ppb	1.3 ppb
Arsenic and Antimony (as As)	≤ 5.0 ppb	< 3.0 ppb
Trace Impurities – Barium (Ba)	≤ 1.0 ppb	0.2 ppb
Trace Impurities - Beryllium (Be)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Bismuth (Bi)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities - Boron (B)	≤ 20.0 ppb	< 5.0 ppb
Trace Impurities - Cadmium (Cd)	≤ 1.0 ppb	< 0.3 ppb
Trace Impurities - Calcium (Ca)	≤ 50.0 ppb	163.0 ppb
Trace Impurities - Chromium (Cr)	≤ 1.0 ppb	0.7 ppb
Trace Impurities - Cobalt (Co)	≤ 1.0 ppb	< 0.3 ppb
Trace Impurities – Copper (Cu)	≤ 1.0 ppb	< 0.1 ppb
Trace Impurities – Gallium (Ga)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities ~ Germanium (Ge)	≤ 3.0 ppb	< 2.0 ppb
Trace Impurities – Gold (Au)	≤ 4.0 ppb	
Heavy Metals (as Pb)	≤ 100 ppb	0.6 ppb
Trace Impurities - Iron (Fe)	≤ 15 ppb	< 50 ppb
	- 12 khn	6 ppb

>>> Continued on page 2 >>>





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

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

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





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

Test

Specification

Result

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

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







MS 934 MS 935 MS956 MS 957 MS 958

Material No.: 9606-03 Batch No.: 24D1062002 Manufactured Date: 2024-03-26

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

Certificate of Analysis

Test	Specification	Result
Assay (HNO ₃)	69.0 – 70.0 %	69.7 %
Appearance	Passes Test	Passes Test
Color (APHA)	≤ 10	rasses rest
Residue after Ignition	≤ 2 ppm	•
Chloride (CI)	≤ 0.08 ppm	1 ppm
Phosphate (PO ₄)	≤ 0.10 ppm	< 0.03 ppm
Sulfate (SO ₄)	≤ 0.2 ppm	< 0.03 ppm
Trace Impurities – Aluminum (AI)	≤ 40.0 ppb	< 0.2 ppm < 1.0 ppb
Arsenic and Antimony (as As)	≤ 5.0 ppb	< 2.0 ppb
Trace Impurities - Barium (Ba)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities - Beryllium (Be)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities - Bismuth (Bi)	≤ 20.0 ppb	< 1.0 ppb
Trace Impurities - Boron (B)	≤ 10.0 ppb	< 5.0 ppb
Trace Impurities - Cadmium (Cd)	≤ 50 ppb	< 1 ppb
Trace Impurities - Calcium (Ca)	≤ 50.0 ppb	2.3 ppb
Trace Impurities - Chromium (Cr)	≤ 30.0 ppb	< 1.0 ppb
Trace Impurities - Cobalt (Co)	≤ 10.0 ppb	< 1.0 ppp < 1.0 ppb
Trace Impurities - Copper (Cu)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities - Gallium (Ga)	≤ 10.0 ppb	
Trace Impurities - Germanium (Ge)	≤ 20 ppb	< 1.0 ppb < 10 ppb
Trace Impurities - Gold (Au)	≤ 20 ppb	
Heavy Metals (as Pb)	≤ 100 ppb	< 5 ppb
Trace Impurities - Iron (Fe)	≤ 40.0 ppb	100 ppb
Trace Impurities ~ Lead (Pb)	≤ 20.0 ppb	< 1.0 ppb
Trace Impurities – Lithium (Li)	≤ 10.0 ppb	< 10.0 ppb
Trace Impurities – Magnesium (Mg)	≤ 20 ppb	< 1.0 ppb
Trace Impurities – Manganese (Mn)	≤ 10.0 ppb	< 1 ppb
Trace Impurities - Nickel (Ni)	≤ 20.0 ppb	< 1.0 ppb < 5.0 ppb

>>> Continued on page 2 >>>





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

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

Nitric Acid 69% **CMOS**





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

Test Specification Result

For Microelectronic Use

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

Director Quality Operations, Bioscience Production



Certificate of Analysis

300 Technology Drive Christiansburg, VA 24073 USA inorganicventures.com

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

ACCREDITATION / REGISTRATION 1.0

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



2.0 PRODUCT DESCRIPTION

Product Code:

Single Analyte Custom Grade Solution

Catalog Number:

CGY10

Lot Number:

V2-Y740548

Matrix:

2% (v/v) HNO3

Value / Analyte(s):

10 000 µg/mL ea:

Yttrium

Starting Material:

Yttrium Oxide

Starting Material Lot#:

2661 and 06230520YL

Starting Material Purity:

99.9984%

CERTIFIED VALUES AND UNCERTAINTIES 3.0

Certified Value:

 $10000 \pm 30 \mu g/mL$

Density:

1.032 g/mL (measured at 20 ± 4 °C)

Assay Information:

Assay Method #1

10011 ± 25 µg/mL

EDTA NIST SRM 928 Lot Number: 928

Assay Method #2

9997 ± 50 µg/mL

ICP Assay NIST SRM 3167a Lot Number: 190730

Assay Method #3

9984 ± 31 µg/mL

Calculated NIST SRM Lot Number: See Sec. 4.2

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

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

Characterization of CRM/RM by Two or More Methods

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

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

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

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

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

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

uts = transport stability standard uncertainty

- ------

Characterization of CRM/RM by One Method
Gertified Value, Xanuary, where one method of characterizat

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

XCDM/DM = (Xa) (Uchar a)

X_a = mean of Assay Method A with

uchar a = the standard uncertainty of characterization Method A

CRM/RM Expanded Uncertainty (±) = $U_{CRM/RM} = k (u^2_{char} a + u^2_{bb} + u^2_{lts} + u^2_{ts})^{V_2}$

k = coverage factor = 2

uchar a = the errors from characterization

ubb = bottle to bottle homogeneity standard uncertainty

ults = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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

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

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

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

6.0 INTENDED USE

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

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

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

chemically stable for years in 2-5% HNO3 / LDPE container.

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

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

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

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

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

8.0 HAZARDOUS INFORMATION

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

9.0 HOMOGENEITY

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

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

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

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

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

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

February 20, 2024

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

11.2 Lot Expiration Date

- February 20, 2029
- The date after which this CRM/RM should not be used.
- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

11.3 Period of Validity

_	Sealed TCT	Bag	Open	Date:	

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

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

Uyen Truong Custom Processing Supervisor

Mayyand Man Paul R. Laine

Certificate Approved By:

Muzzammil Khan Stock Laboratory Supervisor

Certifying Officer:

Paul Gaines Chairman / Senior Technical Director

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



Certified Reference Material CRM

M5962 R! 06/14/24



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

m/z->		io io	m/z->	-	Ņ	m/z->	i i	1. Selenium (Se)	Compound		<		Nominal Co	Re			CERTIFIED WEIGHT HEPOHT	מדודודה שובום
210	1.OE8	2.008	110	1.OE8		10	[1] Spectrum No.1				Volume shown below was diluted to (mL):	NIST Test Number:	Nominal Concentration (µg/mL):	Recommended Storage:	1	Lot Number: Description:	Part Number:	1 11000H
0			0			Ü	Z 2 0	58134	Number	Part	as dilute					lie ie ii	_	
220			120			20	-	071223	Number	Lot	d to (mL):	6UTB	1000	Ambient (20 °C)		060624 Selenium (Se)	57034	
Ŋ			<u></u>			ω	3.702	0.1000	Factor	Dilution	2000.07			<u>ග</u>		Se)		
230			130			30	sec]:58	200.0	Vol. (mL	Initial	0.100	5E-05						
240			140			40	33.702 sec]:58034.D# [Count] [Linear]	0.084	Val. (mL) Pipette (mL) Conc. (μg/mL)	Uncertainty	Flask Uncertainty	Balance Uncertainty						
250			150			50	Count) [L	1000	Conc. (µg/mL)	Nominal	ťγ	ainty			2.0%	24007540	24002546	
260			160			. 60	inear	10002.5	Conc. (µg/mL	Initial				(m_C)	40.0	Na Contraction	Solvent:	
0						12 33 34		1000.0	Conc. (µg/mL) Conc. (µg/mL)	Final					Nitric Acid			(1)
			170			70		2.2	.) +/- (µg/mL)	Uncertainty	Expanded	Reviewed By:	ta	N	Formulated By:	M		10
			180			80		7782-49-2	C	(So		y:	1 to	11	By:			
			190			90		2 0.2 mg/m3	OSHA PEL (TWA)	(Solvent Safety Info. On Attached pg.)	SDS Information	Pedro L. Rentas	leenes		Benson Chan	M		
			2200			100			VA)). On Atta	rmation	ntas	,	/	ב	5		
						-		orl-rat 6700 mg/kg	1.050	ched pg.)		060624			060624			
								3149	SRM	NIST		ٿ			1+2			

							I race M	1etals	Verifica	lion	oy ICP-M	S (H	g/mL)						
Al	40.02	CG	<0.02	Dγ	<0.02	HH	<0.02	11	<0.02	Z.	<0.02	Pr	<0.02	Se	H	16	40.02	W	40,02
SЪ	<0.02	ದ್ದ	<0.2	퍜	<0.02	田	<0.02	Ę	<0.02	₽	<0.02	Re	<0.02	S:	<0.02	Te	<0.02	U	<0.02
As	<0.2	ಕಿ	<0.02	핃	<0.02	Ы	<0.02	Mg	<0.01	°	<0.02	Rh	40.02	Ag	<0.02	∄	40.02	۷	<0.02
Ва	<0.02	င္တ	<0.02	æ	<0.02	H.	<0.02	Mn	<0.02	Pd	40.02	₽.	<0.02	Na	<0.2	Ħ	<0.02	4	<0.02
Ве	40.01	ť	40.02	Ga	<0.02	Fe	<0.2	Hg	A02	P	<0.02	Ru	40.02	Sr	<0.02	Tm	<0.02	¥	<0.02
Bi	40.02	င္ပ	<0.02	ଦୁ	<0.02	Ľ	<0.02	Mo	<0.02	7	<0.02	Sm	40.02	S	<0.02	Sn	40.02	Zn	<0.02
В	<0.02	Cι	<0.02	Au	<0.02	Pb	<0.02	M	<0.02	×	40.2	Sc	<0.02	Ta	<0.02	Ħ	<0.02	Zr	<0.02

(T) = Target analyte

Physical Characterization:

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

Certified by:

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

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

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

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

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

Absolute Standards, Inc. 800-368-1131

www.absolutestandards.com



Certified Reference Material CRM

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

R: 03/16/23 MS473 MS474, MS475, MS Lot #

CERTIFIED WEIGHT REPORT:

Part Number:

56138 082922

Solvent: 20510011

Nitric Acid

2% 20.0 Nitric Acid

<u>P</u>

Nominal Concentration (µg/mL):

NIST Test Number:

6UTB 10000 Recommended Storage:

Ambient (20 °C) 082925

Expiration Date:

Description: Lot Number:

Strontium (Sr)

Weight shown below was diluted to (mL):

1000.12

0.058 Flask Uncertainty 5E-05 Balance Uncertainty

> Formulated By: Lawrence Barry

Pedro L. Rentas

Reviewed By:

082922

082922

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

OSHA PEL (TWA)

CAS#

Strontium nitrate (Sr

IN017 SRZ022018A1

10000

41.2

24.2756 Weight (g)

20.0

RM#

Number

Conc. (µg/mL)

8

Purity (%)

8

Weight (g) Conc. (µg/mL) +/- (µg/mL)

Uncertainty

Expanded

닭

Nominal

Purity Uncertainty Assay

orl-rat >2000mg/kg 3153a LD50 SRM SRM

m/z-> m/z-> M/z-> 2.5E6 5.0E6 5.0E5 1.0E6 2.5 € 6 5.0E6 [1] Spectrum No.1 210 110 10 220 120 20 [14.495 sec]:58138.D# [Count] [Linear] 230 130 30 99.997 140 240 0.10 40 250 150 50 24.2758 260 160 60 10000.1 170 0 80 10042-76-9 190 90 Ι₹ 200 100

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

П				П		Ш	Trace Me	tals	Verifica	tion	by ICP-	S	μg/mL)	Н					
				I		i				ı	8	ı		۱					
Α	<0.02	${\mathfrak S}$	<0.02	Dу	<0.02	H	<0.02	Ľ.	40.02	<u>Z</u> .	<0.02	P.	<0.02	Se	<0.2	4T	<0.02	¥	<0.02
SЬ	<0.02	က္အ	<0.2	缸	△0.02	Но	<0.02	Lu	<0.02	子	<0.02	Re	<0.02	Si	<0.02	Te	∆ 0.02	Ϥ	<0.02
As	<0.2	ප	<0.02	땹	<0.02	F	<0.02	Mg	<0.01	္တ	<0.02	₽	<0.02	Ag	<0.02	∄	<0.02	<	<0.02
Ва	<0.02	స	<0.02	ନ୍ଦ	<0.02	ī	<0.02	M	<0.02	Pd	<0.02	₽ B	<0.02	N ₂	<0.2	∄	<0.02	4	<0.02
Be	<0.01	Ω	△0.02	ନ୍ଥ	<0.02	듔	<0.2	Нg	<0.2	Р	<0.02	ᇟ	<0.02	Sr	Ţ	Tm	<0.02	~	<0.02
Bi	40.02	င္ပ	<0.02	Ge	<0.02	La	<0.02	Μo	<0.02	뫈	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
В	<0.02	₽ C	<0.02	Au	<0.02	Рь	<0.02	Nd	40.02	×	<0.2	Sc	<0.02	Ta	<0.02	∄	<0.02	Zr	<0.02

Physical Characterization:

(T)= Target analyte

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

Certified by:

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

 * Purified acids, 18.2 megohm deionized water, calibrated Class A glassware and the highest purity raw materials are used in the preparation of all standards.
- All standard containers are meticulously cleaned prior to use. Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- Standards are 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).