

FORM 1 - IN
INORGANIC ANALYSIS DATA SHEET

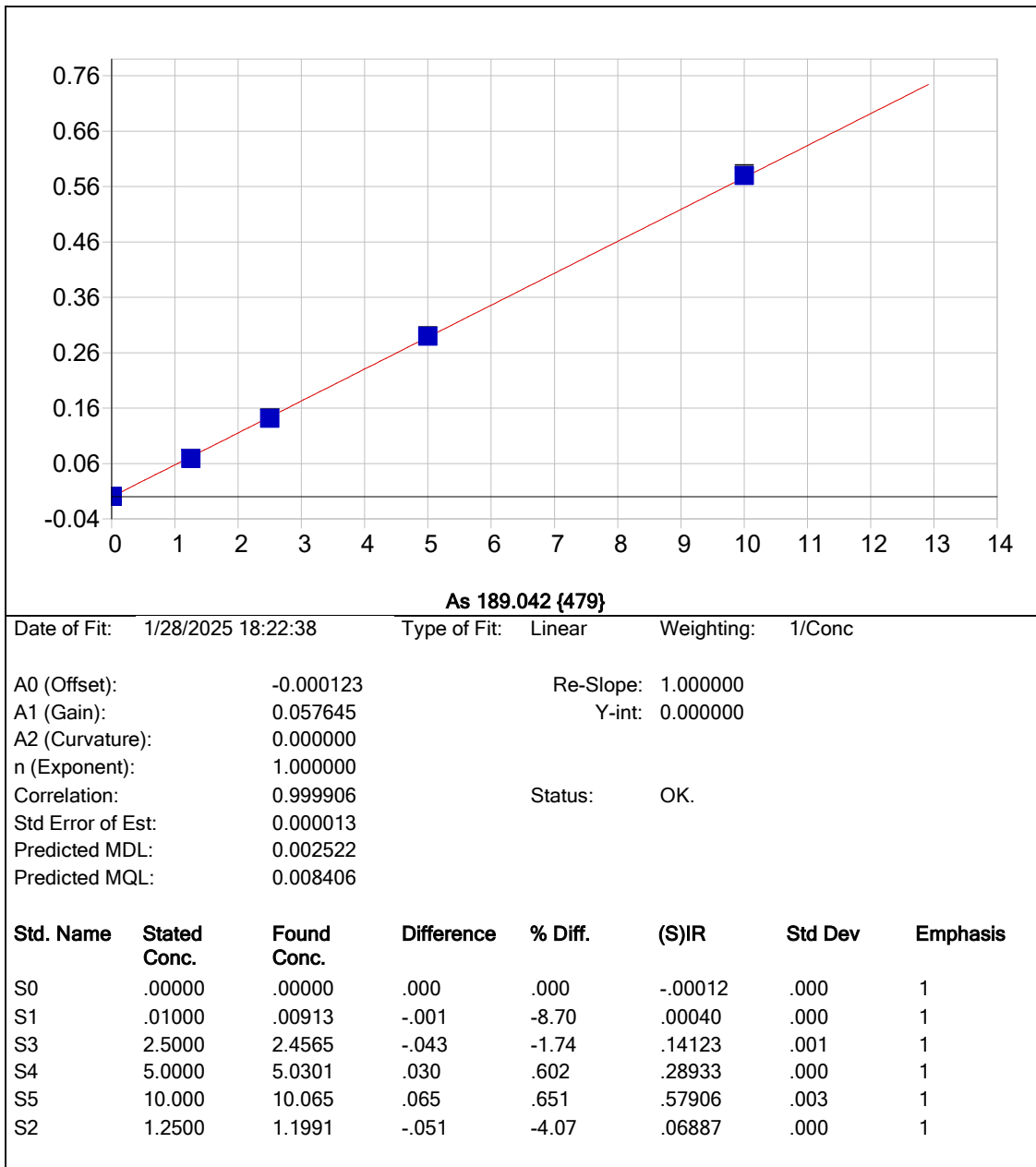
EPA SAMPLE NO.
MBHH98

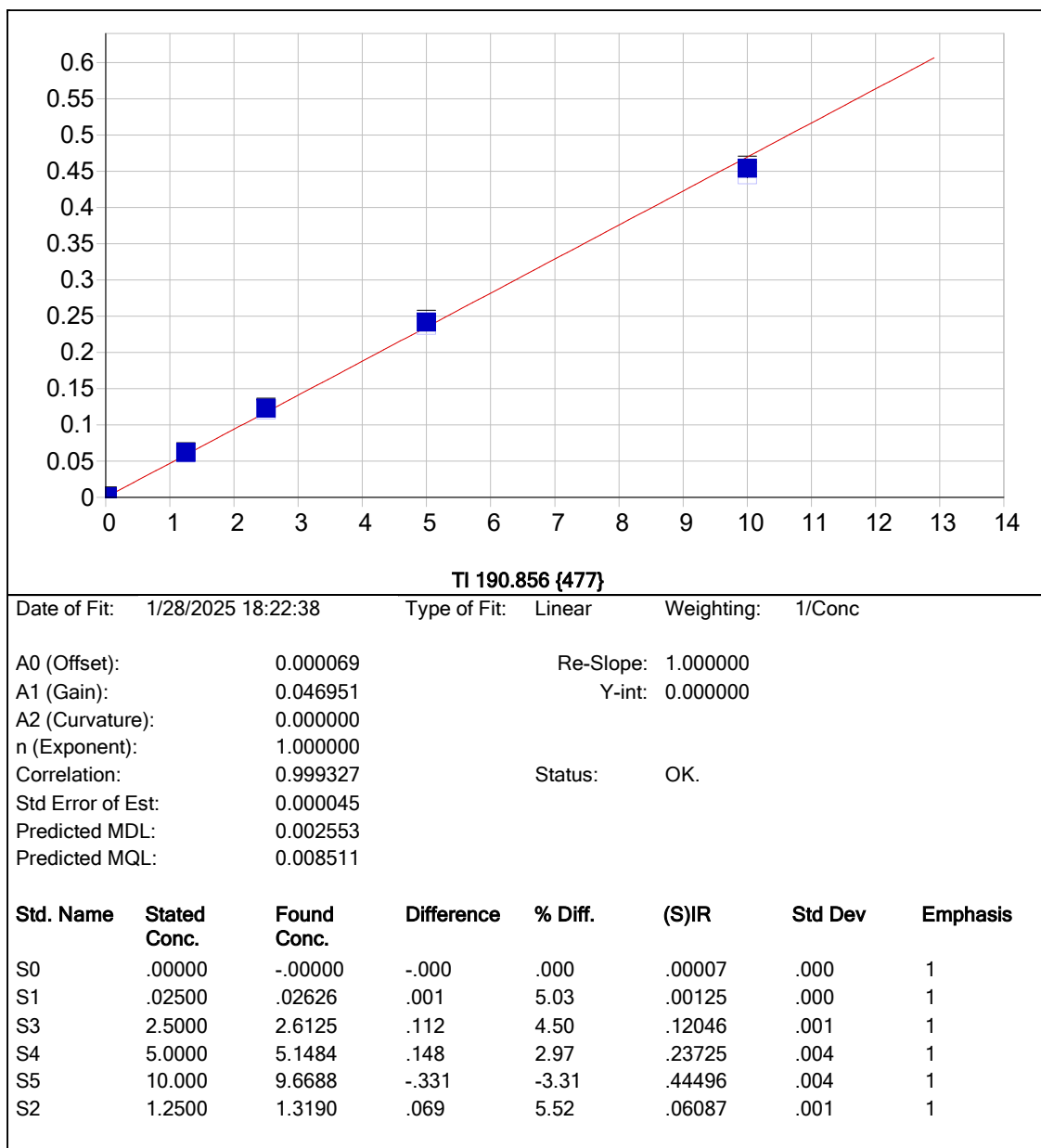
Lab Name: Alliance Technical Group, LLC Contract: 68HERH20D0011
Lab Code: ACE Case No.: 51974 MA No. : SDG No.: MBHH97
Matrix: WATER Lab Sample ID: Q1182-03
% Solids: Date Received: 01/24/2025
Analytical Method: ICP_AES
Concentration Units (µg/L, mg/L, mg/kg dry weight, µg, or µg/cm²): ug/L

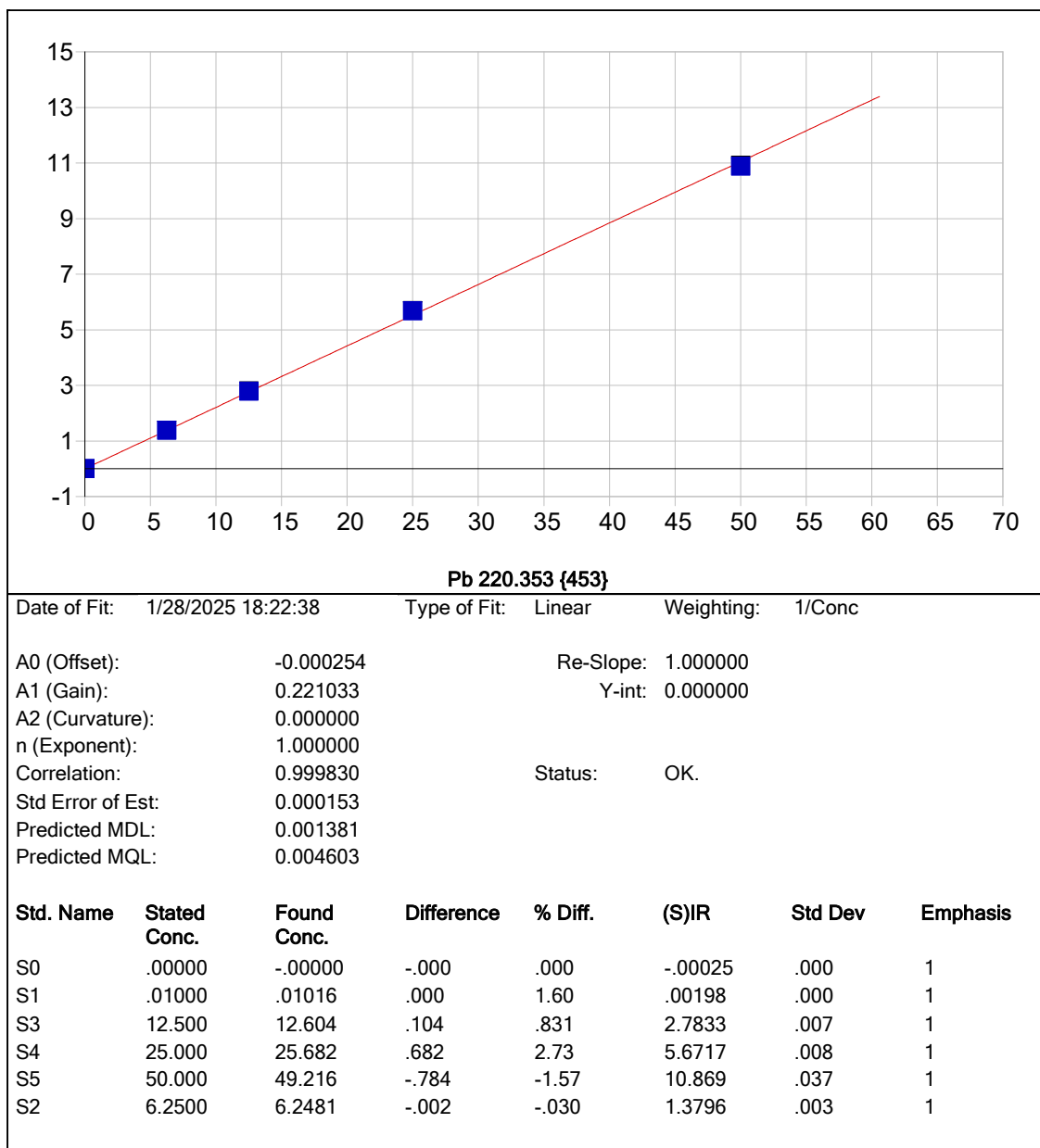
CAS No.	Analyte	Concentration	Q	Date Analyzed	Time Analyzed
7440-38-2	Arsenic	2.9	J	01/28/2025	2132
7440-39-3	Barium	1700		01/28/2025	2132
7440-43-9	Cadmium	2.2	J	01/28/2025	2132
7440-47-3	Chromium	10	U	01/28/2025	2132
7439-92-1	Lead	3.4	J	01/28/2025	2132
7782-49-2	Selenium	35	U	01/28/2025	2132
7440-22-4	Silver	0.29	J	01/28/2025	2132

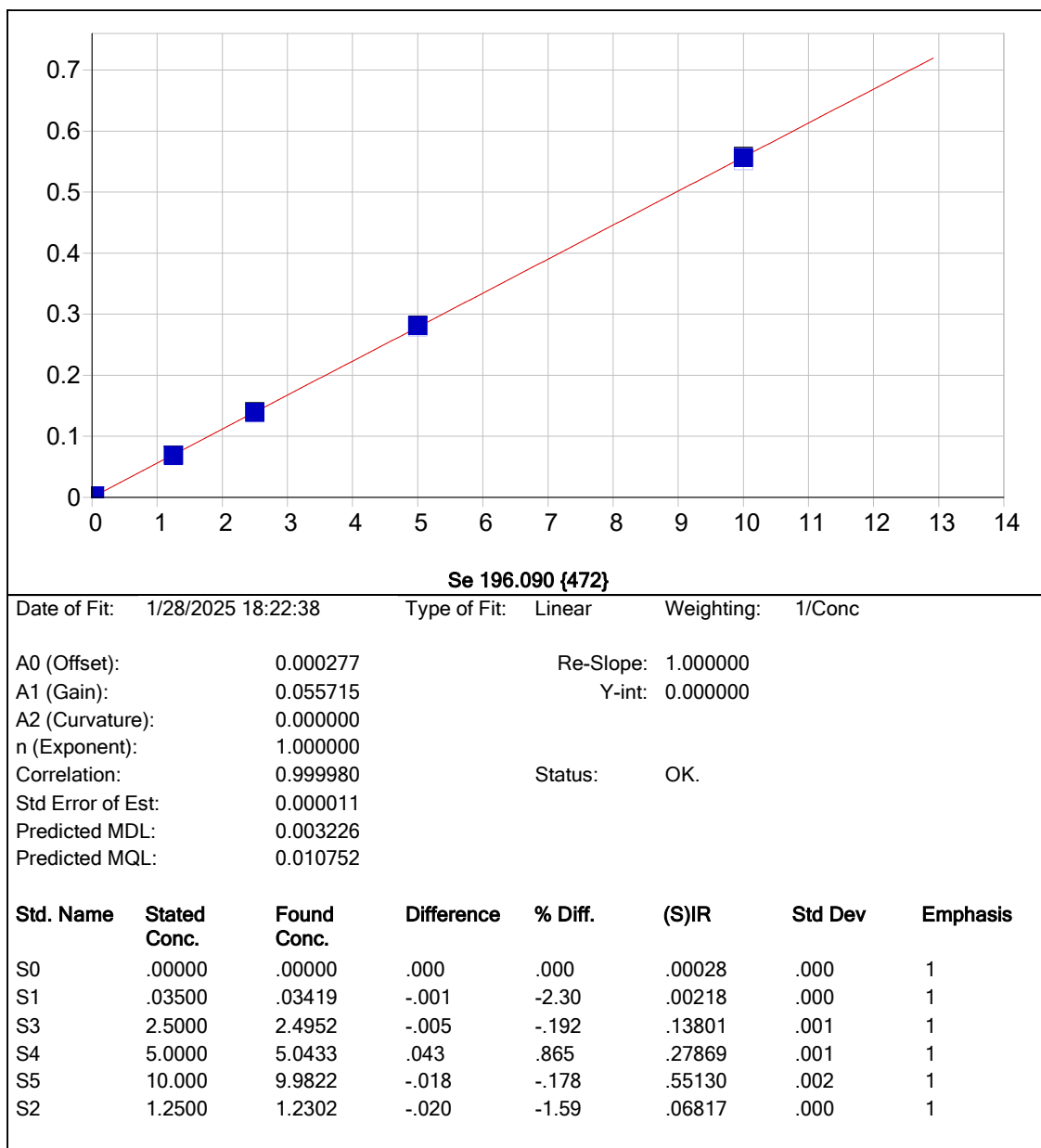
NOTE: Hardness (total) is reported in mg/L

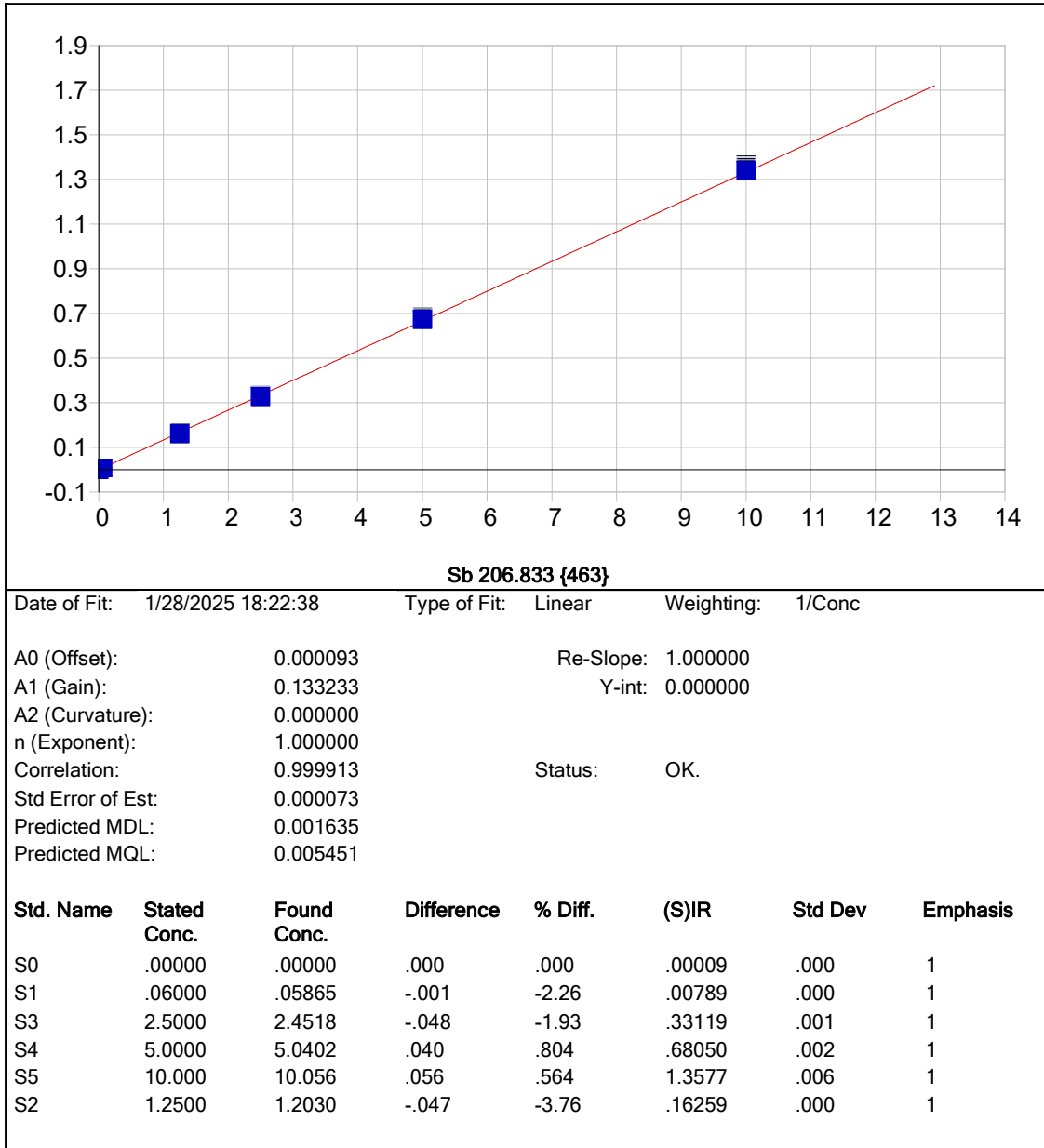
Comments:

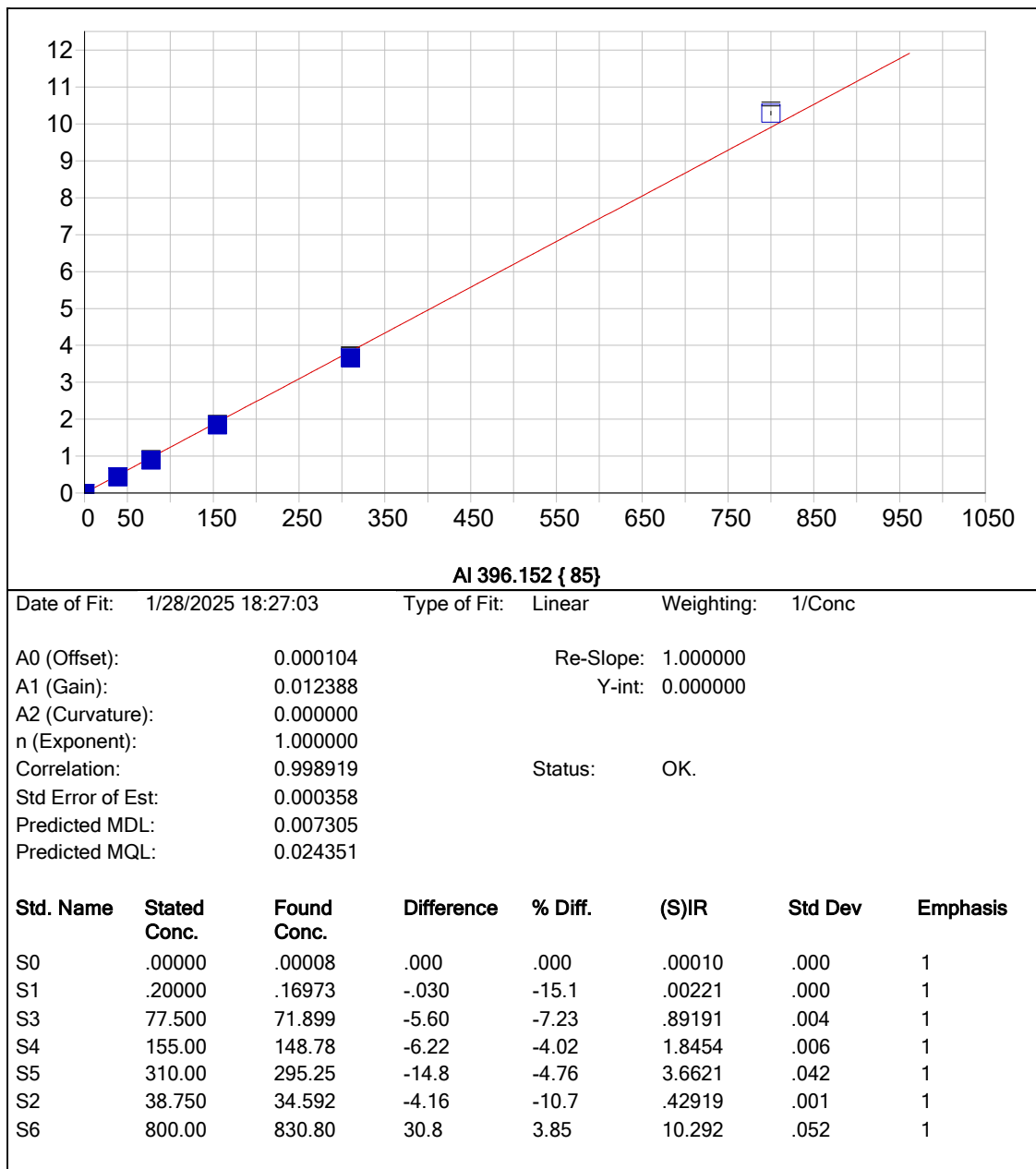


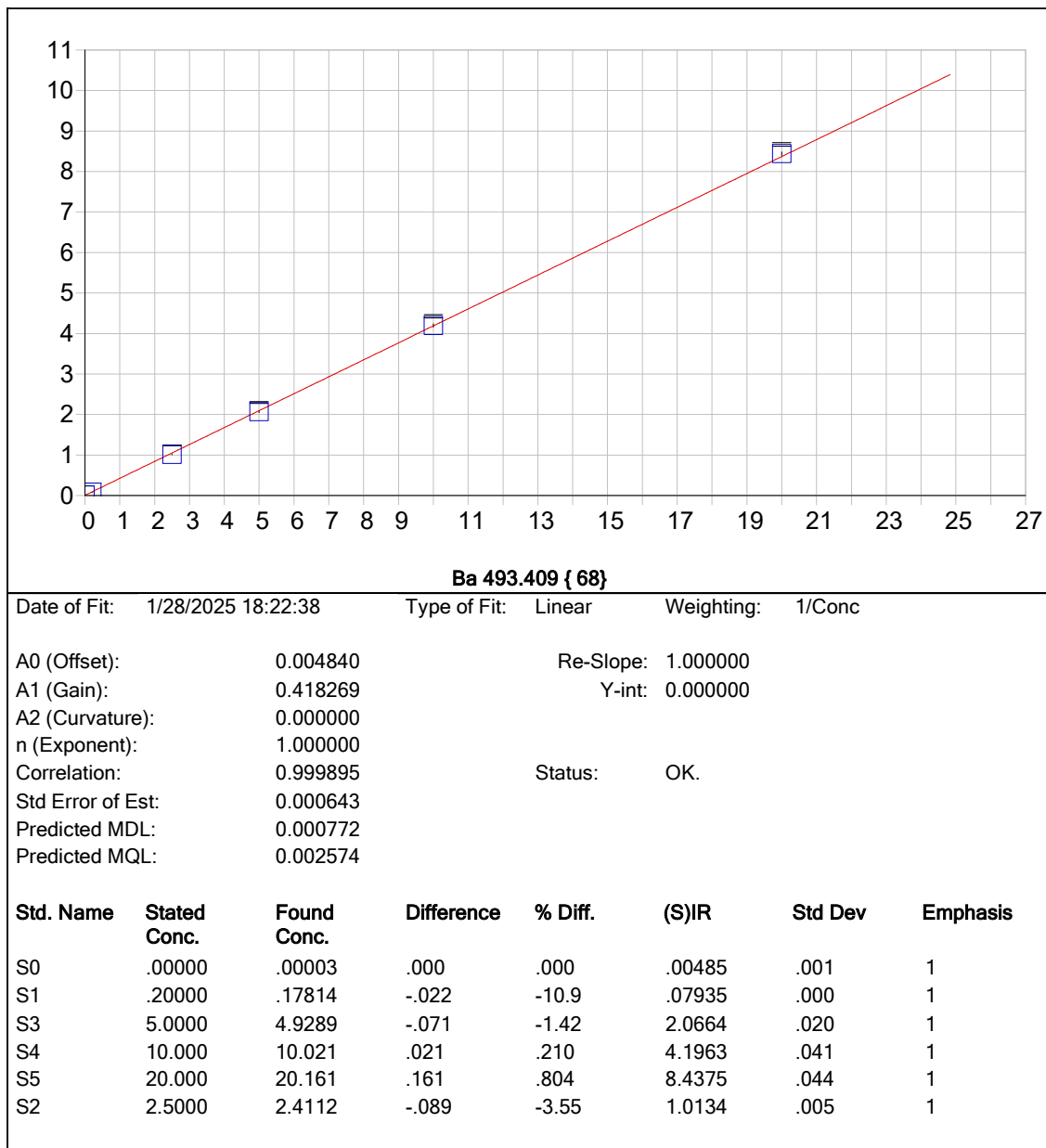


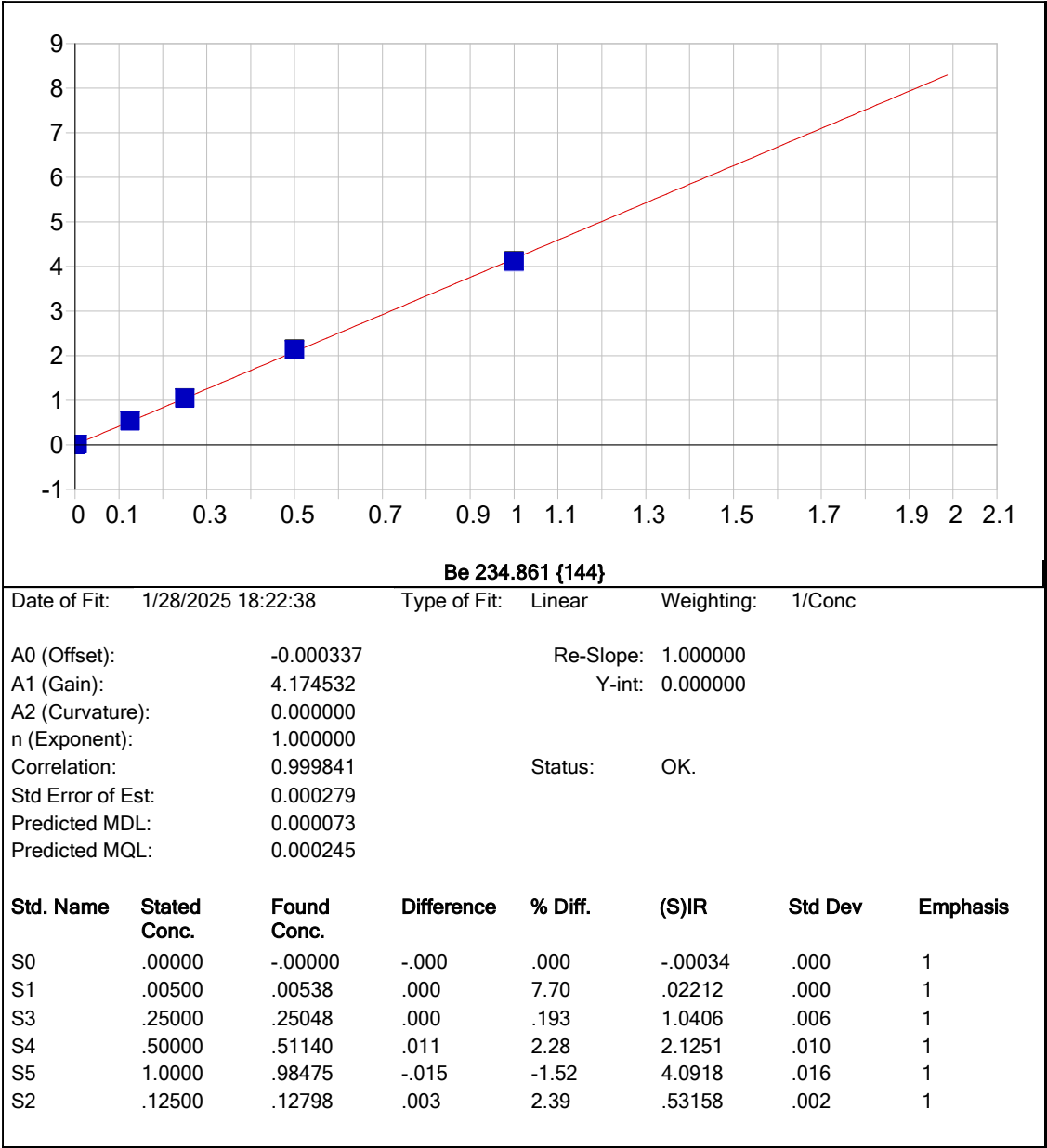


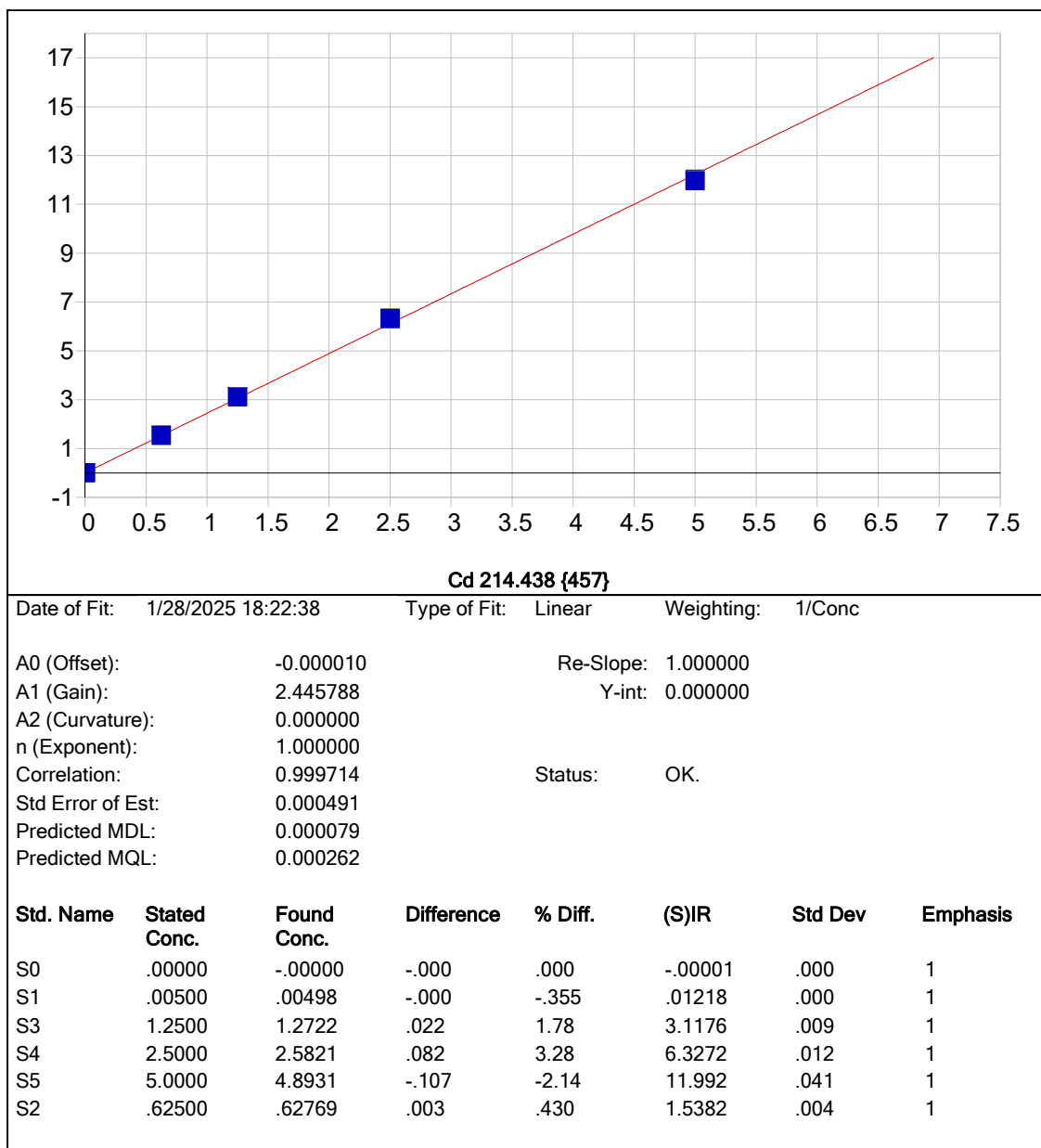


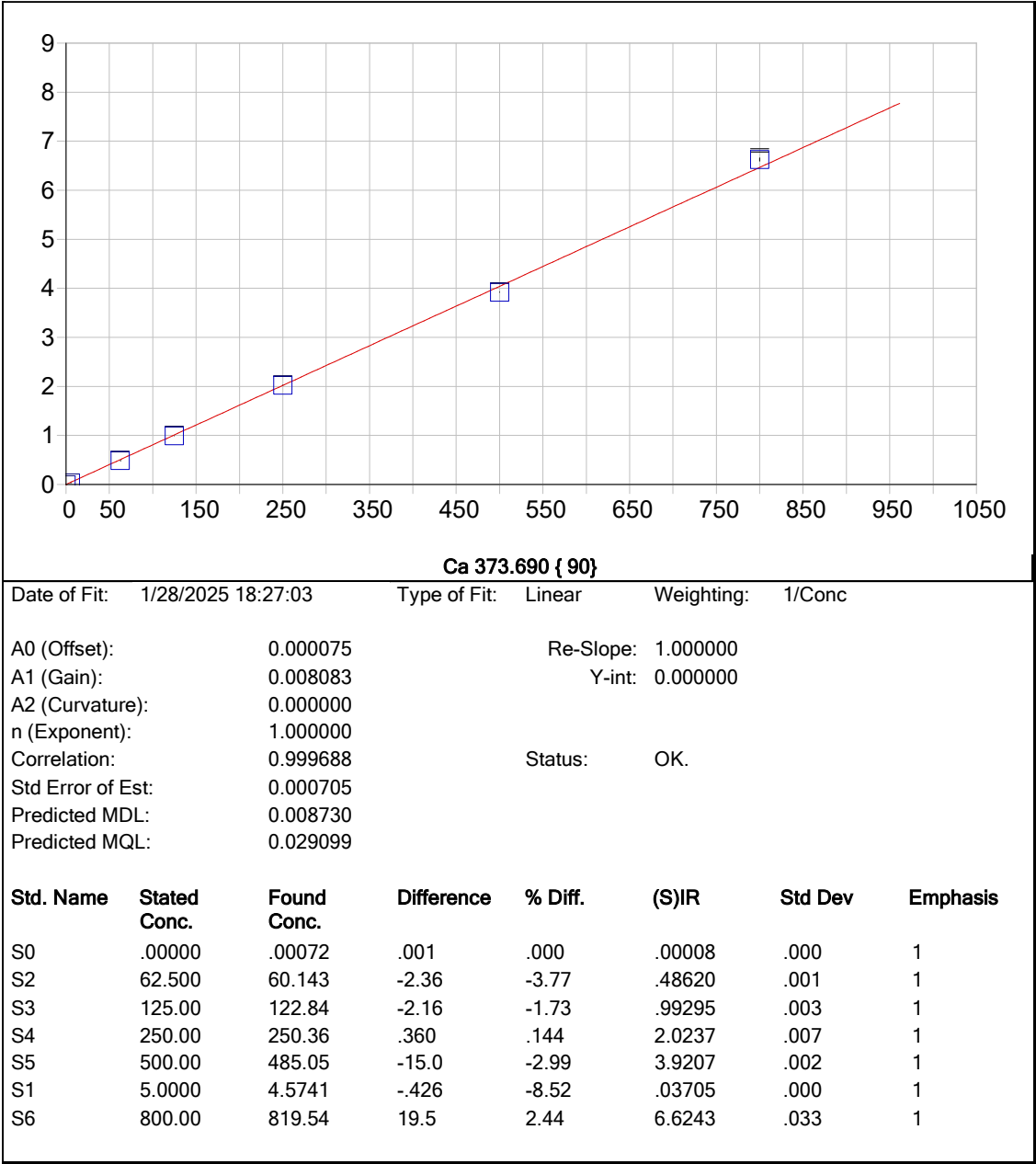


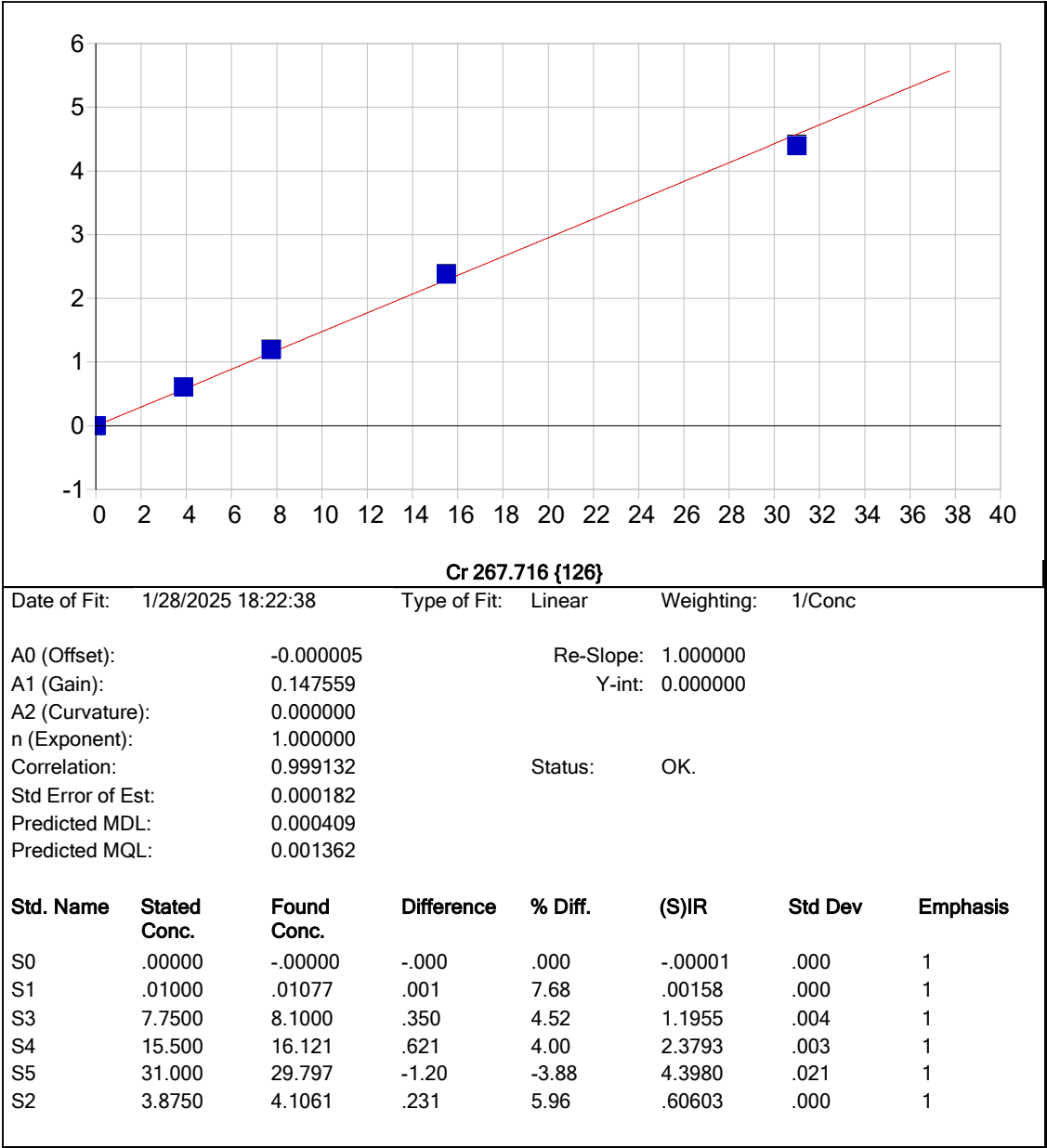


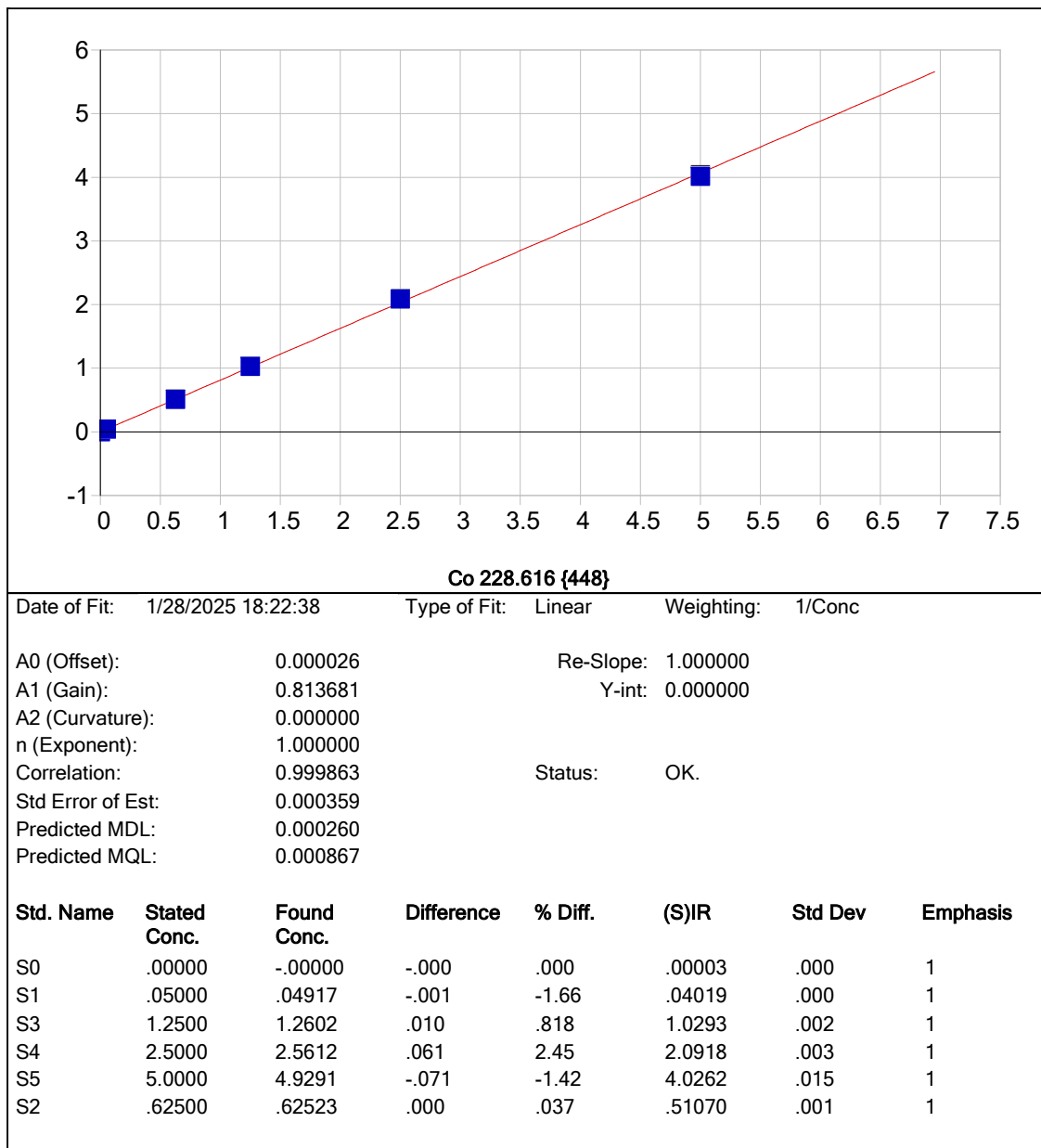


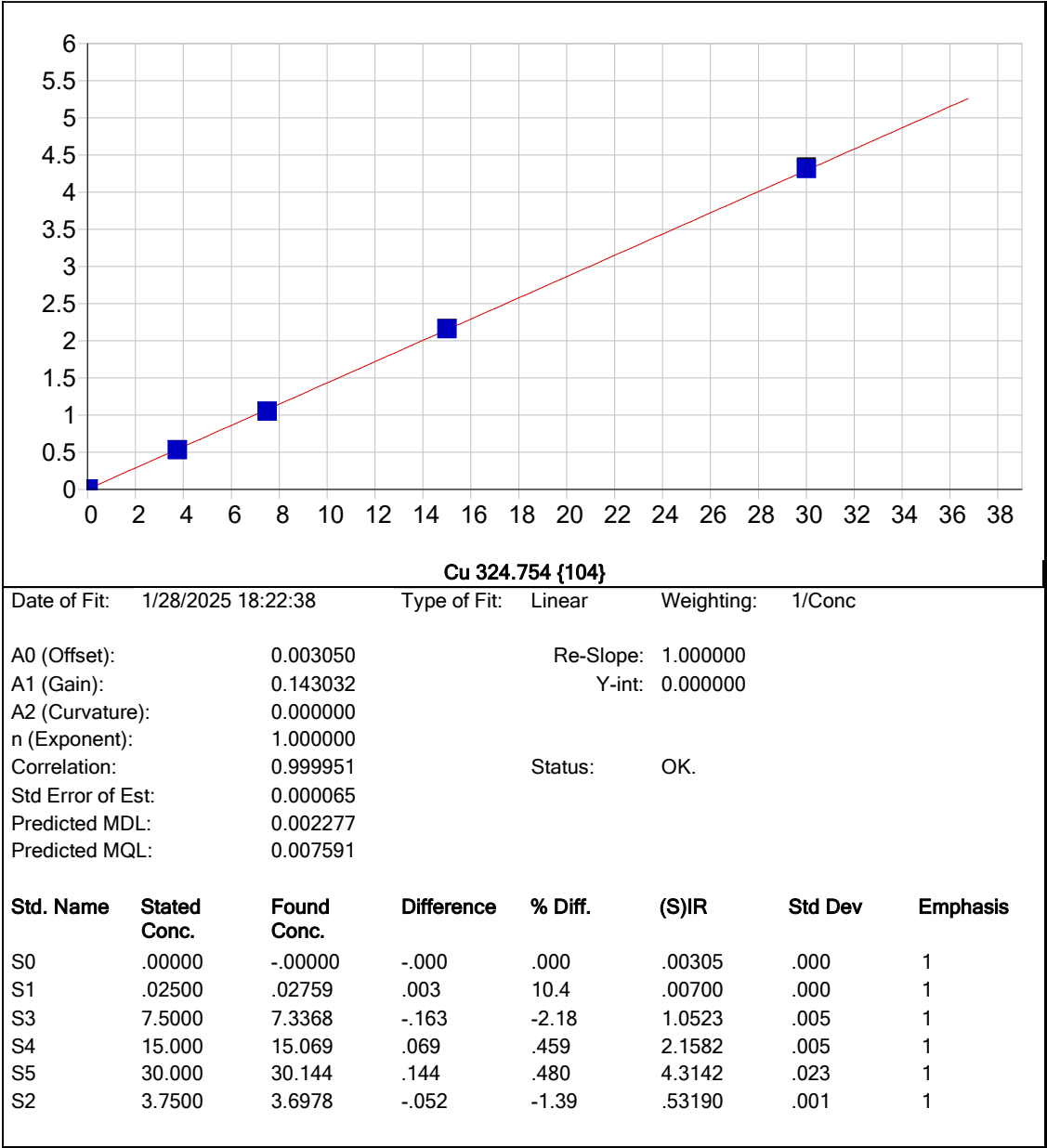


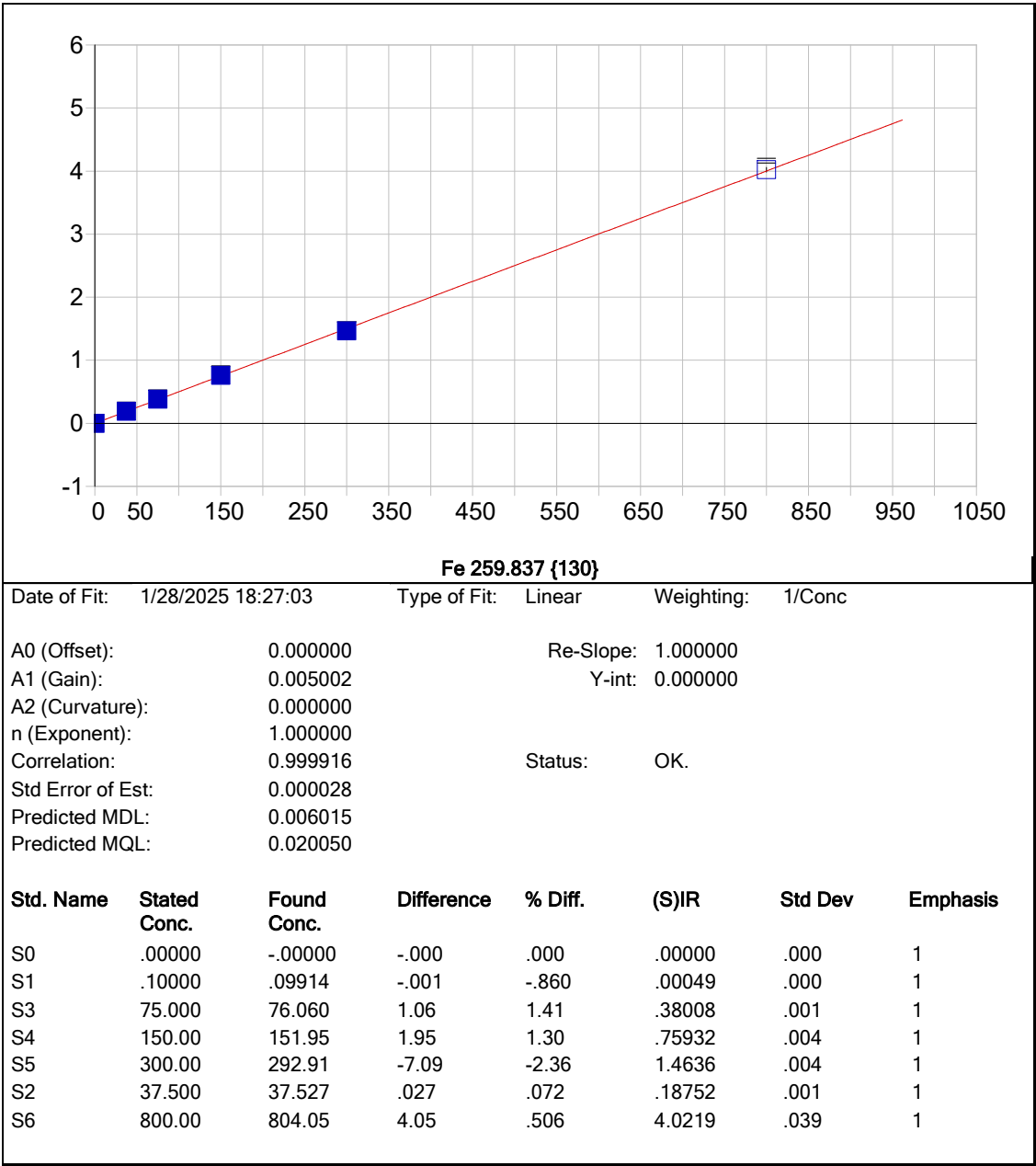


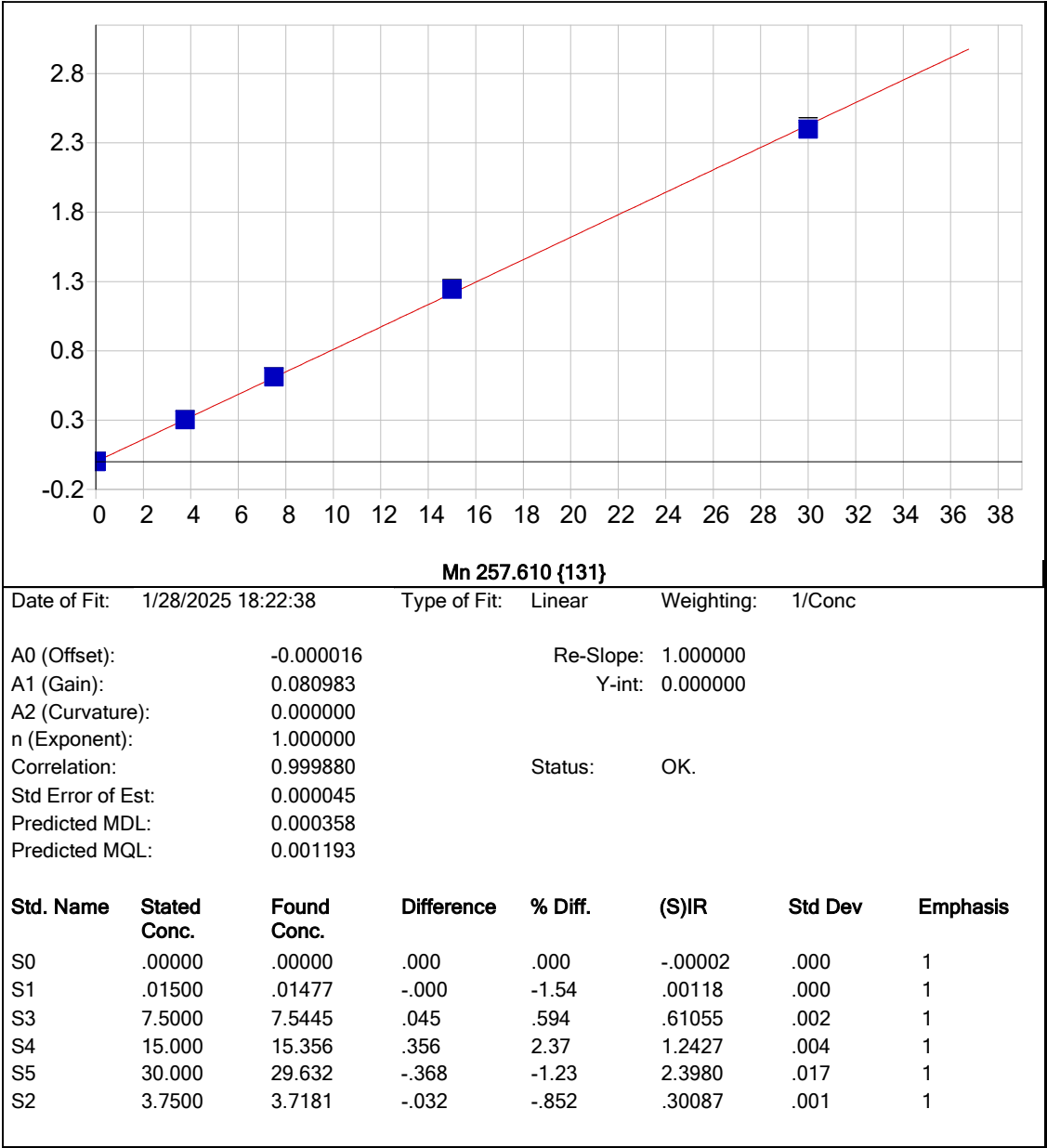


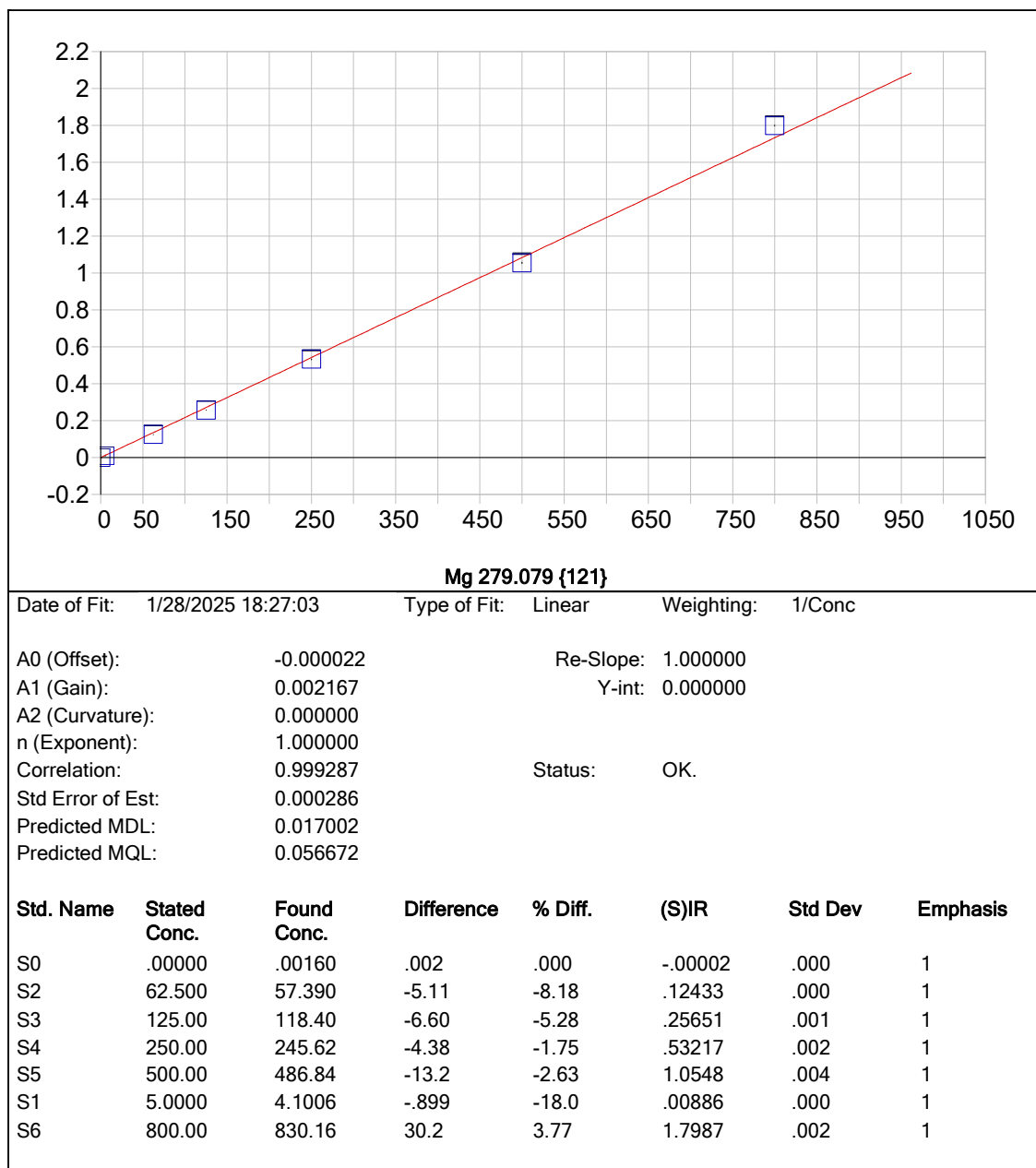


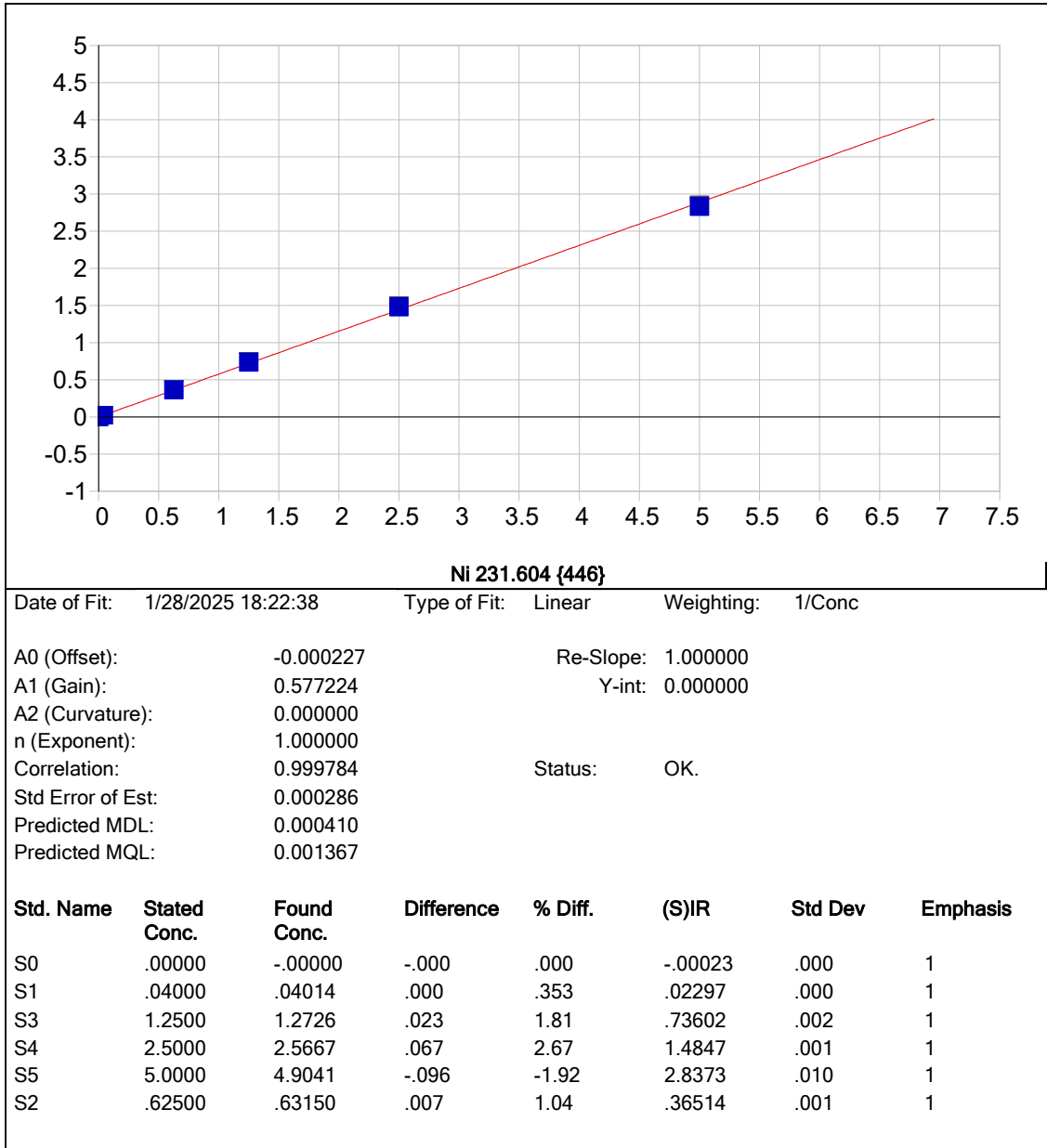


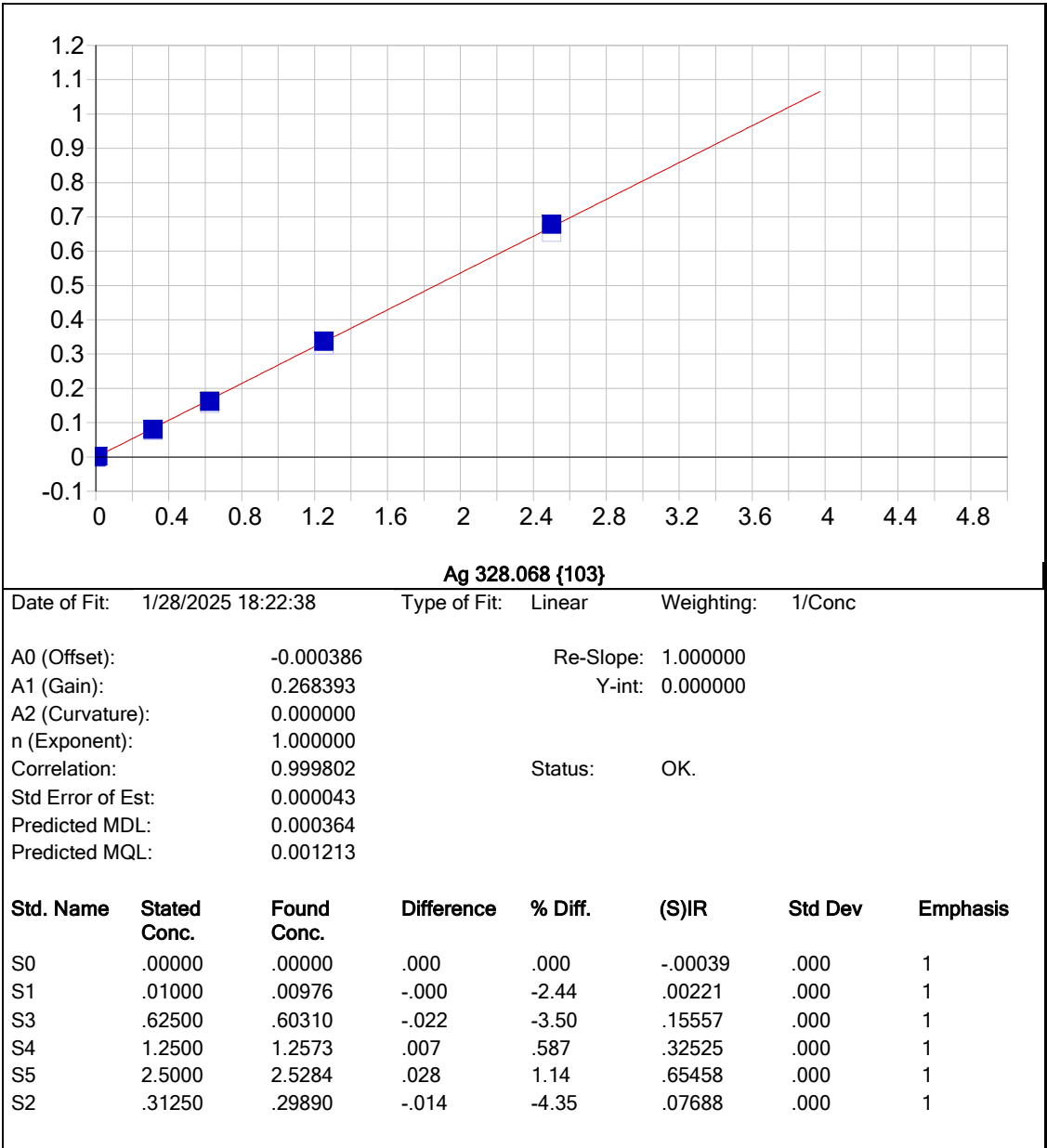


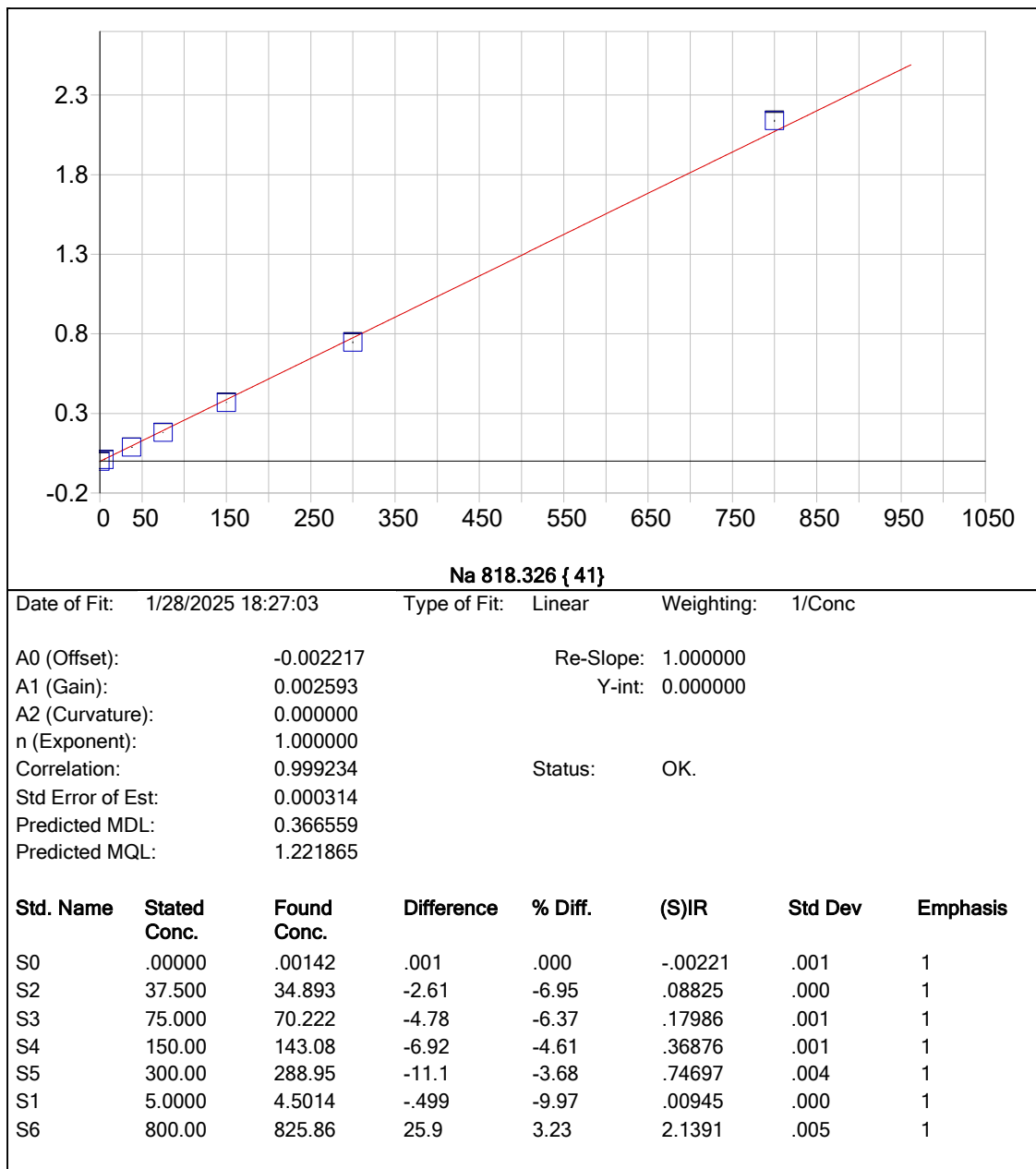


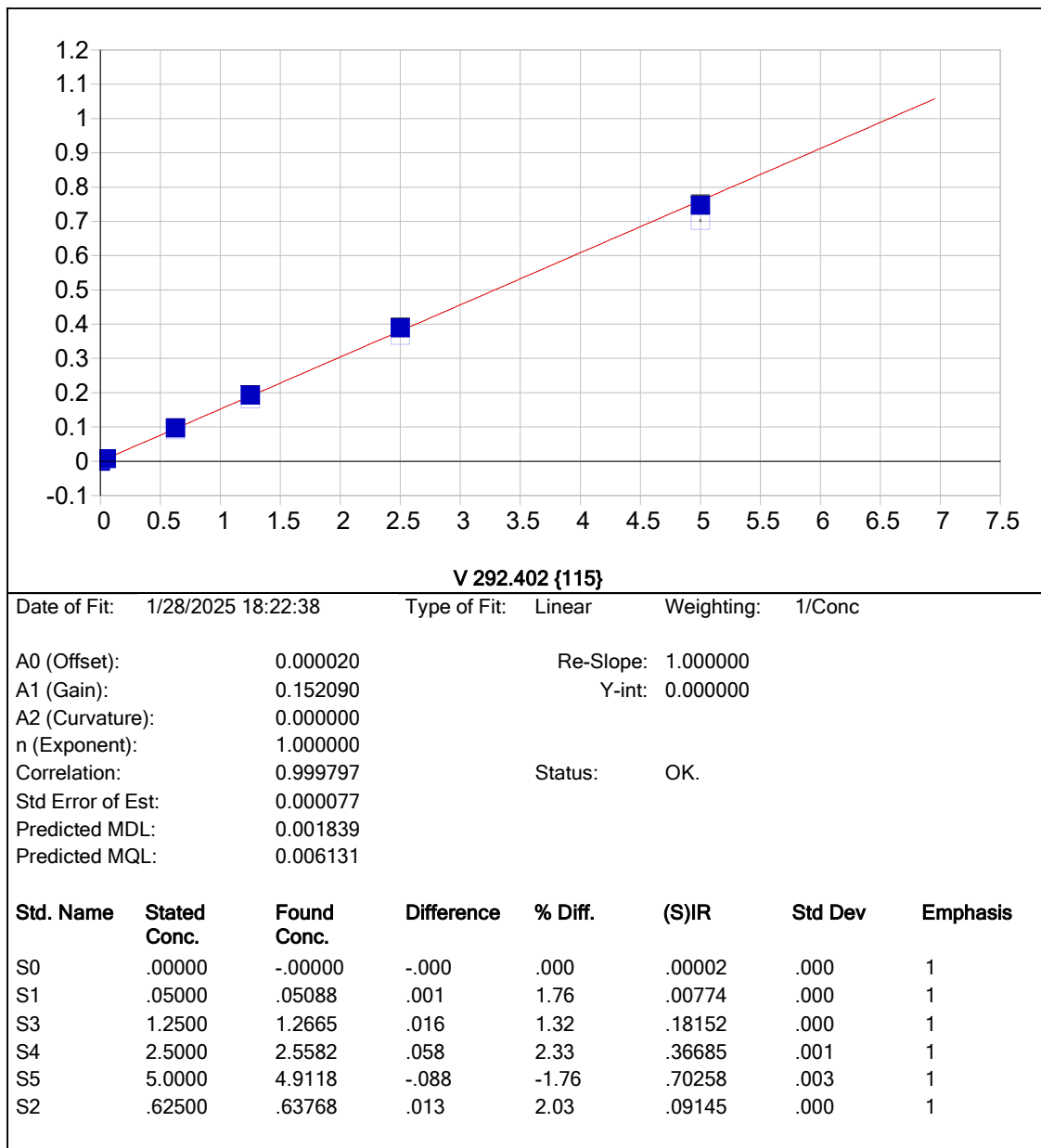


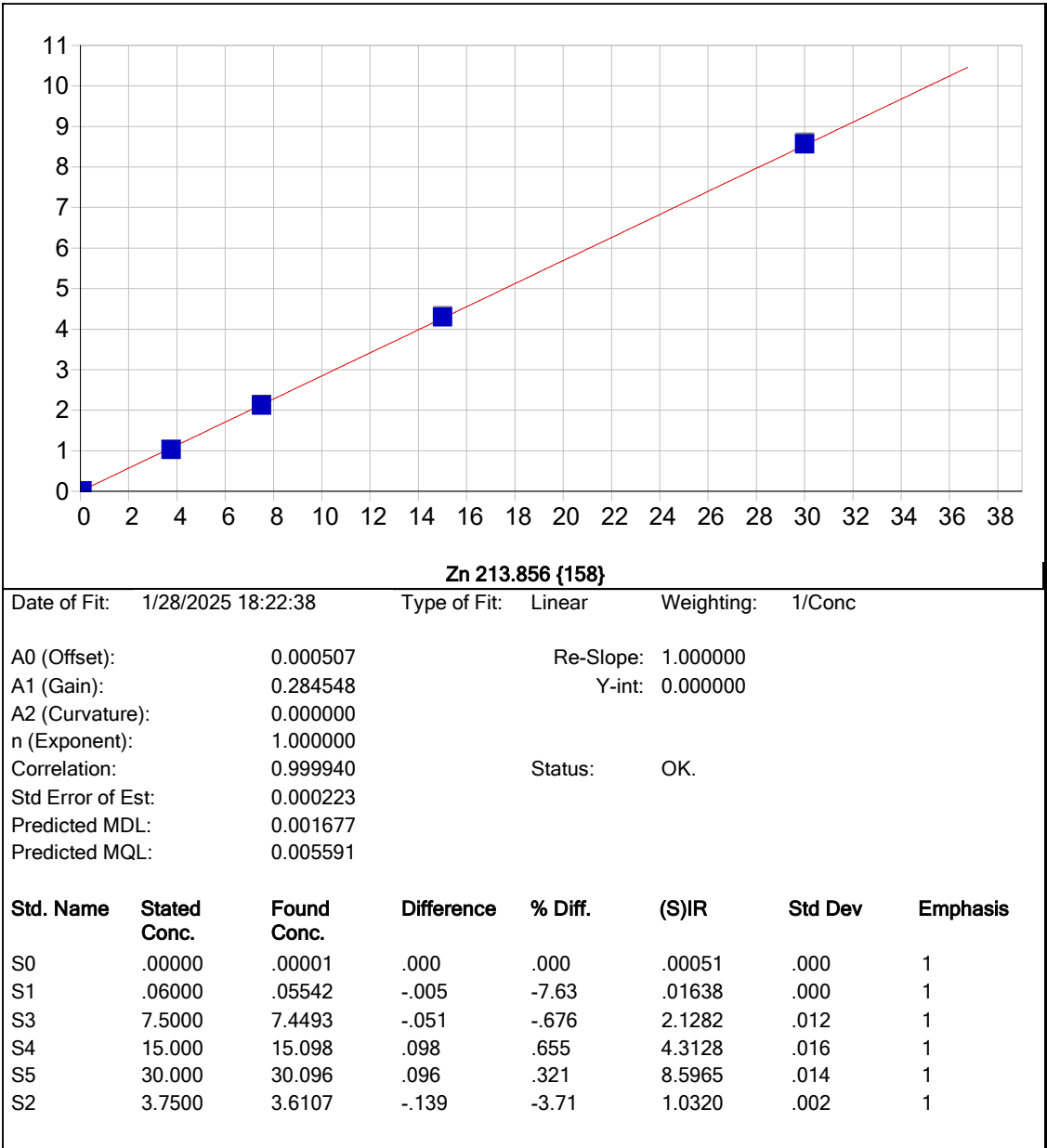


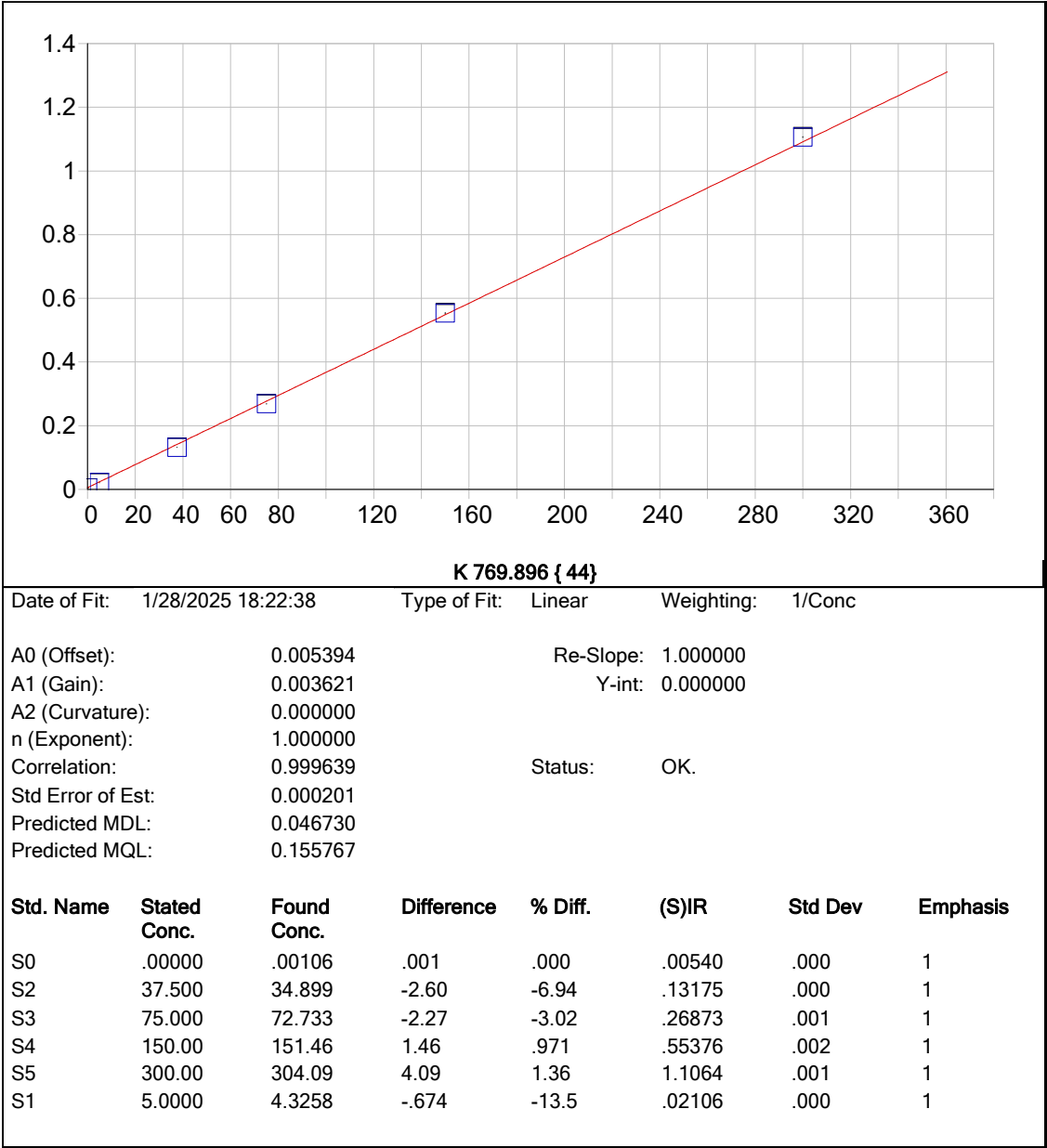


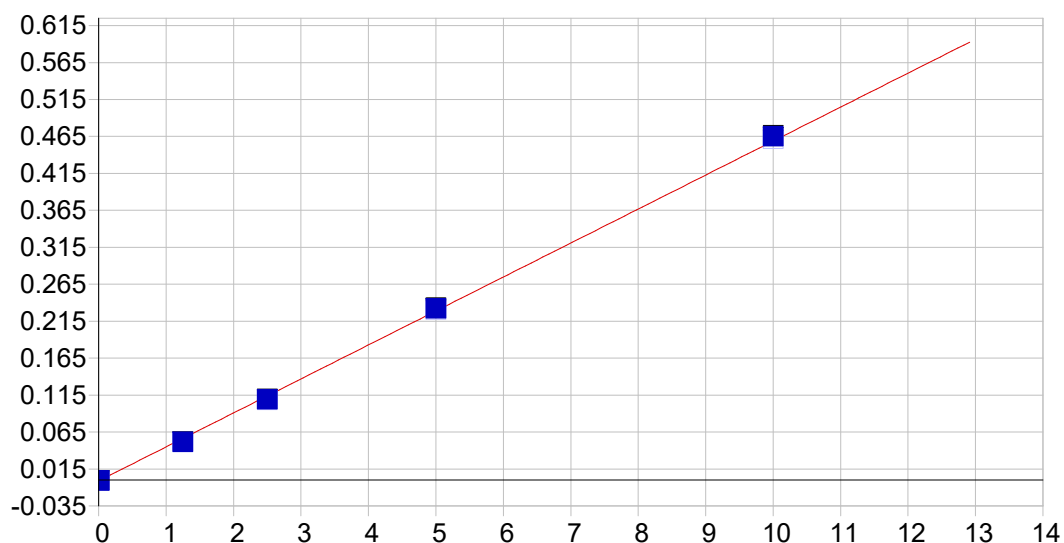










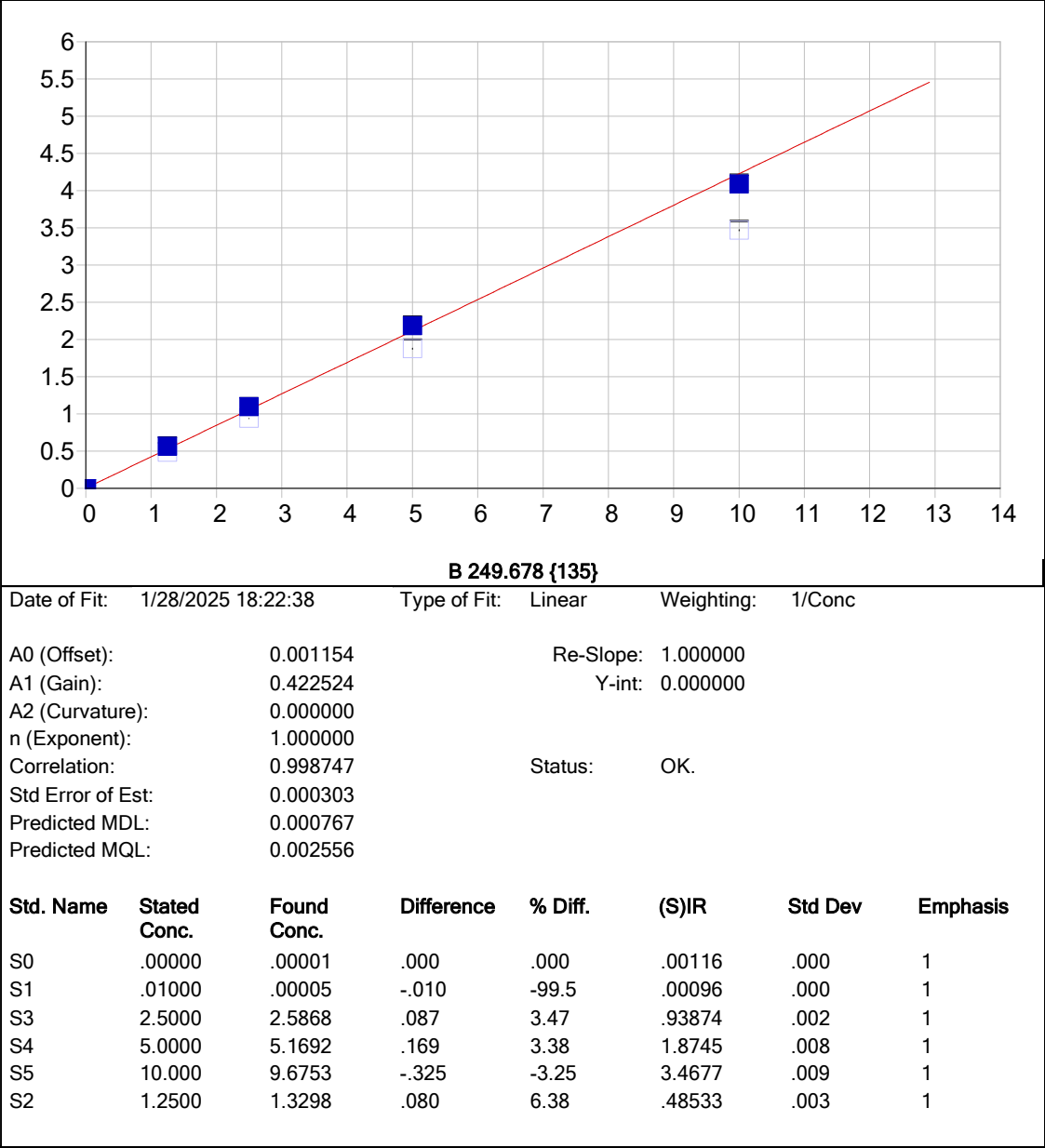


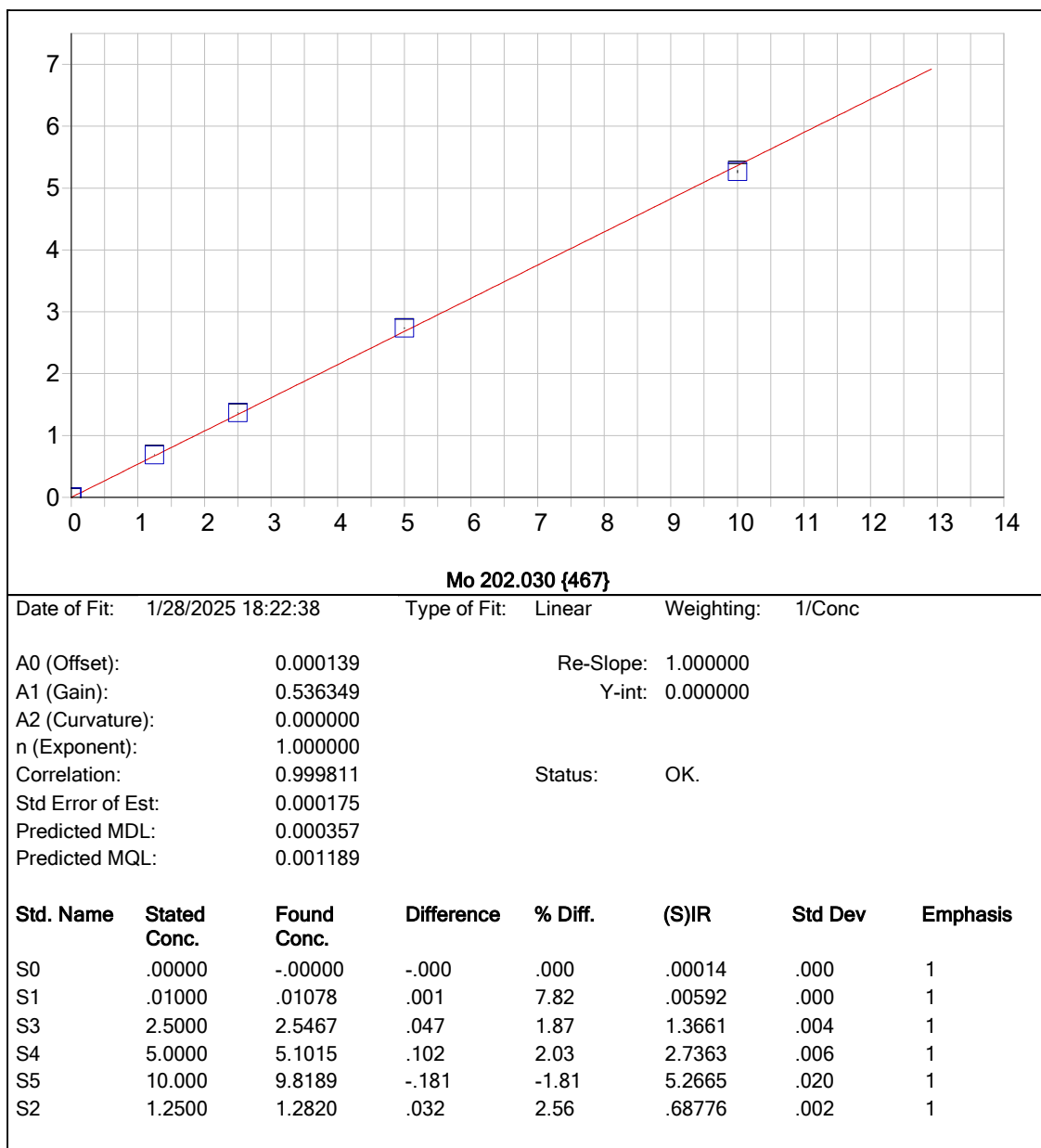
P 177.495 {490}

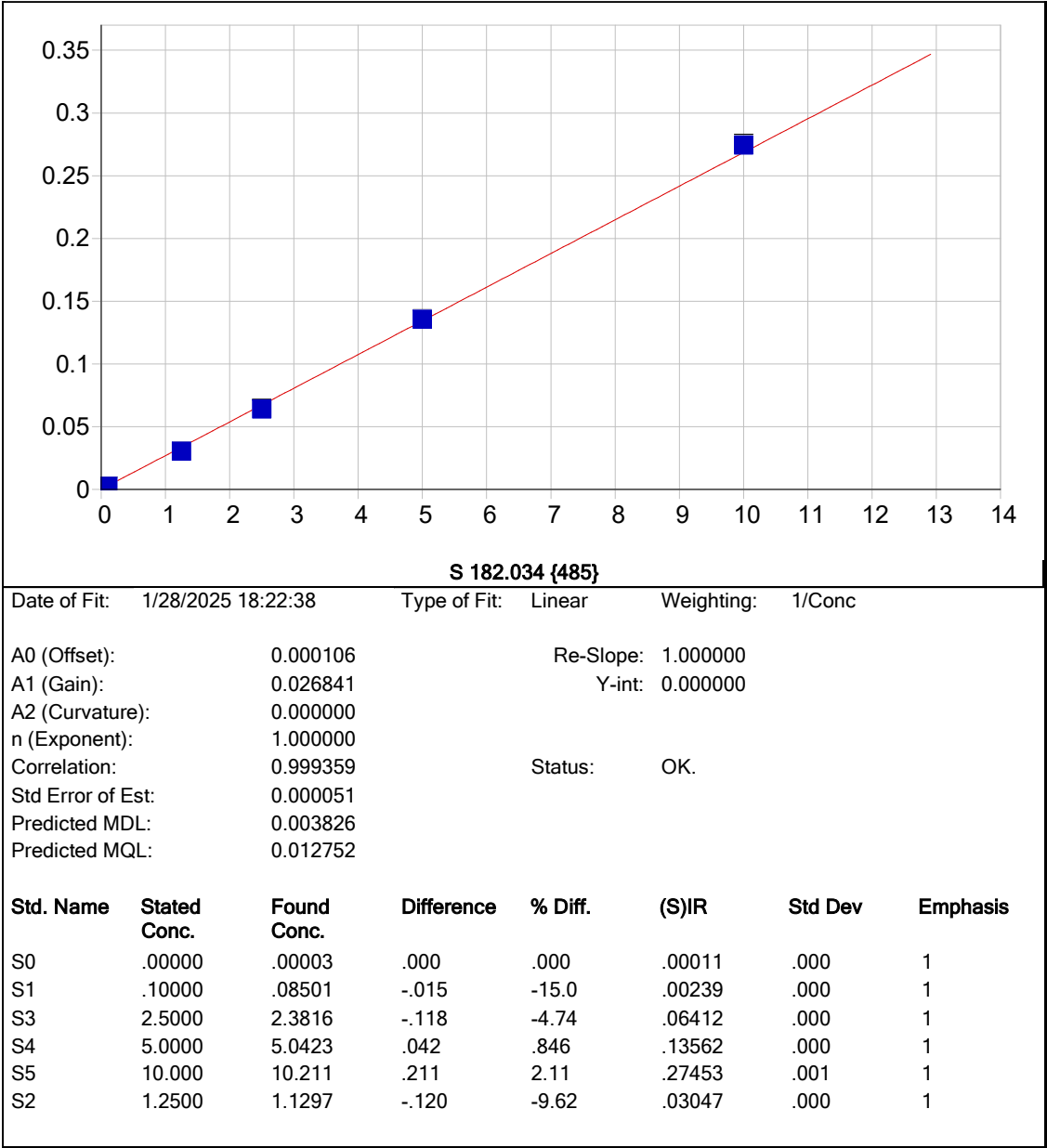
Date of Fit: 1/28/2025 18:22:38 Type of Fit: Linear Weighting: 1/Conc

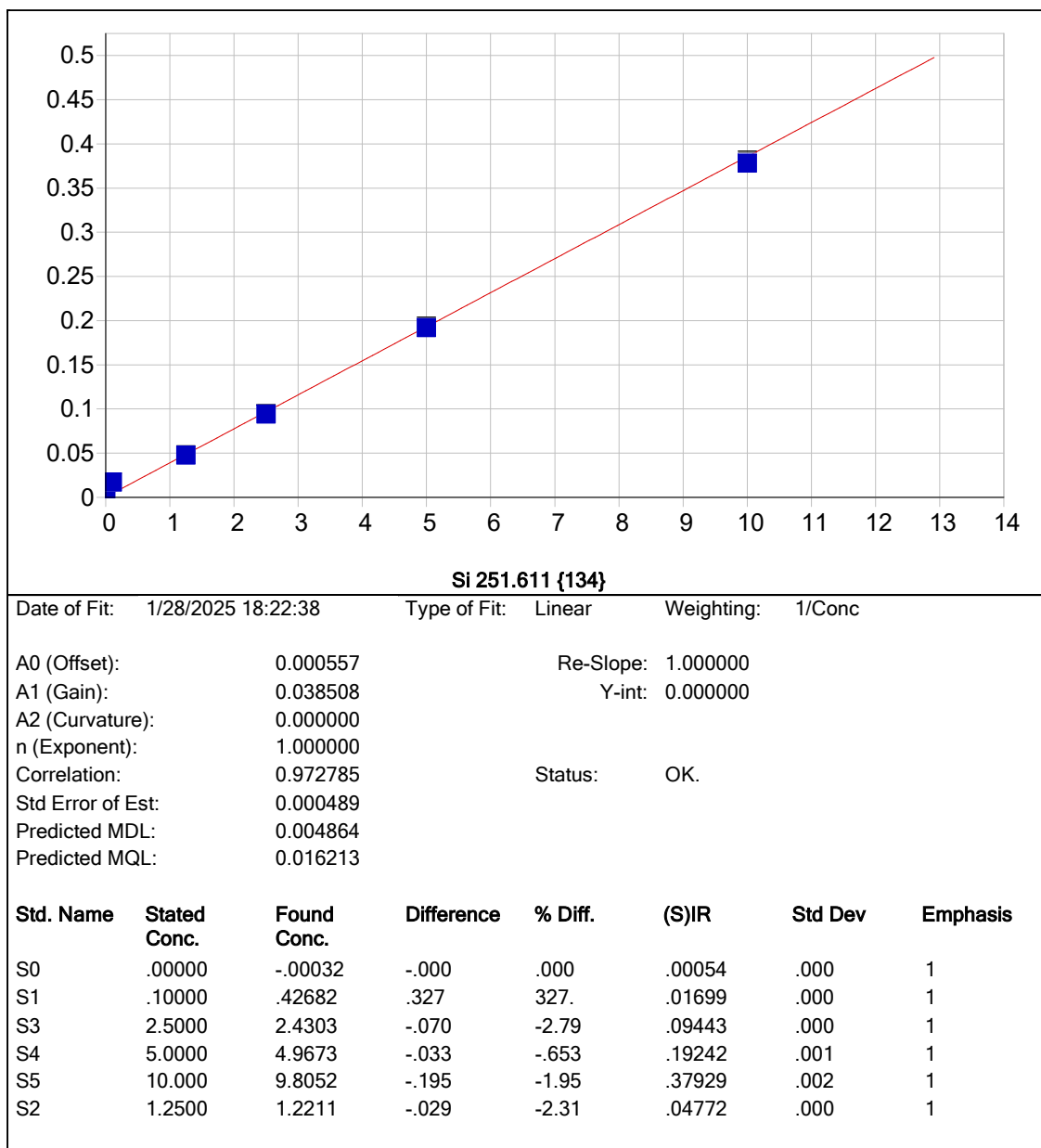
A0 (Offset): -0.001129 Re-Slope: 1.000000
A1 (Gain): 0.045986 Y-int: 0.000000
A2 (Curvature): 0.000000
n (Exponent): 1.000000
Correlation: 0.999577 Status: OK.
Std Error of Est: 0.000022
Predicted MDL: 0.002209
Predicted MQL: 0.007364

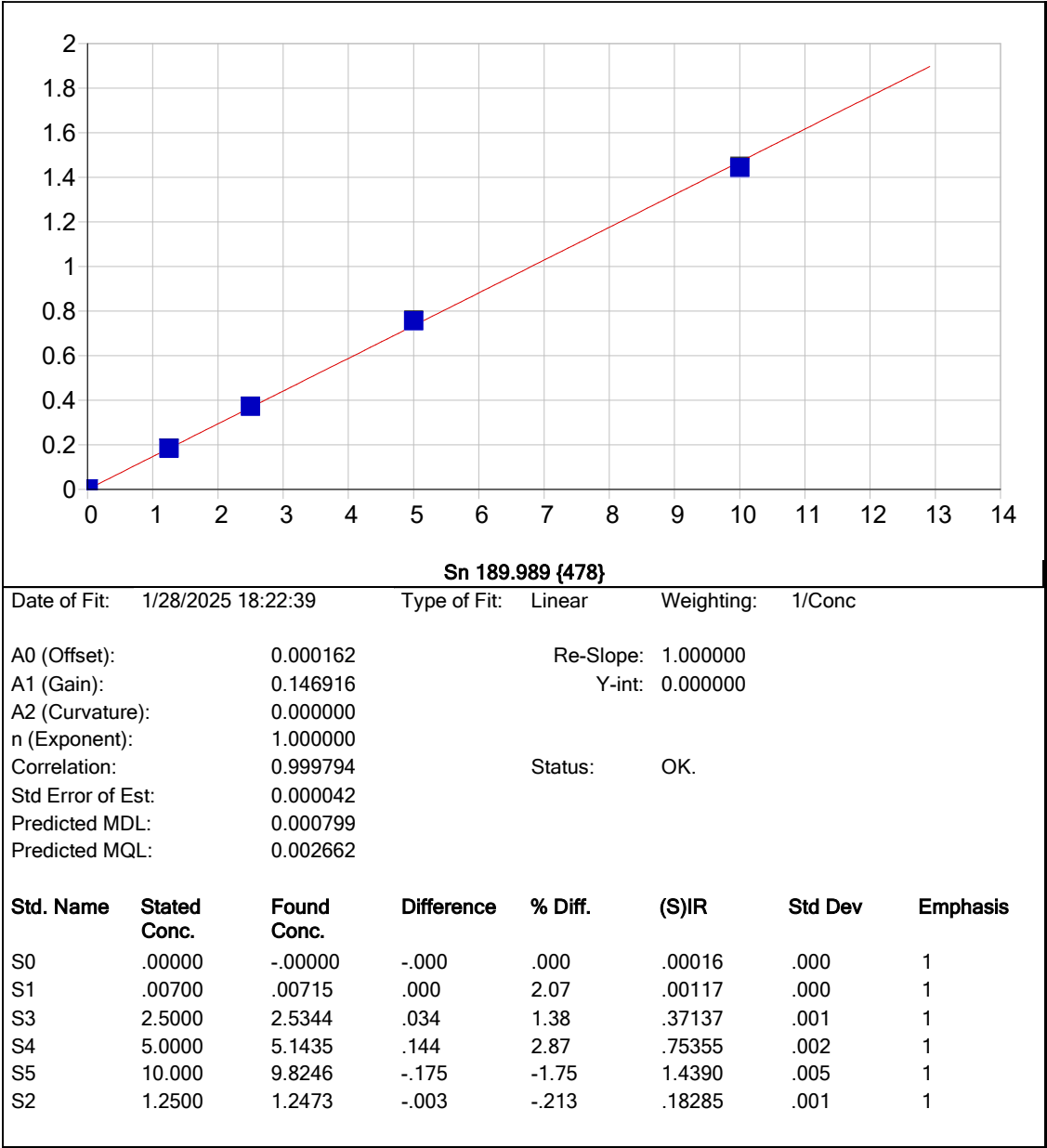
Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
S0	.00000	.00000	.000	.000	-.00113	.000	1
S1	.01000	.00840	-.002	-16.0	-.00075	.000	1
S3	2.5000	2.3979	-.102	-4.09	.10832	.001	1
S4	5.0000	5.0701	.070	1.40	.23038	.001	1
S5	10.000	10.136	.136	1.36	.46170	.002	1
S2	1.2500	1.1476	-.102	-8.19	.05124	.000	1

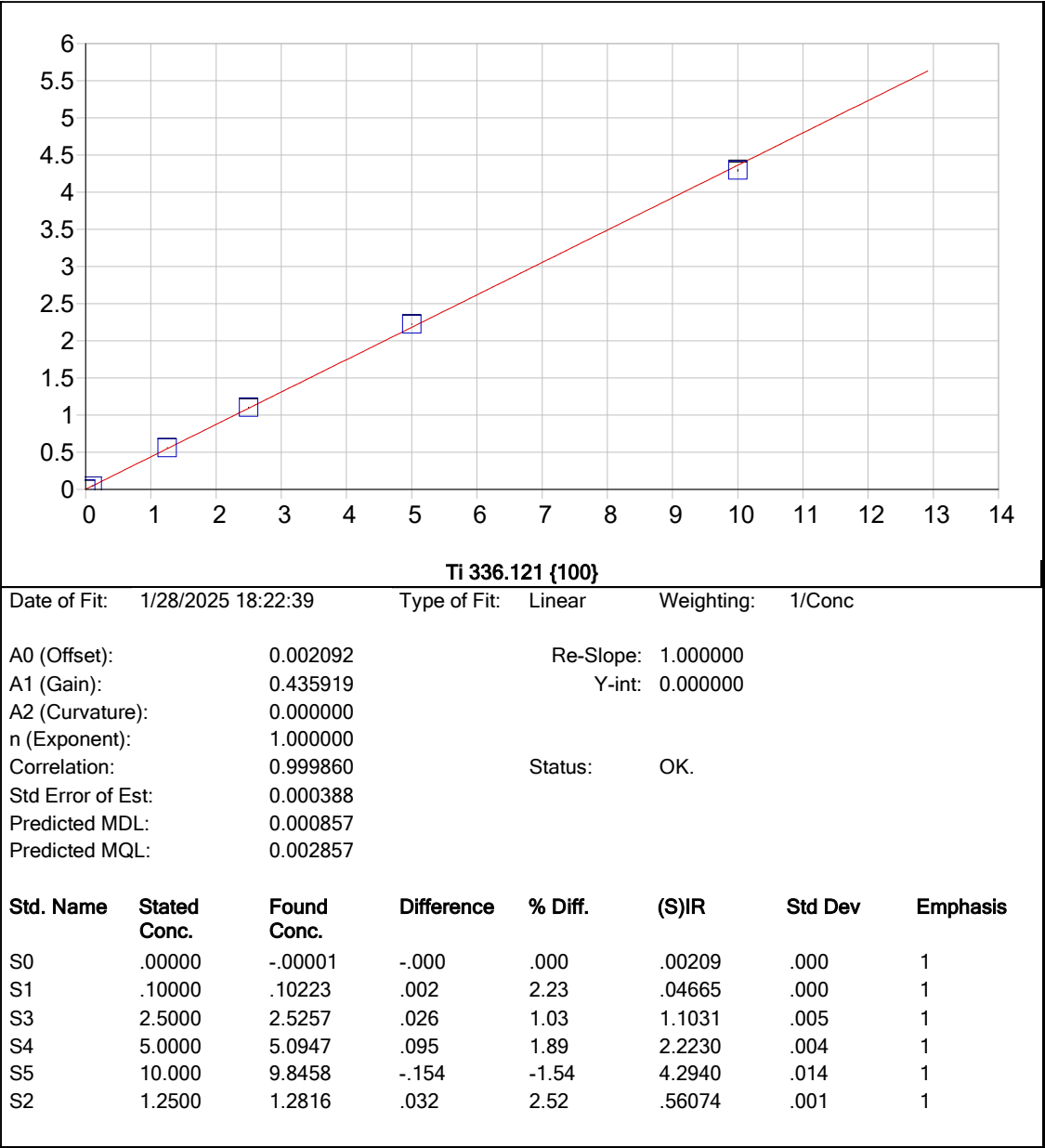


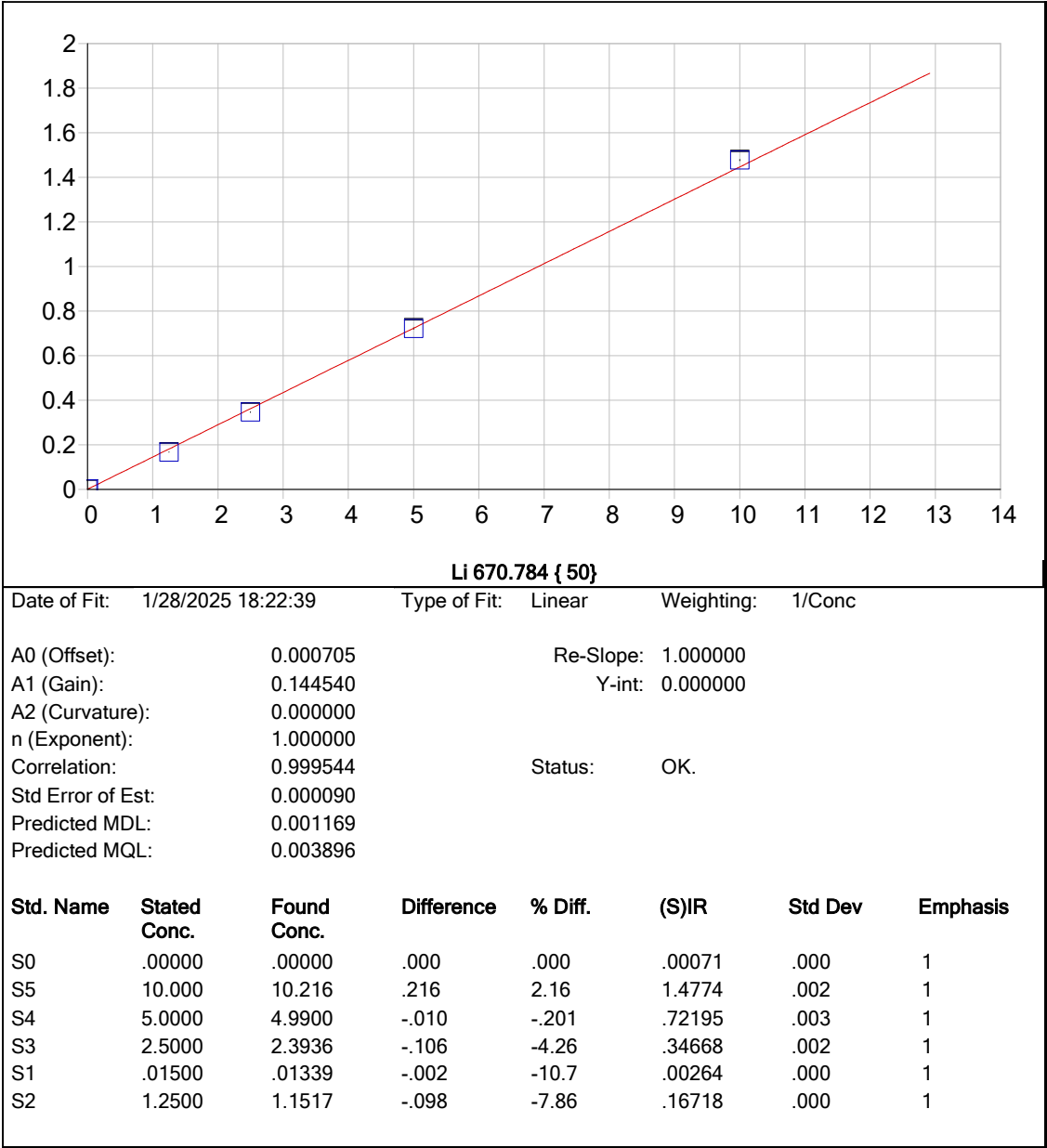


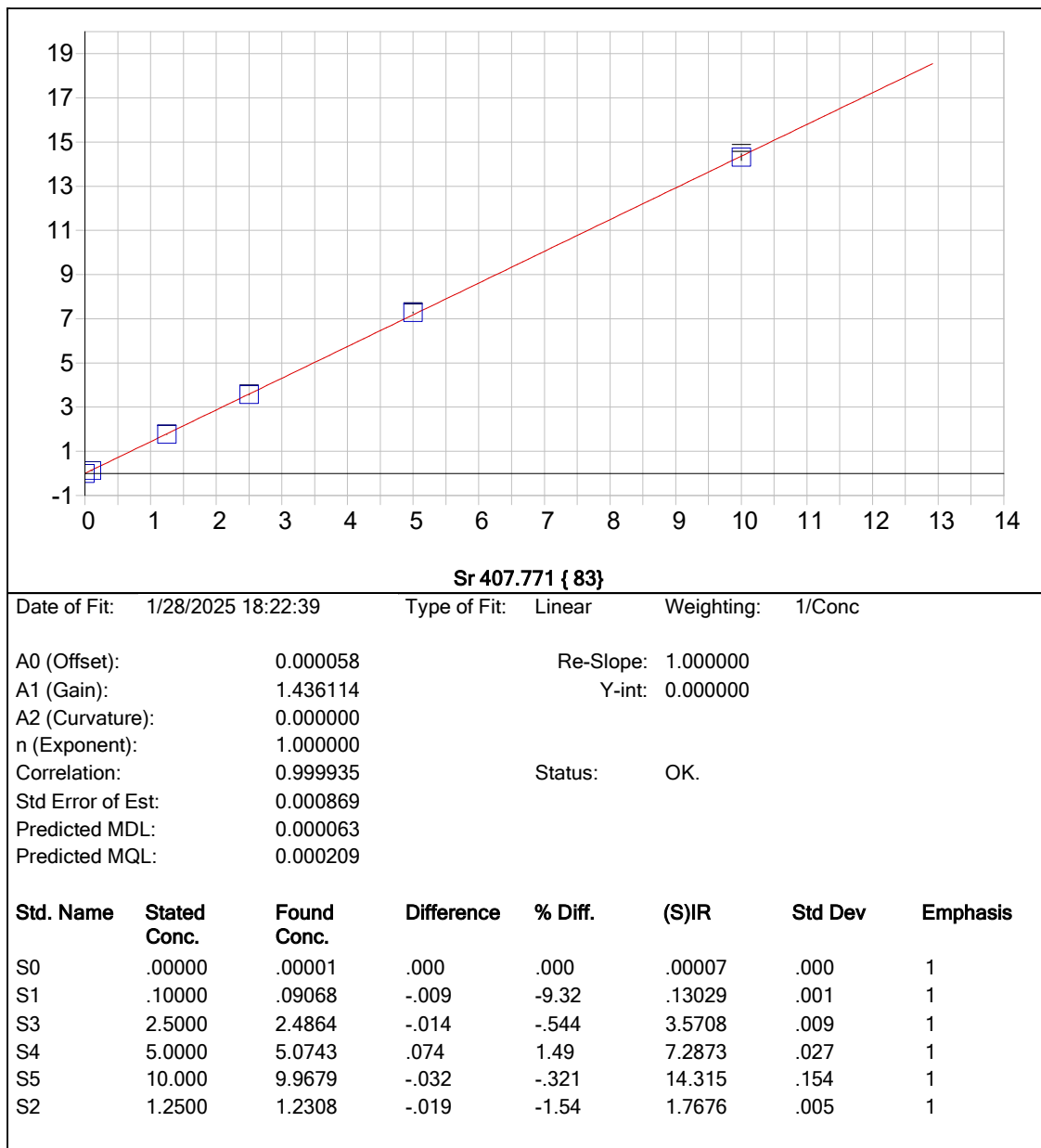


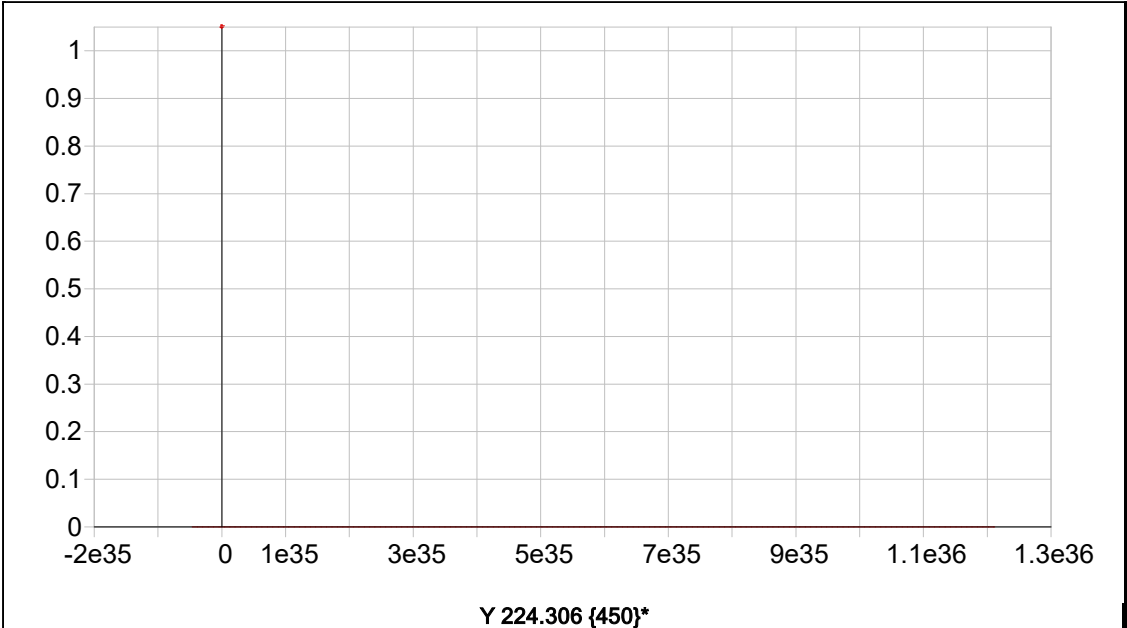












Date of Fit: 1/28/2025 17:56:48 Type of Fit: Linear Weighting: 1/Conc

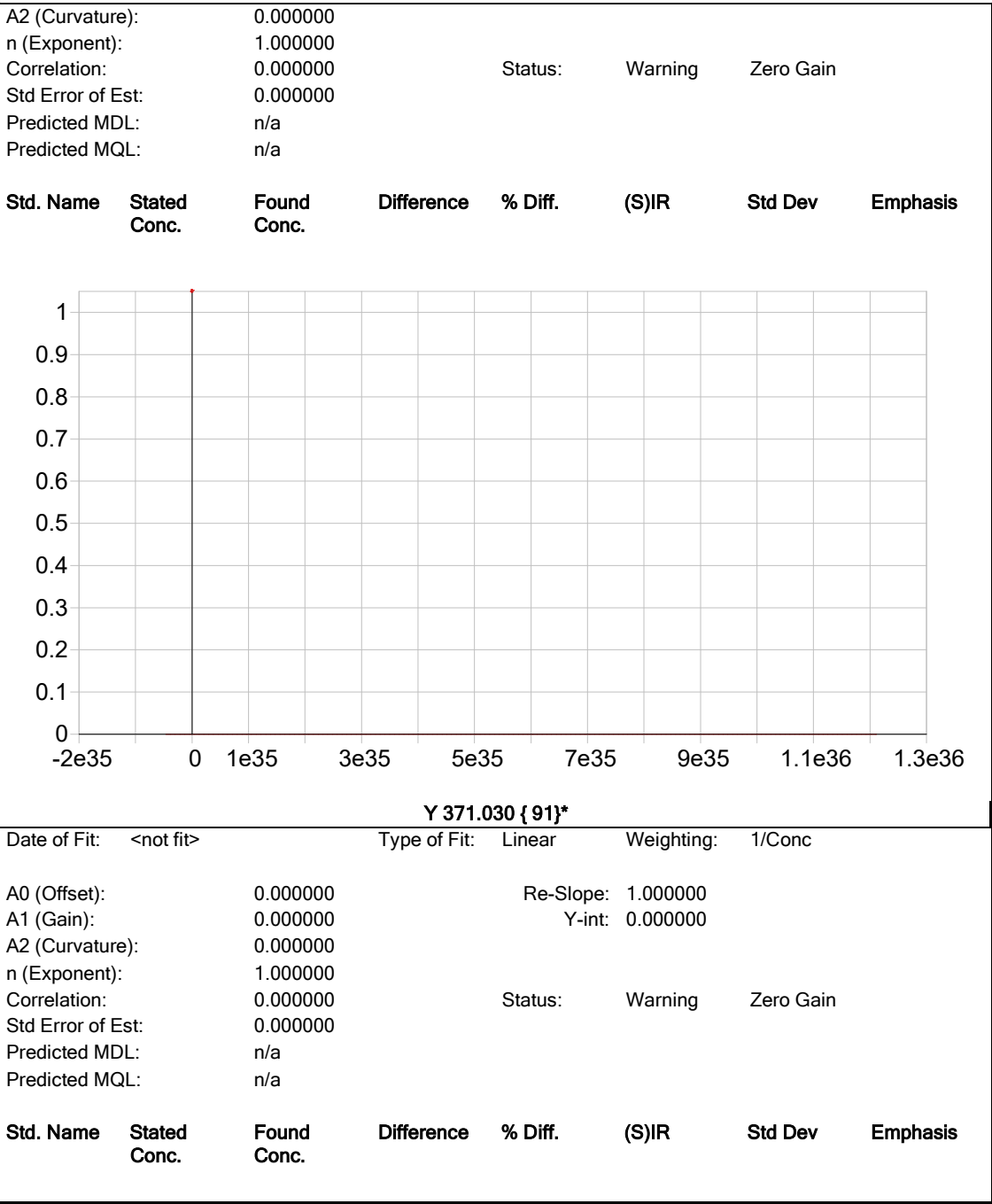
A0 (Offset):	0.000000	Re-Slope:	1.000000
A1 (Gain):	0.000000	Y-int:	0.000000
A2 (Curvature):	0.000000		
n (Exponent):	1.000000		
Correlation:	0.000000	Status:	Warning Zero Gain
Std Error of Est:	0.000000		
Predicted MDL:	n/a		
Predicted MQL:	n/a		

Std. Name	Stated Conc.	Found Conc.	Difference	% Diff.	(S)IR	Std Dev	Emphasis
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Y 360.073 { 94}*

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

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



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

Sample Name: S0 Acquired: 1/28/2025 17:57:32 Type: Cal
Method: EPA SFAM01.0(v58) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S0 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934	Be2348
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	-.00012	.00007	-.00025	.00028	.00009	.00010	.00485	-.00034
Stddev	.00005	.00005	.00029	.00016	.00021	.00006	.00053	.00031
%RSD	42.311	78.909	112.80	58.690	223.32	53.853	10.943	90.942

#1	-.00009	.00004	-.00023	.00028	-.00006	.00013	.00536	.00002
#2	-.00018	.00003	-.00055	.00044	.00001	.00014	.00430	-.00049
#3	-.00010	.00013	.00002	.00012	.00033	.00004	.00489	-.00055

Elem	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598	Mn2576	Mg2790
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	-.00001	.00008	-.00001	.00003	.00305	.00000	-.00002	-.00002
Stddev	.00008	.00000	.00001	.00022	.00024	.00003	.00002	.00004
%RSD	812.84	6.1856	251.14	846.03	8.0125	11648.	127.01	208.65

#1	-.00002	.00009	.00001	-.00021	.00331	-.00003	-.00000	-.00004
#2	.00007	.00008	-.00002	.00022	.00300	.00003	-.00000	-.00004
#3	-.00009	.00008	-.00001	.00007	.00283	-.00000	-.00004	.00003

Elem	Ni2316	Ag3280	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	-.00023	-.00039	-.00221	.00002	.00051	.00540	-.00113	.00116
Stddev	.00024	.00010	.00140	.00012	.00032	.00022	.00004	.00011
%RSD	103.47	26.273	63.400	583.89	63.480	4.0243	3.6183	9.3318

#1	-.00048	-.00047	-.00281	.00011	.00081	.00564	-.00109	.00107
#2	-.00020	-.00027	-.00061	-.00011	.00055	.00534	-.00112	.00113
#3	-.00001	-.00042	-.00322	.00006	.00017	.00521	-.00117	.00128

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707	Sr4077
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.00014	.00011	.00054	.00016	.00209	.00071	.00007
Stddev	.00005	.00003	.00007	.00006	.00037	.00008	.00008
%RSD	35.639	28.266	13.131	38.810	17.481	11.336	112.35

#1	.00013	.00014	.00056	.00009	.00171	.00076	-.00002
#2	.00009	.00009	.00061	.00022	.00243	.00074	.00011
#3	.00019	.00009	.00047	.00017	.00213	.00061	.00013

Sample Name: S0 Acquired: 1/28/2025 17:57:32 Type: Cal
Method: EPA SFAM01.0(v58) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S0 Custom ID2: Custom ID3:
Comment:

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3666.6	79491.	11506.	2579.7	4657.4
Stddev	19.5	206.	55.	6.1	13.3
%RSD	.53205	.25917	.47422	.23555	.28528
#1	3686.4	79266.	11458.	2580.9	4672.0
#2	3665.9	79534.	11565.	2585.2	4654.2
#3	3647.4	79671.	11494.	2573.2	4646.0

Sample Name: S1 Acquired: 1/28/2025 18:01:45 Type: Cal
Method: EPA SFAM01.0(v58) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S01 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934	Be2348
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.00040	.00125	.00198	.00218	.00789	.00221	.07935	.02212
Stddev	.00014	.00015	.00026	.00026	.00017	.00003	.00048	.00026
%RSD	35.702	11.938	13.216	12.000	2.1006	1.5700	.60970	1.1552

#1	.00028	.00109	.00181	.00190	.00808	.00223	.07990	.02204
#2	.00037	.00128	.00228	.00242	.00777	.00223	.07899	.02240
#3	.00056	.00139	.00184	.00222	.00783	.00217	.07916	.02191

Elem	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598	Mn2576	Mg2790
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.01218	.03705	.00158	.04019	.00700	.00049	.00118	.00886
Stddev	.00010	.00016	.00000	.00016	.00006	.00001	.00002	.00005
%RSD	.81855	.42651	.24742	.40914	.89192	2.7317	1.8521	.60879

#1	.01209	.03723	.00158	.04001	.00706	.00048	.00117	.00881
#2	.01217	.03693	.00158	.04032	.00700	.00048	.00120	.00887
#3	.01229	.03698	.00159	.04025	.00693	.00050	.00116	.00891

Elem	Ni2316	Ag3280	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.02297	.00221	.00945	.00774	.01638	.02106	-.00075	.00096
Stddev	.00026	.00009	.00027	.00008	.00018	.00013	.00004	.00007
%RSD	1.1466	4.1129	2.8138	1.0660	1.1162	.62685	5.5919	7.4352

#1	.02316	.00231	.00975	.00779	.01657	.02091	-.00071	.00095
#2	.02308	.00213	.00924	.00765	.01637	.02117	-.00074	.00104
#3	.02267	.00221	.00937	.00779	.01620	.02108	-.00079	.00089

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707	Sr4077
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.00592	.00239	.01699	.00117	.04665	.00264	.13029
Stddev	.00012	.00005	.00011	.00003	.00032	.00005	.00098
%RSD	2.1060	2.0926	.64618	2.4235	.69324	1.9151	.74965

#1	.00597	.00244	.01704	.00115	.04683	.00264	.13129
#2	.00602	.00237	.01687	.00120	.04628	.00259	.13025
#3	.00578	.00235	.01707	.00115	.04685	.00269	.12933

Sample Name: S1 Acquired: 1/28/2025 18:01:45 Type: Cal
Method: EPA SFAM01.0(v58) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S01 Custom ID2: Custom ID3:
Comment:

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3676.6	79568.	11629.	2560.0	4590.8
Stddev	6.9	182.	29.	12.1	6.6
%RSD	.18706	.22852	.25202	.47366	.14343
#1	3682.9	79462.	11660.	2573.9	4595.4
#2	3669.3	79464.	11603.	2551.7	4583.3
#3	3677.6	79778.	11623.	2554.5	4593.8

Sample Name: S2 Acquired: 1/28/2025 18:05:59 Type: Cal
Method: EPA SFAM01.0(v58) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S02 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934	Be2348
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.06887	.06087	1.3796	.06817	.16259	.42919	1.0134	.53158
Stddev	.00025	.00058	.0031	.00015	.00033	.00063	.0052	.00234
%RSD	.36781	.94658	.22785	.22442	.20603	.14688	.51553	.44080

#1	.06860	.06095	1.3771	.06809	.16243	.42855	1.0120	.53395
#2	.06910	.06025	1.3786	.06835	.16237	.42921	1.0090	.53154
#3	.06892	.06140	1.3831	.06808	.16298	.42981	1.0192	.52926

Elem	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598	Mn2576	Mg2790
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	1.5382	.48620	.60603	.51070	.53190	.18752	.30087	.12433
Stddev	.0044	.00143	.00037	.00145	.00140	.00065	.00125	.00044
%RSD	.28527	.29330	.06093	.28423	.26374	.34752	.41453	.35641

#1	1.5351	.48502	.60646	.50990	.53286	.18687	.29996	.12397
#2	1.5362	.48579	.60581	.50982	.53029	.18752	.30037	.12419
#3	1.5432	.48779	.60583	.51237	.53256	.18818	.30229	.12482

Elem	Ni2316	Ag3280	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.36514	.07688	.08825	.09145	1.0320	.13175	.05124	.48533
Stddev	.00101	.00010	.00035	.00008	.0018	.00043	.00010	.00320
%RSD	.27754	.13449	.39375	.08512	.16989	.32402	.19377	.65876

#1	.36448	.07682	.08864	.09139	1.0306	.13126	.05119	.48847
#2	.36463	.07700	.08798	.09142	1.0314	.13203	.05117	.48546
#3	.36630	.07682	.08814	.09153	1.0339	.13197	.05135	.48208

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707	Sr4077
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.68776	.03047	.04772	.18285	.56074	.16718	1.7676
Stddev	.00176	.00004	.00023	.00089	.00078	.00044	.0051
%RSD	.25519	.13487	.48011	.48833	.13856	.26428	.29020

#1	.68604	.03043	.04751	.18213	.56085	.16722	1.7631
#2	.68770	.03052	.04769	.18257	.55992	.16672	1.7665
#3	.68955	.03047	.04797	.18385	.56147	.16760	1.7732

Sample Name: S2 Acquired: 1/28/2025 18:05:59 Type: Cal
Method: EPA SFAM01.0(v58) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S02 Custom ID2: Custom ID3:
Comment:

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3500.4	74522.	11596.	2407.1	4089.3
Stddev	5.5	180.	20.	4.3	11.6
%RSD	.15807	.24199	.17084	.18040	.28397
#1	3506.0	74609.	11579.	2403.6	4093.8
#2	3500.2	74643.	11590.	2411.9	4097.9
#3	3494.9	74315.	11618.	2405.7	4076.1

Sample Name: S3 Acquired: 1/28/2025 18:09:58 Type: Cal
Method: EPA SFAM01.0(v58) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S03 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934	Be2348
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.14123	.12046	2.7833	.13801	.33119	.89191	2.0664	1.0406
Stddev	.00053	.00129	.0075	.00092	.00106	.00367	.0201	.0056
%RSD	.37423	1.0673	.26881	.67006	.32013	.41195	.97466	.54221

#1	.14074	.12006	2.7868	.13727	.33077	.88874	2.0432	1.0441
#2	.14116	.11942	2.7747	.13771	.33041	.89104	2.0774	1.0436
#3	.14179	.12190	2.7884	.13905	.33240	.89594	2.0787	1.0341

Elem	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598	Mn2576	Mg2790
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3.1176	.99295	1.1955	1.0293	1.0523	.38008	.61055	.25651
Stddev	.0094	.00271	.0043	.0021	.0052	.00144	.00223	.00077
%RSD	.30146	.27250	.36140	.20826	.49116	.37872	.36606	.30164

#1	3.1205	.99121	1.1944	1.0292	1.0561	.37929	.60989	.25601
#2	3.1071	.99157	1.2003	1.0272	1.0465	.37921	.60871	.25613
#3	3.1253	.99606	1.1919	1.0315	1.0545	.38174	.61304	.25740

Elem	Ni2316	Ag3280	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.73602	.15557	.17986	.18152	2.1282	.26873	.10832	.93874
Stddev	.00223	.00015	.00052	.00012	.0121	.00123	.00051	.00199
%RSD	.30270	.09393	.29131	.06355	.56735	.45673	.46674	.21154

#1	.73543	.15549	.18043	.18165	2.1363	.26765	.10817	.94024
#2	.73414	.15548	.17972	.18144	2.1143	.26848	.10790	.93951
#3	.73848	.15574	.17941	.18147	2.1340	.27007	.10888	.93649

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707	Sr4077
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	1.3661	.06412	.09443	.37137	1.1031	.34668	3.5708
Stddev	.0043	.00029	.00020	.00108	.0054	.00165	.0088
%RSD	.31202	.45204	.21154	.29009	.48877	.47456	.24720

#1	1.3645	.06380	.09456	.37152	1.1048	.34542	3.5652
#2	1.3628	.06417	.09420	.37023	1.0971	.34606	3.5662
#3	1.3709	.06438	.09453	.37237	1.1075	.34854	3.5810

Sample Name: S3 Acquired: 1/28/2025 18:09:58 Type: Cal
Method: EPA SFAM01.0(v58) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S03 Custom ID2: Custom ID3:
Comment:

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3370.5	72565.	11622.	2309.4	3841.5
Stddev	7.1	188.	42.	7.8	10.3
%RSD	.21161	.25857	.35815	.33713	.26810
#1	3372.4	72732.	11593.	2300.5	3843.8
#2	3376.5	72362.	11604.	2314.6	3850.5
#3	3362.6	72601.	11670.	2313.2	3830.2

Sample Name: S4 Acquired: 1/28/2025 18:14:02 Type: Cal
Method: EPA SFAM01.0(v58) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S04 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934	Be2348
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.28933	.23725	5.6717	.27869	.68050	1.8454	4.1963	2.1251
Stddev	.00039	.00377	.0080	.00061	.00218	.0060	.0415	.0096
%RSD	.13638	1.5889	.14024	.22038	.32078	.32653	.98870	.45148

#1	.28937	.23352	5.6745	.27813	.68029	1.8523	4.2368	2.1151
#2	.28891	.23719	5.6627	.27860	.67843	1.8413	4.1982	2.1261
#3	.28970	.24106	5.6779	.27935	.68278	1.8426	4.1539	2.1342

Elem	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598	Mn2576	Mg2790
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	6.3272	2.0237	2.3793	2.0918	2.1582	.75932	1.2427	.53217
Stddev	.0122	.0073	.0033	.0027	.0052	.00351	.0044	.00227
%RSD	.19321	.35879	.13895	.13166	.23929	.46257	.35290	.42702

#1	6.3208	2.0321	2.3815	2.0923	2.1610	.76321	1.2478	.53479
#2	6.3196	2.0188	2.3755	2.0888	2.1522	.75836	1.2398	.53075
#3	6.3413	2.0202	2.3809	2.0943	2.1613	.75638	1.2406	.53097

Elem	Ni2316	Ag3280	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	1.4847	.32525	.36876	.36685	4.3128	.55376	.23038	1.8745
Stddev	.0014	.00026	.00119	.00110	.0161	.00199	.00125	.0081
%RSD	.09076	.08024	.32357	.29943	.37247	.36026	.54124	.43132

#1	1.4857	.32528	.36856	.36806	4.3298	.55603	.22941	1.8652
#2	1.4832	.32550	.36768	.36590	4.3106	.55228	.22995	1.8782
#3	1.4853	.32498	.37004	.36660	4.2979	.55296	.23179	1.8801

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707	Sr4077	
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	
Avg	2.7363	.13562	.19242	.75355	2.2230	.72195	7.2873	
Stddev	.0063	.00033	.00107	.00220	.0044	.00289	.0266	
%RSD	.23098	.24276	.55381	.29212	.19717	.40003	.36501	

#1	2.7326	.13527	.19202	.75114	2.2274	.72517	7.3029	
#2	2.7328	.13567	.19161	.75405	2.2186	.71957	7.3024	
#3	2.7436	.13592	.19363	.75545	2.2229	.72112	7.2566	

Sample Name: S4 Acquired: 1/28/2025 18:14:02 Type: Cal
Method: EPA SFAM01.0(v58) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S04 Custom ID2: Custom ID3:
Comment:

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3160.3	68691.	11098.	2198.7	3516.8
Stddev	3.6	205.	33.	7.8	3.9
%RSD	.11365	.29794	.30033	.35634	.10997
#1	3159.8	68480.	11107.	2190.5	3517.1
#2	3164.1	68889.	11125.	2199.5	3520.6
#3	3156.9	68705.	11061.	2206.1	3512.8

Sample Name: S5 Acquired: 1/28/2025 18:18:04 Type: Cal
Method: EPA SFAM01.0(v58) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S05 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934	Be2348
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	.57906	.44496	10.869	.55130	1.3577	3.6621	8.4375	4.0918
Stddev	.00287	.00396	.037	.00198	.0057	.0419	.0442	.0159
%RSD	.49517	.88908	.34408	.35935	.42271	1.1454	.52408	.38758

#1	.57754	.44416	10.839	.55027	1.3535	3.6505	8.4715	4.0814
#2	.57727	.44146	10.856	.55004	1.3554	3.6272	8.4533	4.1100
#3	.58236	.44925	10.911	.55358	1.3643	3.7086	8.3875	4.0839

Elem	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598	Mn2576	Mg2790
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	11.992	3.9207	4.3980	4.0262	4.3142	1.4636	2.3980	1.0548
Stddev	.041	.0024	.0213	.0150	.0227	.0038	.0167	.0036
%RSD	.34468	.06228	.48429	.37193	.52723	.26096	.69815	.34162

#1	11.961	3.9216	4.3737	4.0128	4.2924	1.4603	2.3904	1.0517
#2	11.975	3.9225	4.4132	4.0235	4.3378	1.4628	2.3864	1.0539
#3	12.039	3.9179	4.4071	4.0424	4.3124	1.4678	2.4172	1.0588

Elem	Ni2316	Ag3280	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	2.8373	.65458	.74697	.70258	8.5965	1.1064	.46170	3.4677
Stddev	.0095	.00046	.00450	.00330	.0141	.0015	.00161	.0090
%RSD	.33586	.07041	.60215	.47025	.16453	.13289	.34842	.25832

#1	2.8296	.65419	.74346	.70056	8.6095	1.1057	.46087	3.4670
#2	2.8343	.65446	.75204	.70639	8.5986	1.1053	.46068	3.4769
#3	2.8480	.65508	.74539	.70078	8.5814	1.1080	.46356	3.4591

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707	Sr4077
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	5.2665	.27453	.37929	1.4390	4.2940	1.4774	14.315
Stddev	.0202	.00122	.00208	.0054	.0143	.0024	.154
%RSD	.38297	.44491	.54939	.37330	.33333	.16054	1.0725

#1	5.2522	.27394	.37777	1.4359	4.2852	1.4746	14.140
#2	5.2578	.27372	.38167	1.4359	4.3106	1.4787	14.428
#3	5.2896	.27594	.37844	1.4452	4.2864	1.4788	14.377

Sample Name: S5 Acquired: 1/28/2025 18:18:04 Type: Cal
Method: EPA SFAM01.0(v58) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S05 Custom ID2: Custom ID3:
Comment:

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	2934.5	66171.	10916.	2091.6	3230.4
Stddev	8.9	175.	48.	9.2	9.1
%RSD	.30396	.26395	.44090	.44173	.28179
#1	2941.6	66372.	10941.	2082.9	3236.8
#2	2937.4	66063.	10860.	2090.6	3234.4
#3	2924.5	66076.	10946.	2101.3	3220.0

Sample Name: S6 Acquired: 1/28/2025 18:22:39 Type: Cal
Method: EPA SFAM01.0(v58) Mode: IR Corr. Factor: 1.000000
User: Kareem Custom ID1: S06 Custom ID2: Custom ID3:
Comment:

Elem	Al3961	Ca3736	Fe2598	Mg2790	Na8183
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	10.292	6.6243	4.0219	1.7987	2.1391
Stddev	.052	.0329	.0386	.0023	.0048
%RSD	.50141	.49712	.96023	.12547	.22539

#1	10.234	6.6044	3.9841	1.7973	2.1371
#2	10.307	6.6623	4.0205	1.7975	2.1356
#3	10.334	6.6062	4.0613	1.8013	2.1446

Int. Std.	Y_3600	Y_3710
Units	Cts/S	Cts/S
Avg	60500.	10419.
Stddev	116.	58.
%RSD	.19131	.55384

#1	60542.	10412.
#2	60588.	10480.
#3	60369.	10366.

Sample Name: ICV004 Acquired: 1/28/2025 19:08:21 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ICV004 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.024072	1.080656	.9815387	.9901187	1.052336	2.454092
Stddev	.002816	.017991	.0026185	.0073205	.004353	.016395
%RSD	.2749579	1.664859	.2667783	.7393523	.4136151	.6680699

#1	1.021157	1.067994	.9795567	.9834615	1.050054	2.438892
#2	1.024282	1.072725	.9805521	.9889362	1.049599	2.471465
#3	1.026777	1.101251	.9845072	.9979584	1.057355	2.451919

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.5627036	.5030200	.4920648	10.07143	.5475218	.4958866
Stddev	.0027988	.0030089	.0017023	.02899	.0010018	.0010390
%RSD	.4973785	.5981653	.3459396	.2878105	.1829618	.2095336

#1	.5603289	.5057926	.4912732	10.04159	.5478532	.4953172
#2	.5657893	.5034469	.4909024	10.09948	.5483159	.4952567
#3	.5619924	.4998204	.4940186	10.07322	.5463964	.4970859

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.4966123	9.576807	.5699108	6.035969	.5045477	.2289889
Stddev	.0038909	.046879	.0038233	.016695	.0019185	.0002036
%RSD	.7834804	.4895081	.6708540	.2765993	.3802494	.0888963

#1	.4960086	9.522813	.5658833	6.022862	.5044961	.2288219
#2	.5007698	9.607149	.5734904	6.054766	.5026555	.2292157
#3	.4930586	9.600459	.5703586	6.030280	.5064916	.2289292

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	10.27528	.4987958	.9583374	9.582529	5.121295	F .0150007
Stddev	.33611	.0025752	.0032669	.057136	.027320	.0009024
%RSD	3.271030	.5162804	.3408914	.5962523	.5334656	6.015566

#1	10.34105	.4993099	.9546471	9.557184	5.111495	.0150904
#2	9.91115	.5010752	.9608598	9.542449	5.100226	.0140568
#3	10.57364	.4960024	.9595053	9.647953	5.152164	.0158549

Sample Name: ICV004 Acquired: 1/28/2025 19:08:21 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ICV004 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	F -.000409	F .0042013	F .0011405	F .0004284	F -.000379	4.960938
Stddev	.000347	.0010380	.0024441	.0005214	.000607	.021586
%RSD	84.83578	24.70679	214.3035	121.7039	160.2407	.4351186

#1	-.000155	.0053818	.0002670	.0006561	-.000289	4.936463
#2	-.000805	.0037907	.0039013	-.000168	-.001026	4.977261
#3	-.000268	.0034314	-.000747	.000797	.000178	4.969090

Elem	Sr4077
Units	ppm
Avg	F 5.749802
Stddev	.072098
%RSD	1.253917

#1	5.666704
#2	5.786972
#3	5.795730

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3601.369	77743.63	11749.69	2518.855	4370.579
Stddev	4.200	233.96	91.22	8.689	5.629
%RSD	.1166199	.3009415	.7763724	.3449484	.1288007

#1	3604.863	77652.95	11675.63	2510.167	4375.129
#2	3602.535	77568.59	11721.85	2527.544	4372.325
#3	3596.709	78009.36	11851.59	2518.855	4364.284

Sample Name: ICB004 Acquired: 1/28/2025 19:12:24 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ICB004 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.001037	-.000310	.0001953	.0004497	.0008429	-.005442	-.000054
Stddev	.001175	.000947	.0016006	.0008182	.0011130	.004174	.000553
%RSD	113.3000	305.5002	819.5513	181.9386	132.0505	76.70182	1031.516

#1	-.000678	-.001301	.0007556	-.000480	-.000298	-.009501	.000192
#2	-.002349	.000587	.0014404	.000769	.001926	-.005666	-.000687
#3	-.000084	-.000216	-.001610	.001060	.000900	-.001161	.000334

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0000000	.0000330	.0007337	.0001013	-.000043	.0012971	.0038621
Stddev	.0000317	.0000583	.0015360	.0002227	.000082	.0004690	.0017554
%RSD	88162.90	176.7051	209.3464	219.8600	187.8018	36.15962	45.45240

#1	-.000035	.0000725	.0024556	.0000549	-.000126	.0009279	.0022486
#2	.000026	.0000605	.0002410	-.000095	.000037	.0018249	.0057314
#3	.000009	-.000034	-.000495	.000344	-.000042	.0011385	.0036065

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001542	-.010209	-.000218	.0000320	-.032329	-.000149	.0002471
Stddev	.0003528	.017599	.000408	.0002081	.276009	.002512	.0028320
%RSD	228.8774	172.3968	187.6664	650.0631	853.7476	1690.742	1146.131

#1	.0002289	-.030155	-.000477	-.000106	.276983	.000934	-.000780
#2	.0004637	.003132	-.000429	.000271	-.120463	.001641	.003449
#3	-.000230	-.003603	.000253	-.000069	-.253507	-.003021	-.001928

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0074191	-.000588	.0005080	-.000106	.0015043	.0015780	.0002664
Stddev	.0242765	.001755	.0002954	.000129	.0034996	.0015981	.0006070
%RSD	327.2141	298.6133	58.13617	121.3110	232.6467	101.2788	227.8113

#1	.0227279	-.001097	.0002057	-.000132	.0039782	.0028209	.0007051
#2	.0201014	.001366	.0007958	.000034	-.002500	.0021377	.0005205
#3	-.020572	-.002032	.0005226	-.000220	.003034	-.000225	-.000426

Sample Name: ICB004 Acquired: 1/28/2025 19:12:24 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ICB004 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Li6707	Sr4077
Units	ppm	ppm	ppm
Avg	.0002668	.0003494	.0000680
Stddev	.0006123	.0004222	.0000590
%RSD	229.4667	120.8557	86.79928

#1	.0008245	.0004349	.0001362
#2	.0003645	-.000109	.0000363
#3	-.000388	.000722	.0000316

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3671.244	79741.36	11699.87	2550.914	4687.856
Stddev	2.581	99.32	39.27	7.773	7.498
%RSD	.0702918	.1245556	.3356546	.3046995	.1599368

#1	3668.295	79765.82	11707.29	2559.660	4681.074
#2	3672.350	79632.09	11734.90	2544.795	4695.907
#3	3673.088	79826.16	11657.42	2548.289	4686.586

Sample Name: ICSA004 Acquired: 1/28/2025 19:29:00 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ICSA004 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0017704	-.002500	.0036714	.0129850	.0049714	221.5081
Stddev	.0035874	.003660	.0020899	.0009780	.0029588	1.4691
%RSD	202.6352	146.4048	56.92415	7.531863	59.51747	.6632342

#1	-.000201	.001128	.0015874	.0129574	.0016447	219.8127
#2	-.000399	-.006192	.0057671	.0120211	.0059603	222.3053
#3	.005911	-.002436	.0036596	.0139765	.0073090	222.4063

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0060213	-.000490	.0007857	233.6179	.0600327	.0008597
Stddev	.0002571	.000065	.0001404	1.8097	.0003536	.0003236
%RSD	4.269739	13.21399	17.86802	.7746254	.5889934	37.64158

#1	.0058389	-.000415	.0008233	231.7889	.0596249	.0010111
#2	.0059097	-.000518	.0009034	233.6573	.0602205	.0004882
#3	.0063154	-.000535	.0006303	235.4076	.0602528	.0010799

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.001608	97.35675	.0188906	228.9408	.0023882	-.001542
Stddev	.001860	.76480	.0001758	1.9741	.0004680	.000494
%RSD	115.6623	.7855676	.9307195	.8622889	19.59577	32.04019

#1	-.002536	96.55301	.0189462	226.9489	.0027738	-.002106
#2	.000533	97.44173	.0186937	228.9769	.0018675	-.001336
#3	-.002820	98.07551	.0190319	230.8967	.0025234	-.001184

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.321340	-.005598	-.006593	-.072375	.0031917	F .1375005
Stddev	.416916	.001562	.001087	.016214	.0034195	.0054265
%RSD	129.7427	27.90014	16.48461	22.40203	107.1400	3.946559

#1	-.506939	-.003795	-.006248	-.059586	.0007905	.1314191
#2	.156145	-.006452	-.007810	-.090611	.0071068	.1392336
#3	-.613228	-.006545	-.005720	-.066929	.0016777	.1418487

Sample Name: ICSA004 Acquired: 1/28/2025 19:29:00 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ICSA004 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.000649	.0255624	.0047724	-.003439	-.001973	.0042078
Stddev	.000707	.0004087	.0015749	.001113	.000431	.0004693
%RSD	109.0771	1.598940	32.99986	32.37247	21.84313	11.15247

#1	-.000125	.0256363	.0037022	-.003999	-.001487	.0036841
#2	-.000367	.0259291	.0040342	-.002157	-.002126	.0045900
#3	-.001453	.0251217	.0065808	-.004162	-.002307	.0043494

Elem	Sr4077
Units	ppm
Avg	.0976591
Stddev	.0006434
%RSD	.6588367

#1	.0969463
#2	.0978342
#3	.0981969

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3248.292	70236.97	11267.08	2258.367	3705.150
Stddev	11.295	412.54	49.05	8.462	5.299
%RSD	.3477131	.5873602	.4352952	.3747096	.1430135

#1	3247.993	70622.63	11214.30	2267.509	3702.067
#2	3259.734	70286.31	11275.69	2256.785	3711.269
#3	3237.151	69801.98	11311.25	2250.807	3702.115

Sample Name: ICSAB004 Acquired: 1/28/2025 19:33:14 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ICSAB004 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0984752	.1072255	.0536597	.0656287	.5929165	223.1824
Stddev	.0029852	.0009894	.0005770	.0053840	.0013292	2.3654
%RSD	3.031383	.9227303	1.075223	8.203790	.2241743	1.059833

#1	.1011677	.1073922	.0535994	.0608889	.5919598	225.4878
#2	.0952651	.1081210	.0531153	.0714826	.5944342	223.2980
#3	.0989928	.1061634	.0542645	.0645144	.5923555	220.7613

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.4982733	.5174900	1.013980	237.5935	.6108018	.5125355
Stddev	.0012214	.0020423	.000844	1.0781	.0029668	.0007996
%RSD	.2451354	.3946557	.0832322	.4537731	.4857283	.1560172

#1	.4987483	.5159934	1.013006	238.6091	.6138452	.5118172
#2	.4968857	.5198166	1.014469	236.4621	.6079180	.5133971
#3	.4991859	.5166599	1.014465	237.7091	.6106423	.5123921

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.4931073	98.54347	.5185856	232.4035	1.024002	.2019991
Stddev	.0033599	.36492	.0015719	1.1830	.001561	.0005527
%RSD	.6813632	.3703115	.3031191	.5090314	.1524817	.2736112

#1	.4941519	98.86321	.5196438	233.6874	1.022222	.2015335
#2	.4958209	98.14593	.5167793	231.3577	1.025140	.2018538
#3	.4893493	98.62127	.5193336	232.1654	1.024645	.2026099

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.562431	.4917839	.9649070	-.240257	.0061078	F .1323241
Stddev	.319505	.0024779	.0024072	.048050	.0021330	.0039637
%RSD	56.80781	.5038595	.2494734	19.99932	34.92309	2.995462

#1	-.841750	.4946000	.9672342	-.197607	.0076552	.1350299
#2	-.631504	.4899378	.9650597	-.292315	.0069936	.1277743
#3	-.214040	.4908137	.9624270	-.230850	.0036746	.1341680

Sample Name: ICSAB004 Acquired: 1/28/2025 19:33:14 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ICSAB004 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.000946	.0214703	.0018220	-.004186	-.003214	.0045713
Stddev	.000213	.0027344	.0007225	.001444	.000258	.0004014
%RSD	22.55359	12.73552	39.65152	34.50771	8.034094	8.780004

#1	-.000700	.0187727	.0018252	-.002681	-.003433	.0049526
#2	-.001070	.0242399	.0010980	-.004315	-.003280	.0046090
#3	-.001069	.0213982	.0025429	-.005561	-.002929	.0041525

Elem	Sr4077
Units	ppm
Avg	.0986244
Stddev	.0003287
%RSD	.3333314

#1	.0987391
#2	.0982536
#3	.0988804

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3274.309	70267.09	11201.28	2279.465	3714.032
Stddev	7.441	237.49	38.57	6.907	4.905
%RSD	.2272637	.3379823	.3443161	.3029964	.1320650

#1	3269.066	69993.20	11209.55	2272.461	3715.672
#2	3282.826	70415.96	11159.25	2279.665	3717.907
#3	3271.036	70392.10	11235.04	2286.270	3708.517

Sample Name: CCV025 Acquired: 1/28/2025 19:37:18 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: CCV025 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	5.118387	5.034869	25.59717	5.229792	5.249854	407.4405
Stddev	.020649	.043953	.03798	.020641	.025647	.9915
%RSD	.4034223	.8729691	.1483789	.3946767	.4885191	.2433485

#1	5.108573	5.069821	25.57737	5.240854	5.236209	407.9164
#2	5.104475	4.985524	25.57318	5.205978	5.233913	406.3008
#3	5.142112	5.049261	25.64096	5.242544	5.279438	408.1043

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	10.76587	.5394792	2.625318	416.8475	16.38113	2.629880
Stddev	.19483	.0016130	.004659	1.3311	.04356	.005863
%RSD	1.809729	.2989970	.1774484	.3193332	.2658977	.2229547

#1	10.58485	.5400304	2.629760	415.7126	16.40446	2.627776
#2	10.97207	.5376628	2.620469	416.5171	16.33088	2.625359
#3	10.74069	.5407443	2.625723	418.3127	16.40806	2.636505

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	16.19001	414.9626	16.24688	414.9139	2.619255	1.365174
Stddev	.04347	.8136	.04025	.3680	.004748	.000305
%RSD	.2684750	.1960759	.2477604	.0886959	.1812603	.0223282

#1	16.23867	415.6266	16.27887	415.0088	2.615819	1.365428
#2	16.17633	415.2063	16.26008	415.2252	2.617274	1.365257
#3	16.15503	414.0550	16.20168	414.5078	2.624672	1.364836

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	428.0150	2.645803	16.07317	161.4269	5.357741	F 5.628883
Stddev	1.3217	.006953	.03898	.2729	.015766	.006153
%RSD	.3087928	.2627923	.2425247	.1690855	.2942698	.1093146

#1	429.3596	2.646561	16.03053	161.6887	5.358964	5.635399
#2	426.7175	2.638501	16.08199	161.4481	5.341398	5.623172
#3	427.9677	2.652345	16.10698	161.1441	5.372859	5.628078

Sample Name: CCV025 Acquired: 1/28/2025 19:37:18 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: CCV025 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	5.200077	5.291973	F 7.594269	5.220972	5.323204	5.374206
Stddev	.015630	.011864	.016534	.006257	.019727	.015080
%RSD	.3005708	.2241914	.2177167	.1198358	.3705766	.2806021

#1	5.197406	5.297007	7.606397	5.224988	5.345434	5.385308
#2	5.185954	5.278422	7.600974	5.213763	5.307786	5.380272
#3	5.216870	5.300491	7.575436	5.224165	5.316392	5.357037

Elem	Sr4077
Units	ppm
Avg	F 5.619974
Stddev	.018621
%RSD	.3313308

#1	5.609255
#2	5.641475
#3	5.609192

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3000.040	65428.63	10603.61	2095.602	3274.195
Stddev	8.626	86.18	39.60	12.496	4.601
%RSD	.2875258	.1317173	.3734622	.5963108	.1405286

#1	3005.682	65392.43	10590.57	2104.617	3277.834
#2	3004.328	65527.01	10648.09	2100.852	3275.728
#3	2990.111	65366.46	10572.18	2081.337	3269.023

Sample Name: CCB025 Acquired: 1/28/2025 19:41:37 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: CCB025 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0019137	-.000083	.0006243	.0007240	-.000469	.0037900	-.000454
Stddev	.0008079	.001221	.0008699	.0012439	.000801	.0065336	.000863
%RSD	42.21798	1468.010	139.3375	171.8009	170.7863	172.3897	190.1486

#1	.0028380	-.001476	.0012698	-.000368	-.000254	-.003579	-.000294
#2	.0015608	.000426	-.000365	.000461	-.001356	.006073	-.001385
#3	.0013422	.000800	.000968	.002078	.000202	.008875	.000318

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0000139	-.000018	.0010109	.0001979	-.000092	.0021652	.0098070
Stddev	.0000967	.000057	.0030830	.0001717	.000177	.0009150	.0034248
%RSD	697.4076	319.7116	304.9882	86.72548	193.1154	42.25730	34.92139

#1	-.000004	-.000042	.0044394	.0001958	-.000147	.0021446	.0099104
#2	-.000073	-.000059	.0001266	.0003706	-.000235	.0030904	.0131789
#3	.000118	.000048	-.001533	.0000274	.000106	.0012608	.0063318

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0002781	-.007657	-.000101	-.000081	-.038172	.0004309	-.000520
Stddev	.0000488	.013290	.000130	.000118	.064028	.0028684	.001052
%RSD	17.56015	173.5656	128.5273	145.9789	167.7325	665.6527	202.1730

#1	.0002271	-.017348	-.000031	-.000000	-.029417	-.002494	-.001730
#2	.0002830	.007493	-.000251	-.000216	.021027	.003239	-.000014
#3	.0003244	-.013117	-.000021	-.000026	-.106127	.000548	.000183

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0046217	.0006761	.0037635	-.000013	-.000449	.0036685	.0001907
Stddev	.0305312	.0013036	.0008744	.000309	.000498	.0036933	.0008775
%RSD	660.6060	192.8165	23.23467	2443.360	111.0329	100.6767	460.0838

#1	-.023561	.0019547	.0034935	.000121	.000125	.0079309	.0005808
#2	.037056	-.000651	.0030559	.000207	-.000777	.0014187	.0008055
#3	.000370	.000725	.0047411	-.000366	-.000694	.0016558	-.000814

Sample Name: CCB025 Acquired: 1/28/2025 19:41:37 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: CCB025 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Li6707	Sr4077
Units	ppm	ppm	ppm
Avg	.0001849	-.000352	.0000605
Stddev	.0004669	.001454	.0000711
%RSD	252.5298	412.7705	117.5467

#1	-.000307	.001299	.0001417
#2	.000239	-.000913	.0000088
#3	.000623	-.001443	.0000311

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3734.858	79917.57	11577.30	2580.528	4769.529
Stddev	8.371	175.54	105.71	14.315	11.384
%RSD	.2241264	.2196532	.9131062	.5547177	.2386876

#1	3742.094	79851.96	11505.07	2578.144	4780.085
#2	3736.789	80116.47	11698.63	2595.885	4771.037
#3	3725.690	79784.29	11528.19	2567.555	4757.466

Sample Name: Q1136-02 Acquired: 1/28/2025 19:45:45 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: YE8F7 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0147780	.0069812	.0068284	-.003376	-.001624	33.81171
Stddev	.0005629	.0008576	.0006384	.000902	.000872	.17705
%RSD	3.809333	12.28377	9.349771	26.70711	53.72408	.5236490

#1	.0142164	.0071950	.0061497	-.004294	-.002397	33.62962
#2	.0147754	.0060369	.0074170	-.003341	-.000678	33.82224
#3	.0153422	.0077115	.0069183	-.002492	-.001796	33.98326

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0410467	.0028413	.0016578	53.08451	.0332094	.1134061
Stddev	.0003308	.0000433	.0000322	.11781	.0001827	.0006442
%RSD	.8059867	1.524955	1.940036	.2219258	.5500661	.5680038

#1	.0409200	.0028815	.0016693	52.94848	.0329989	.1127534
#2	.0407980	.0027954	.0016827	53.15215	.0333274	.1134235
#3	.0414222	.0028469	.0016215	53.15291	.0333018	.1140414

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1250833	13.09764	2.442305	24.74865	.1068792	-.002578
Stddev	.0011669	.05456	.006388	.06552	.0002217	.000098
%RSD	.9328981	.4165267	.2615703	.2647573	.2074056	3.820053

#1	.1237421	13.03512	2.434951	24.67354	.1071243	-.002494
#2	.1256420	13.13561	2.446487	24.79408	.1066927	-.002686
#3	.1258659	13.12218	2.445475	24.77833	.1068206	-.002553

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	2.479239	.0247641	.5181907	12.91934	.5906014	.2939675
Stddev	.108049	.0002136	.0028850	.07600	.0035165	.0001100
%RSD	4.358155	.8625757	.5567504	.5882696	.5954147	.0374341

#1	2.409450	.0246002	.5207099	12.84025	.5873207	.2938497
#2	2.424570	.0246864	.5188190	12.92595	.5901697	.2939851
#3	2.603698	.0250057	.5150434	12.99182	.5943139	.2940677

Sample Name: Q1136-02 Acquired: 1/28/2025 19:45:45 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: YE8F7 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001113	F 325.3368	F 22.74824	-.001405	.0134576	.0249069
Stddev	.0000381	.3611	.05435	.000787	.0003290	.0001612
%RSD	34.23355	.1109790	.2388983	56.04197	2.445005	.6472893

#1	.0000891	325.5031	22.80922	-.002119	.0130974	.0248633
#2	.0000895	324.9225	22.73057	-.001535	.0135330	.0250855
#3	.0001553	325.5847	22.70493	-.000561	.0137424	.0247720

Elem	Sr4077
Units	ppm
Avg	.2973897
Stddev	.0017260
%RSD	.5803752

#1	.2956431
#2	.2974318
#3	.2990943

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	7553.949	164353.0	24800.55	5250.213	4243.696
Stddev	30.305	334.7	76.25	21.444	14.717
%RSD	.4011777	.2036189	.3074727	.4084340	.3468083

#1	7584.121	164674.1	24752.70	5236.826	4255.065
#2	7554.213	164006.3	24760.46	5238.867	4248.951
#3	7523.513	164378.7	24888.49	5274.946	4227.073

Sample Name: Q1136-03 Acquired: 1/28/2025 19:49:44 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: YE8F7D Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0151549	.0065648	.0074004	-.004706	-.001385	34.72050
Stddev	.0005877	.0009288	.0012188	.001143	.000603	.23862
%RSD	3.877934	14.14767	16.46952	24.29916	43.57525	.6872476

#1	.0144764	.0064606	.0062159	-.003765	-.002047	34.47433
#2	.0155056	.0056925	.0086508	-.004374	-.000866	34.95077
#3	.0154827	.0075413	.0073346	-.005979	-.001241	34.73638

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0425579	.0028050	.0015834	54.54164	.0333956	.1130793
Stddev	.0004030	.0000554	.0001409	.23334	.0001359	.0005026
%RSD	.9470137	1.974231	8.895324	.4278146	.4069237	.4444969

#1	.0421952	.0028592	.0016924	54.28491	.0332987	.1133262
#2	.0429918	.0028071	.0016334	54.74080	.0333372	.1125009
#3	.0424869	.0027486	.0014244	54.59922	.0335509	.1134107

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1273432	13.42806	2.520961	25.50848	.1067633	-.002570
Stddev	.0002995	.08941	.011886	.08916	.0007250	.000151
%RSD	.2352132	.6658636	.4715029	.3495343	.6790816	5.864099

#1	.1276313	13.33208	2.507857	25.42134	.1066232	-.002454
#2	.1270334	13.50900	2.531049	25.59953	.1061186	-.002740
#3	.1273649	13.44310	2.523978	25.50456	.1075482	-.002515

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	2.542568	.0249352	.5288804	13.21984	.5820108	.2940947
Stddev	.041329	.0005237	.0031533	.09524	.0045604	.0013867
%RSD	1.625502	2.100306	.5962237	.7203980	.7835567	.4715205

#1	2.525063	.0248900	.5252461	13.13256	.5780340	.2954643
#2	2.512872	.0244356	.5308917	13.32142	.5810099	.2926915
#3	2.589769	.0254801	.5305032	13.20555	.5869885	.2941284

Sample Name: Q1136-03 Acquired: 1/28/2025 19:49:44 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: YE8F7D Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0000420	F 320.3798	F 23.09086	-.002541	.0136097	.0260836
Stddev	.0001253	.1553	.03674	.000670	.0006286	.0001740
%RSD	297.8778	.0484885	.1591002	26.34812	4.618481	.6669719

#1	-.000058	320.4137	23.13288	-.002561	.0143279	.0260483
#2	.000183	320.2103	23.06481	-.001862	.0133420	.0262726
#3	.000002	320.5155	23.07489	-.003201	.0131594	.0259300

Elem	Sr4077
Units	ppm
Avg	.3071698
Stddev	.0025483
%RSD	.8295891

#1	.3043469
#2	.3093003
#3	.3078623

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	7603.134	161980.4	24877.08	5200.427	4260.381
Stddev	30.353	107.4	166.00	4.146	11.448
%RSD	.3992185	.0662842	.6672679	.0797152	.2686985

#1	7637.278	161961.1	24706.58	5198.282	4271.882
#2	7592.915	162096.1	25038.18	5205.205	4260.273
#3	7579.209	161884.0	24886.49	5197.793	4248.988

Sample Name: Q1136-02LX5 Acquired: 1/28/2025 19:53:42 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: YE8F7L Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0061676	.0031680	.0026969	-.002109	-.000624	11.77968
Stddev	.0018760	.0001571	.0010787	.001471	.000490	.12082
%RSD	30.41712	4.957291	39.99864	69.73279	78.47322	1.025684

#1	.0083335	.0029942	.0021448	-.002876	-.000065	11.72811
#2	.0050534	.0032997	.0039400	-.000413	-.000978	11.91774
#3	.0051159	.0032101	.0020060	-.003038	-.000828	11.69321

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0162199	.0009920	.0002471	18.81616	.0118016	.0227751
Stddev	.0006541	.0000255	.0000665	.09421	.0002899	.0000347
%RSD	4.032672	2.573051	26.92489	.5006862	2.456890	.1524458

#1	.0164583	.0009681	.0001822	18.73599	.0114787	.0227418
#2	.0154800	.0010189	.0003151	18.91992	.0120397	.0227722
#3	.0167213	.0009890	.0002438	18.79255	.0118865	.0228111

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0468268	4.718418	.8897972	8.660730	.0218343	-.000856
Stddev	.0012120	.026330	.0052829	.028672	.0004246	.000064
%RSD	2.588181	.5580280	.5937155	.3310597	1.944672	7.449954

#1	.0454421	4.710181	.8856573	8.630719	.0213785	-.000911
#2	.0476949	4.747882	.8957471	8.663628	.0219056	-.000871
#3	.0473432	4.697191	.8879870	8.687843	.0222187	-.000786

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.7568630	.0091844	.1799570	4.301281	.1154171	.1065679
Stddev	.3122256	.0009987	.0022527	.044758	.0009630	.0009183
%RSD	41.25259	10.87433	1.251796	1.040570	.8343615	.8616986

#1	1.097422	.0084628	.1774526	4.274533	.1143424	.1075552
#2	.689049	.0103242	.1818179	4.352952	.1157074	.1057393
#3	.484117	.0087660	.1806006	4.276358	.1162016	.1064093

Sample Name: Q1136-02LX5 Acquired: 1/28/2025 19:53:42 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: YE8F7L Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.000057	F 65.49333	8.229046	-.000948	.0056128	.0088958
Stddev	.000192	.18024	.029320	.000072	.0005797	.0008041
%RSD	333.6048	.2752023	.3563017	7.563344	10.32865	9.038934

#1	.000065	65.38461	8.225209	-.001028	.0050435	.0082660
#2	-.000278	65.39399	8.201833	-.000929	.0055925	.0086199
#3	.000041	65.70138	8.260095	-.000889	.0062024	.0098015

Elem	Sr4077
Units	ppm
Avg	.1045974
Stddev	.0013171
%RSD	1.259252

#1	.1039208
#2	.1061153
#3	.1037560

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4484.515	95841.91	14255.51	3114.470	4480.574
Stddev	11.733	185.84	166.92	8.228	4.751
%RSD	.2616315	.1939025	1.170905	.2641715	.1060408

#1	4488.300	95989.34	14214.23	3123.854	4484.120
#2	4493.889	95903.23	14439.20	3108.497	4482.427
#3	4471.357	95633.16	14113.11	3111.058	4475.176

Sample Name: Q1136-04 Acquired: 1/28/2025 19:57:45 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: YE8F7S Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0352516	.0580033	.0286544	.0465898	.0453682	35.98168
Stddev	.0006978	.0022432	.0015008	.0014407	.0012720	.29796
%RSD	1.979550	3.867300	5.237533	3.092219	2.803615	.8280977

#1	.0344578	.0561194	.0297511	.0469845	.0441495	35.64532
#2	.0355285	.0574057	.0269440	.0477920	.0452676	36.08720
#3	.0357685	.0604847	.0292681	.0449930	.0466874	36.21253

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.9615274	.0277737	.0534311	55.32377	.1380373	.6239273
Stddev	.0133308	.0003701	.0003113	.25439	.0004053	.0015238
%RSD	1.386416	1.332573	.5826921	.4598212	.2936436	.2442213

#1	.9461881	.0281956	.0536852	55.03900	.1384510	.6239536
#2	.9680840	.0276214	.0530838	55.40375	.1380199	.6223906
#3	.9703102	.0275040	.0535242	55.52856	.1376409	.6254378

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2529781	14.03462	2.845161	25.78346	.6242395	.0159009
Stddev	.0017735	.09398	.018888	.04968	.0015137	.0001040
%RSD	.7010513	.6696481	.6638782	.1926661	.2424857	.6539159

#1	.2509336	13.93288	2.823499	25.72767	.6253267	.0157853
#2	.2541020	14.05278	2.853793	25.82290	.6225107	.0159868
#3	.2538986	14.11820	2.858191	25.79980	.6248811	.0159307

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	2.583270	.2691659	.7781836	13.12044	.6031810	.2936667
Stddev	.146648	.0004904	.0080359	.15455	.0045107	.0015613
%RSD	5.676856	.1821967	1.032643	1.177931	.7478183	.5316709

#1	2.521964	.2692604	.7749202	12.94806	.6032870	.2954591
#2	2.750623	.2686352	.7873378	13.16662	.5986183	.2929388
#3	2.477222	.2696022	.7722928	13.24664	.6076378	.2926023

Sample Name: Q1136-04 Acquired: 1/28/2025 19:57:45 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: YE8F7S Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.000119	F 330.8813	F 23.79579	-.002187	.0131760	.0272457
Stddev	.000251	.9827	.05948	.000498	.0002075	.0006184
%RSD	210.1684	.2969918	.2499688	22.76488	1.574871	2.269516

#1	-.000139	330.7629	23.85558	-.001852	.0132741	.0268345
#2	.000141	329.9632	23.79519	-.002759	.0133162	.0279568
#3	-.000360	331.9178	23.73662	-.001950	.0129376	.0269458

Elem	Sr4077
Units	ppm
Avg	.3134672
Stddev	.0038646
%RSD	1.232866

#1	.3090467
#2	.3151480
#3	.3162067

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	7461.474	162949.5	25001.48	5243.595	4165.726
Stddev	29.489	21.8	215.57	15.488	18.613
%RSD	.3952190	.0133964	.8622255	.2953718	.4468062

#1	7490.847	162968.1	24756.50	5242.024	4176.746
#2	7461.706	162955.1	25085.80	5228.952	4176.197
#3	7431.870	162925.5	25162.15	5259.808	4144.236

Sample Name: Q1151-01 Acquired: 1/28/2025 20:01:39 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MC0AZ0 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.7739310	-.716565	2.149432	.4322301	5.496121	14.20943
Stddev	.0035123	.024018	.006217	.0080677	.028317	.03526
%RSD	.4538203	3.351868	.2892275	1.866527	.5152117	.2481247

#1	.7772865	-.731958	2.155764	.4319829	5.522180	14.24865
#2	.7702806	-.728848	2.143337	.4242889	5.465988	14.18038
#3	.7742260	-.688889	2.149195	.4404186	5.500197	14.19925

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.3811330	.0414587	.0118606	87.07797	F 322.2298	F 117.7215
Stddev	.0009213	.0002367	.0000572	.31534	.6719	.6667
%RSD	.2417324	.5709142	.4821676	.3621399	.2085031	.5662966

#1	.3821920	.0414573	.0118215	87.43886	322.0563	117.0907
#2	.3806909	.0412228	.0118341	86.93950	322.9714	117.6548
#3	.3805160	.0416961	.0119262	86.85556	321.6617	118.4190

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	3.327391	138.1456	2.253830	12.64228	F 98.25901	.0086273
Stddev	.005291	.3976	.001731	.09338	.64036	.0001617
%RSD	.1590252	.2877838	.0768099	.7386368	.6517055	1.874047

#1	3.325254	138.6046	2.255422	12.70343	97.94289	.0086609
#2	3.333417	137.9189	2.251987	12.68861	97.83818	.0084514
#3	3.323503	137.9132	2.254081	12.53479	98.99596	.0087695

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	36.46556	1.830980	5.068877	2.172824	3.131673	1.001341
Stddev	.51616	.015232	.077075	.022853	.009992	.003178
%RSD	1.415483	.8319140	1.520563	1.051743	.3190543	.3173434

#1	36.10901	1.821054	5.140054	2.184262	3.141927	1.003477
#2	37.05745	1.823370	5.079560	2.146511	3.121966	.997689
#3	36.23021	1.848518	4.987018	2.187700	3.131125	1.002857

Sample Name: Q1151-01 Acquired: 1/28/2025 20:01:39 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MC0AZ0 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	F 97.59689	F 173.3436	7.123264	.3403215	.3812290	.0202916
Stddev	.29849	.7823	.005615	.0003477	.0023210	.0021982
%RSD	.3058441	.4513058	.0788234	.1021684	.6088218	10.83286
#1	97.58978	174.2354	7.125565	.3404131	.3827502	.0215395
#2	97.30202	172.7735	7.127363	.3399372	.3823792	.0177535
#3	97.89888	173.0217	7.116864	.3406142	.3785575	.0215817

Elem	Sr4077
Units	ppm
Avg	.8446854
Stddev	.0011904
%RSD	.1409254
#1	.8449794
#2	.8433756
#3	.8457013

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	1920.251	74057.51	11657.61	1883.154	3827.234
Stddev	9.187	250.50	51.77	26.643	8.736
%RSD	.4784460	.3382563	.4440741	1.414784	.2282464
#1	1926.063	73852.76	11642.53	1856.095	3822.722
#2	1925.031	73982.95	11615.06	1884.006	3837.303
#3	1909.659	74336.83	11715.25	1909.360	3821.677

Sample Name: Q1151-01DLX10 Acquired: 1/28/2025 20:05:56 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MC0AZ0 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0691838	-.104911	.2144700	.0285724	.1133862	1.366862
Stddev	.0012502	.001935	.0014015	.0017878	.0107617	.022601
%RSD	1.807009	1.843973	.6534884	6.257093	9.491225	1.653495

#1	.0685296	-.105248	.2153976	.0289781	.1015707	1.391978
#2	.0683964	-.106655	.2128578	.0266167	.1159607	1.360443
#3	.0706253	-.102831	.2151547	.0301226	.1226272	1.348164

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0320396	.0020597	.0009941	8.186777	F 50.23631	F 12.33794
Stddev	.0002185	.0000868	.0000369	.075931	.68669	.05699
%RSD	.6820676	4.213724	3.716089	.9274800	1.366921	.4619167

#1	.0322884	.0019781	.0010356	8.274040	51.02710	12.29736
#2	.0318789	.0021509	.0009817	8.150519	49.89118	12.31336
#3	.0319515	.0020503	.0009649	8.135772	49.79064	12.40310

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.3272525	13.14004	.2105533	1.183044	F 10.42881	.0006670
Stddev	.0017364	.09286	.0026093	.004264	.04736	.0001196
%RSD	.5305839	.7067005	1.239267	.3604313	.4540825	17.92507

#1	.3287016	13.24589	.2135221	1.186912	10.39731	.0005616
#2	.3253279	13.10195	.2095140	1.183749	10.40585	.0006425
#3	.3277279	13.07229	.2086238	1.178471	10.48326	.0007969

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	3.486633	.2137508	.3497255	-.000594	.2881732	.0898802
Stddev	.196833	.0053095	.0043454	.017243	.0026707	.0005731
%RSD	5.645361	2.483952	1.242503	2904.001	.9267749	.6376514

#1	3.701307	.2198744	.3547412	.018680	.2888652	.0893104
#2	3.314646	.2109459	.3473351	-.005905	.2852246	.0904566
#3	3.443947	.2104320	.3471001	-.014557	.2904298	.0898736

Sample Name: Q1151-01DLX10 Acquired: 1/28/2025 20:05:56 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MC0AZ0 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	6.510186	F 16.48000	.7541040	.0338500	.0407980	.0005958
Stddev	.016428	.03936	.0118915	.0006330	.0009102	.0004652
%RSD	.2523422	.2388137	1.576905	1.870118	2.231040	78.08553
#1	6.502099	16.46046	.7495817	.0332929	.0416232	.0000942
#2	6.499369	16.45423	.7675932	.0337188	.0398217	.0006802
#3	6.529089	16.52530	.7451370	.0345384	.0409493	.0010131

Elem	Sr4077
Units	ppm
Avg	.0740663
Stddev	.0008596
%RSD	1.160606
#1	.0750531
#2	.0736655
#3	.0734802

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3538.139	79071.80	11108.09	2520.067	4554.664
Stddev	8.437	551.26	16.86	20.027	16.118
%RSD	.2384578	.6971698	.1518164	.7947132	.3538863
#1	3541.457	78440.53	11104.49	2500.305	4561.943
#2	3544.412	79316.57	11093.33	2540.350	4565.859
#3	3528.547	79458.29	11126.47	2519.546	4536.190

Sample Name: Q1151-02DLX2 Acquired: 1/28/2025 20:10:02 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MC0AZ1 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0531038	-.033761	1.463034	.0241722	.0249779	22.08972
Stddev	.0005366	.001760	.001379	.0011329	.0023079	.13158
%RSD	1.010550	5.214489	.0942640	4.686681	9.239530	.5956843

#1	.0536197	-.033115	1.462909	.0228660	.0234415	22.22495
#2	.0531432	-.032415	1.461722	.0247634	.0276318	21.96212
#3	.0525486	-.035754	1.464472	.0248872	.0238606	22.08208

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1564410	.0023648	.0035690	16.58536	14.07433	F 6.016998
Stddev	.0010180	.0000624	.0000433	.06548	.05607	.005384
%RSD	.6507068	2.636843	1.213865	.3948021	.3983968	.0894815

#1	.1573978	.0024310	.0035192	16.65429	14.13477	6.023210
#2	.1565540	.0023072	.0035906	16.52399	14.02401	6.013674
#3	.1553712	.0023562	.0035973	16.57781	14.06422	6.014110

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.7019743	62.35863	.4799384	9.681554	F 5.837373	.0002468
Stddev	.0082688	.24005	.0032749	.029665	.003823	.0002581
%RSD	1.177931	.3849510	.6823610	.3064115	.0654995	104.5782

#1	.7114678	62.60340	.4837198	9.714710	5.841787	.0002612
#2	.6981092	62.12359	.4780705	9.657523	5.835238	-.000018
#3	.6963458	62.34889	.4780248	9.672428	5.835093	.000497

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	17.56608	.1479695	1.039820	4.857974	5.894674	.1743887
Stddev	.33622	.0025779	.005177	.026026	.007719	.0003808
%RSD	1.914025	1.742147	.4978632	.5357444	.1309479	.2183885

#1	17.84280	.1509058	1.044068	4.872905	5.888362	.1747650
#2	17.19190	.1469238	1.034054	4.873095	5.903280	.1740035
#3	17.66355	.1460787	1.041339	4.827921	5.892381	.1743976

Sample Name: Q1151-02DLX2 Acquired: 1/28/2025 20:10:02 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MC0AZ1 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.8897201	F 53.10561	6.344822	.0448655	.5879901	.0366947
Stddev	.0008922	.04646	.048376	.0002194	.0040206	.0021783
%RSD	.1002808	.0874910	.7624444	.4891273	.6837876	5.936372

#1	.8907445	53.08586	6.396958	.0448816	.5923709	.0361125
#2	.8893030	53.15868	6.336121	.0450764	.5844687	.0348666
#3	.8891129	53.07228	6.301388	.0446384	.5871306	.0391050

Elem	Sr4077
Units	ppm
Avg	.2354466
Stddev	.0014453
%RSD	.6138585

#1	.2371073
#2	.2347596
#3	.2344730

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3698.859	82563.65	12228.19	2612.282	4347.870
Stddev	7.485	87.37	48.21	5.791	7.073
%RSD	.2023639	.1058169	.3942133	.2216710	.1626775

#1	3691.463	82467.18	12172.83	2612.427	4340.231
#2	3698.682	82637.45	12260.89	2606.420	4349.185
#3	3706.430	82586.32	12250.85	2617.999	4354.193

Sample Name: Q1151-03DLX2 Acquired: 1/28/2025 20:13:56 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MC0AZ2 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0438953	-.005719	.8073661	.0201898	.0106556	18.71914
Stddev	.0025156	.003309	.0024370	.0017763	.0007415	.08134
%RSD	5.730798	57.86289	.3018473	8.797887	6.958579	.4345432

#1	.0419987	-.003416	.8066493	.0201042	.0112601	18.75787
#2	.0467489	-.009511	.8100811	.0220073	.0108786	18.62567
#3	.0429384	-.004230	.8053679	.0184579	.0098283	18.77389

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1800270	.0045485	.0078113	8.827675	1.001663	4.394044
Stddev	.0014404	.0000610	.0000708	.042474	.004208	.006398
%RSD	.8000724	1.340287	.9061321	.4811454	.4201404	.1456102

#1	.1816387	.0045603	.0078682	8.871296	1.003958	4.386869
#2	.1788654	.0044824	.0078335	8.786449	.996806	4.399156
#3	.1795769	.0046026	.0077320	8.825279	1.004225	4.396107

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.6521810	50.44420	.2985998	4.778823	2.657837	.0002101
Stddev	.0048732	.18519	.0024551	.047723	.005221	.0001519
%RSD	.7472118	.3671204	.8222028	.9986319	.1964555	72.30113

#1	.6577922	50.53820	.3003150	4.756179	2.652140	.0002052
#2	.6497411	50.23086	.2957874	4.746637	2.662395	.0000607
#3	.6490097	50.56353	.2996969	4.833652	2.658976	.0003644

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	11.76120	.0848923	1.179939	1.458695	1.432556	.1209167
Stddev	.44268	.0004447	.011236	.044914	.004679	.0023038
%RSD	3.763902	.5238566	.9522701	3.079065	.3266337	1.905252

#1	12.15383	.0845089	1.192279	1.467621	1.436657	.1225765
#2	11.28143	.0853799	1.170298	1.409988	1.433553	.1182865
#3	11.84835	.0847882	1.177241	1.498476	1.427459	.1218870

Sample Name: Q1151-03DLX2 Acquired: 1/28/2025 20:13:56 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MC0AZ2 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0756595	F 30.99597	4.831500	.0387335	.3580009	.0156858
Stddev	.0000803	.06689	.017326	.0002571	.0016084	.0003325
%RSD	.1061012	.2157968	.3586050	.6637665	.4492641	2.119636

#1	.0756245	30.95805	4.851274	.0385874	.3594736	.0159721
#2	.0756027	31.07321	4.824246	.0385827	.3562846	.0157641
#3	.0757514	30.95667	4.818981	.0390303	.3582446	.0153212

Elem	Sr4077
Units	ppm
Avg	.1138087
Stddev	.0012632
%RSD	1.109966

#1	.1150778
#2	.1125514
#3	.1137969

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3842.257	84027.18	12402.84	2720.963	4393.871
Stddev	2.988	312.09	8.00	19.726	3.760
%RSD	.0777547	.3714183	.0645318	.7249587	.0855715

#1	3845.589	83774.36	12401.25	2708.820	4390.694
#2	3841.367	84375.99	12395.75	2743.724	4392.898
#3	3839.816	83931.18	12411.52	2710.347	4398.022

Sample Name: Q1151-05DLX2 Acquired: 1/28/2025 20:17:52 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MC0AZ4 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0476604	-.009210	.6583301	.0263107	.0100935	38.13962
Stddev	.0023137	.001360	.0014053	.0032861	.0005422	.24829
%RSD	4.854577	14.76801	.2134674	12.48943	5.371251	.6510035

#1	.0460670	-.008816	.6571019	.0298113	.0099624	37.85415
#2	.0503142	-.008090	.6580259	.0232925	.0096289	38.25941
#3	.0465998	-.010723	.6598627	.0258282	.0106892	38.30531

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1443100	.0042391	.0052857	12.19573	2.475532	2.885098
Stddev	.0003154	.0001658	.0000630	.03285	.011424	.002210
%RSD	.2185418	3.912365	1.192394	.2693281	.4614665	.0766047

#1	.1440256	.0043646	.0052896	12.15944	2.486683	2.883583
#2	.1442551	.0043015	.0053467	12.22343	2.476060	2.884077
#3	.1446492	.0040510	.0052209	12.20432	2.463853	2.887634

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.3257633	92.81062	.7711747	16.04857	2.253386	-.000788
Stddev	.0011677	.35251	.0042075	.08226	.003656	.000355
%RSD	.3584484	.3798135	.5456013	.5125673	.1622581	45.08749

#1	.3261540	92.48775	.7664007	16.03064	2.252030	-.000741
#2	.3244504	93.18671	.7727804	16.13831	2.250601	-.000458
#3	.3266856	92.75739	.7743429	15.97675	2.257526	-.001164

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	26.41560	.1167141	1.085776	8.914875	4.186017	.1970575
Stddev	.21922	.0005494	.002836	.050710	.008800	.0031192
%RSD	.8298815	.4707277	.2611973	.5688234	.2102120	1.582877

#1	26.39400	.1171477	1.088089	8.857358	4.184980	.1934582
#2	26.64481	.1160963	1.086628	8.953141	4.177782	.1989711
#3	26.20797	.1168984	1.082612	8.934125	4.195290	.1987432

Sample Name: Q1151-05DLX2 Acquired: 1/28/2025 20:17:52 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MC0AZ4 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2275975	F 63.62164	7.396390	.0268989	.8851391	.0685070
Stddev	.0004777	.10097	.007000	.0005036	.0002347	.0011679
%RSD	.2098811	.1586989	.0946473	1.872301	.0265127	1.704720

#1	.2272814	63.66675	7.392498	.0274781	.8850450	.0679304
#2	.2281470	63.50598	7.404472	.0265646	.8849661	.0677396
#3	.2273641	63.69219	7.392200	.0266539	.8854062	.0698510

Elem	Sr4077
Units	ppm
Avg	.1397384
Stddev	.0012866
%RSD	.9207065

#1	.1383029
#2	.1401246
#3	.1407876

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3814.393	83522.17	12605.55	2682.667	4222.762
Stddev	9.738	318.81	110.06	15.071	2.541
%RSD	.2553065	.3817011	.8730695	.5618005	.0601834

#1	3805.398	83273.37	12498.28	2671.992	4221.359
#2	3813.046	83411.61	12600.16	2676.103	4221.232
#3	3824.735	83881.54	12718.19	2699.907	4225.696

Sample Name: Q1151-08A Acquired: 1/28/2025 20:21:46 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MC0AZ7A Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1949449	-.003761	.7496662	.0829757	.1200381	25.23052
Stddev	.0014885	.002120	.0030219	.0017451	.0015173	.07042
%RSD	.7635221	56.37487	.4030945	2.103093	1.264052	.2791076

#1	.1941451	-.002643	.7496154	.0833420	.1190635	25.21139
#2	.1940273	-.002433	.7466701	.0810766	.1217863	25.17164
#3	.1966623	-.006206	.7527132	.0845085	.1192644	25.30853

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.5391496	.0491461	.0075753	16.15049	.1753735	.2491670
Stddev	.0025519	.0001917	.0000485	.01183	.0005001	.0006389
%RSD	.4733173	.3900664	.6402186	.0732764	.2851483	.2564266

#1	.5410663	.0491262	.0075902	16.16292	.1759369	.2492271
#2	.5362530	.0493471	.0076146	16.13936	.1749823	.2485002
#3	.5401296	.0489652	.0075211	16.14919	.1752012	.2497738

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2906829	50.37873	.4652300	11.62153	.2592022	.0160628
Stddev	.0012265	.16370	.0018432	.06709	.0007480	.0000733
%RSD	.4219216	.3249424	.3961862	.5773258	.2885628	.4559957

#1	.2898281	50.30415	.4668514	11.58921	.2600579	.0160254
#2	.2920881	50.26560	.4632253	11.57671	.2588758	.0160158
#3	.2901325	50.56644	.4656133	11.69867	.2586728	.0161472

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	37.36189	.0916937	.6211781	5.323312	4.841460	.1287036
Stddev	.11605	.0008865	.0014063	.004782	.018835	.0008289
%RSD	.3106189	.9667550	.2263912	.0898256	.3890271	.6440382

#1	37.38872	.0923035	.6195688	5.318698	4.862588	.1294059
#2	37.46217	.0921008	.6221706	5.328245	4.835359	.1277893
#3	37.23477	.0906768	.6217948	5.322991	4.826432	.1289157

Sample Name: Q1151-08A Acquired: 1/28/2025 20:21:46 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MC0AZ7A Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0152061	F 40.84521	F 11.92122	.0183772	.7661361	.0195291
Stddev	.0001130	.07386	.02784	.0005404	.0011429	.0001329
%RSD	.7432649	.1808306	.2335014	2.940831	.1491725	.6803819
#1	.0152167	40.93047	11.89980	.0181020	.7666529	.0196697
#2	.0153134	40.80060	11.95269	.0180298	.7669294	.0195120
#3	.0150882	40.80457	11.91119	.0189999	.7648262	.0194056

Elem	Sr4077
Units	ppm
Avg	.3462089
Stddev	.0009050
%RSD	.2613965
#1	.3468668
#2	.3451769
#3	.3465831

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4385.193	94860.55	14511.94	3052.110	4316.853
Stddev	8.964	288.57	64.01	9.354	10.419
%RSD	.2044142	.3042003	.4410787	.3064704	.2413649
#1	4389.665	95181.81	14559.02	3060.149	4318.801
#2	4391.042	94776.47	14439.06	3054.337	4326.160
#3	4374.873	94623.35	14537.74	3041.843	4305.596

Sample Name: Q1163-01DLX5 Acquired: 1/28/2025 20:25:42 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ME2946 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0230190	-.047586	1.309760	.0980263	.0372681	14.19844	.1738094
Stddev	.0016104	.000220	.031057	.0010932	.0014023	.08228	.0007509
%RSD	6.996082	.4619502	2.371232	1.115241	3.762814	.5794953	.4320230

#1	.0235769	-.047344	1.331752	.0986858	.0359340	14.28626	.1746437
#2	.0212038	-.047773	1.323296	.0986288	.0387299	14.18594	.1731877
#3	.0242763	-.047642	1.274232	.0967644	.0371405	14.12313	.1735968

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0009132	.0161275	155.9550	1.181418	.0301001	.1186301	494.7593
Stddev	.0001492	.0005826	.7576	.000792	.0004508	.0033496	4.2539
%RSD	16.34249	3.612235	.4857715	.0670600	1.497546	2.823596	.8597877

#1	.0010157	.0167117	156.7475	1.182315	.0305900	.1216389	494.8640
#2	.0007420	.0161240	155.8794	1.181126	.0300075	.1192306	498.9599
#3	.0009818	.0155466	155.2380	1.180813	.0297028	.1150208	490.4540

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	18.65143	38.28223	.5233839	-.007940	.5326866	.1250715	3.406324
Stddev	.08154	.25673	.0106535	.001118	.1700040	.0030591	.012940
%RSD	.4371733	.6706220	2.035508	14.08303	31.91445	2.445895	.3798734

#1	18.73958	38.57202	.5312077	-.008596	.7254277	.1283960	3.421155
#2	18.63602	38.19147	.5276932	-.006649	.4685574	.1244433	3.400473
#3	18.57870	38.08322	.5112507	-.008576	.4040746	.1223753	3.397343

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.440664	1.679022	.6901996	.0235503	2.660885	5.142029	.0213792
Stddev	.012175	.031440	.0205112	.0006905	.054368	.020320	.0012110
%RSD	.8451208	1.872537	2.971779	2.932214	2.043228	.3951651	5.664510

#1	1.446741	1.701600	.6816942	.0242316	2.699753	5.165098	.0219141
#2	1.448605	1.692354	.7135953	.0235685	2.684145	5.126784	.0222308
#3	1.426647	1.643113	.6753093	.0228508	2.598756	5.134206	.0199929

Sample Name: Q1163-01DLX5 Acquired: 1/28/2025 20:25:42 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ME2946 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Li6707	Sr4077
Units	ppm	ppm	ppm
Avg	1.018527	.0285799	.1608051
Stddev	.005442	.0013579	.0006703
%RSD	.5342844	4.751063	.4168600

#1	1.024703	.0298630	.1613852
#2	1.016440	.0287189	.1609589
#3	1.014438	.0271580	.1600713

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3437.864	74996.78	11417.65	2412.145	4019.364
Stddev	32.017	172.60	36.45	15.419	44.282
%RSD	.9313034	.2301484	.3192314	.6392122	1.101706

#1	3422.299	74913.16	11403.23	2396.724	3993.605
#2	3416.606	75195.27	11459.11	2427.561	3993.992
#3	3474.688	74881.91	11390.63	2412.150	4070.496

Sample Name: Q1163-02DLX2 Acquired: 1/28/2025 20:29:47 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ME2947 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0403037	-.032461	.5069621	.0478654	.0247878	41.08907	.3561706
Stddev	.0026909	.002274	.0041895	.0022519	.0013282	.19527	.0026343
%RSD	6.676600	7.005807	.8263900	4.704631	5.358439	.4752261	.7396253

#1	.0416575	-.034979	.5103590	.0493002	.0253360	41.30379	.3590946
#2	.0420488	-.030556	.5022808	.0490261	.0232732	41.04130	.3554348
#3	.0372047	-.031848	.5082466	.0452700	.0257543	40.92212	.3539825

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0024489	.0089594	481.4991	3.024579	.0731610	.1488691	264.1960
Stddev	.0001824	.0002546	1.7471	.008909	.0004879	.0011563	1.4113
%RSD	7.447361	2.841874	.3628536	.2945676	.6668773	.7767358	.5342025

#1	.0023461	.0090473	482.1057	3.034261	.0727804	.1476065	265.6654
#2	.0026595	.0086725	479.5296	3.022751	.0729915	.1498766	264.0715
#3	.0023412	.0091584	482.8621	3.016726	.0737110	.1491240	262.8510

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	12.59126	115.2031	1.497198	-.002987	.3001402	.1600487	1.416878
Stddev	.06578	.5681	.002685	.000289	.3505880	.0028128	.021753
%RSD	.5224519	.4931469	.1793664	9.664389	116.8081	1.757448	1.535242

#1	12.65275	115.7257	1.495431	-.002689	.0898909	.1616668	1.437744
#2	12.59914	115.2852	1.495875	-.003265	.1056679	.1568008	1.418555
#3	12.52190	114.5984	1.500288	-.003007	.7048619	.1616785	1.394336

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	6.101774	2.735378	.4138411	.0562970	3.599746	8.031717	.0135489
Stddev	.023218	.005487	.0098435	.0001897	.005082	.007336	.0006469
%RSD	.3805142	.2005787	2.378582	.3369988	.1411843	.0913416	4.774377

#1	6.088045	2.729615	.4242260	.0562356	3.594334	8.039047	.0142824
#2	6.128581	2.735981	.4126499	.0561455	3.600486	8.031729	.0133042
#3	6.088695	2.740539	.4046473	.0565098	3.604418	8.024375	.0130600

Sample Name: Q1163-02DLX2 Acquired: 1/28/2025 20:29:47 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ME2947 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Li6707	Sr4077
Units	ppm	ppm	ppm
Avg	1.033336	.0862604	.6899371
Stddev	.001050	.0006515	.0046921
%RSD	.1016290	.7553252	.6800727

#1	1.033762	.0862390	.6948795
#2	1.034106	.0869224	.6893882
#3	1.032140	.0856198	.6855436

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3345.478	73711.18	11428.16	2350.171	3629.687
Stddev	2.480	148.13	31.27	11.138	4.389
%RSD	.0741448	.2009579	.2736441	.4739405	.1209119

#1	3346.301	73554.93	11463.90	2339.512	3632.285
#2	3347.443	73729.04	11405.83	2349.268	3632.155
#3	3342.691	73849.56	11414.76	2361.734	3624.619

Sample Name: Q1163-03DLX2 Acquired: 1/28/2025 20:33:51 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ME2947D Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0386066	-.033218	.5086281	.0472124	.0212862	41.43400	.3566515
Stddev	.0028514	.001823	.0067464	.0016413	.0016786	.29555	.0036323
%RSD	7.385871	5.488982	1.326394	3.476460	7.885651	.7132936	1.018457

#1	.0397706	-.035233	.5106084	.0489540	.0227769	41.75170	.3607788
#2	.0353573	-.032739	.5141627	.0469892	.0194680	41.38310	.3539415
#3	.0406920	-.031683	.5011131	.0456942	.0216136	41.16722	.3552341

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0024464	.0089774	480.0761	3.035264	.0738443	.1503277	265.3192
Stddev	.0001170	.0001366	2.8523	.001829	.0007696	.0011757	.9023
%RSD	4.783307	1.521851	.5941308	.0602578	1.042261	.7821216	.3400729

#1	.0025641	.0091274	477.7530	3.034835	.0747129	.1509344	266.3301
#2	.0024449	.0088601	479.2157	3.033688	.0735727	.1510762	265.0319
#3	.0023301	.0089447	483.2595	3.037270	.0732472	.1489726	264.5955

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	12.58472	115.1058	1.501591	-.003351	.4122832	.1567608	1.418735
Stddev	.05787	.0830	.004600	.000221	.3215259	.0032186	.003429
%RSD	.4598243	.0720862	.3063106	6.597506	77.98665	2.053179	.2416731

#1	12.65027	115.1640	1.506156	-.003112	.4076438	.1531583	1.421928
#2	12.54071	115.1427	1.501660	-.003393	.0931021	.1577707	1.415111
#3	12.56319	115.0108	1.496957	-.003548	.7361037	.1593533	1.419164

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	6.184163	2.745271	.4217970	.0557916	3.604923	7.899746	.0133288
Stddev	.025541	.005220	.0096674	.0008949	.015901	.023777	.0003966
%RSD	.4130007	.1901615	2.291946	1.603938	.4411011	.3009887	2.975441

#1	6.212912	2.750238	.4311794	.0567901	3.622080	7.914619	.0134018
#2	6.164093	2.745746	.4223437	.0550621	3.602009	7.872323	.0136839
#3	6.175483	2.739830	.4118678	.0555227	3.590680	7.912296	.0129008

Sample Name: Q1163-03DLX2 Acquired: 1/28/2025 20:33:51 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ME2947D Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Li6707	Sr4077
Units	ppm	ppm	ppm
Avg	1.021377	.0868608	.6948646
Stddev	.003745	.0003421	.0054560
%RSD	.3666353	.3938454	.7851888

#1	1.017718	.0868233	.7010909
#2	1.021212	.0872201	.6925834
#3	1.025202	.0865390	.6909194

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3369.342	73774.13	11619.09	2361.807	3657.179
Stddev	9.569	59.79	80.09	9.660	10.706
%RSD	.2840091	.0810477	.6893141	.4089906	.2927308

#1	3363.086	73810.02	11702.81	2372.948	3644.949
#2	3380.357	73807.26	11611.26	2355.781	3664.856
#3	3364.582	73705.10	11543.20	2356.690	3661.732

Sample Name: Q1163-02LDLX10 Acquired: 1/28/2025 20:37:54 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ME2947L Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0087897	-.005105	.1026936	.0079043	.0047753	8.205280	.0724852
Stddev	.0013124	.003048	.0020356	.0010623	.0005800	.036765	.0007170
%RSD	14.93123	59.70222	1.982161	13.43935	12.14567	.4480709	.9892235

#1	.0102560	-.008456	.1003569	.0089677	.0054402	8.247731	.0733096
#2	.0077253	-.002499	.1040818	.0068431	.0043738	8.183720	.0720065
#3	.0083877	-.004360	.1036420	.0079022	.0045118	8.184389	.0721394

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0005796	.0015630	96.30148	.6431030	.0142420	.0321526	54.57928
Stddev	.0001014	.0000269	.40359	.0040439	.0002695	.0016025	.26139
%RSD	17.49114	1.719264	.4190951	.6288096	1.892159	4.984055	.4789104

#1	.0004750	.0015391	96.73357	.6463632	.0140219	.0332492	54.84605
#2	.0005864	.0015577	95.93424	.6385778	.0141615	.0303136	54.32363
#3	.0006775	.0015921	96.23662	.6443680	.0145425	.0328952	54.56816

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	2.566455	22.95223	.3018716	-.000522	.3248051	.0325990	.2786759
Stddev	.017842	.13565	.0013718	.000106	.3019873	.0008032	.0043662
%RSD	.6952034	.5910169	.4544443	20.20587	92.97494	2.463750	1.566758

#1	2.586883	23.08547	.3011961	-.000414	.3222277	.0316794	.2835563
#2	2.553928	22.81429	.3009684	-.000527	.6280729	.0331630	.2751402
#3	2.558553	22.95692	.3034502	-.000625	.0241147	.0329545	.2773312

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.317548	.5174337	.0827702	.0121671	.6712766	2.080761	.0007252
Stddev	.013993	.0041232	.0009883	.0002718	.0018356	.006357	.0006106
%RSD	1.062066	.7968512	1.194083	2.234015	.2734456	.3055156	84.20487

#1	1.322253	.5174859	.0827771	.0124383	.6708975	2.082153	.0000964
#2	1.301808	.5132847	.0817784	.0118947	.6696603	2.073823	.0007633
#3	1.328582	.5215306	.0837550	.0121683	.6732722	2.086307	.0013158

Sample Name: Q1163-02LDLX10 Acquired: 1/28/2025 20:37:54 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ME2947L Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Li6707	Sr4077
Units	ppm	ppm	ppm
Avg	.2255726	.0163205	.1356746
Stddev	.0014577	.0009253	.0009984
%RSD	.6462300	5.669685	.7358423

#1	.2265620	.0157433	.1368200
#2	.2238986	.0158304	.1352148
#3	.2262573	.0173878	.1349891

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3534.507	76894.71	11463.01	2502.023	4168.583
Stddev	16.487	491.38	47.12	19.267	15.345
%RSD	.4664497	.6390301	.4111016	.7700646	.3681075

#1	3546.941	76465.18	11417.61	2494.577	4177.759
#2	3540.774	77430.54	11511.68	2523.901	4177.122
#3	3515.806	76788.42	11459.73	2487.589	4150.868

Sample Name: Q1163-04DLX2 Acquired: 1/28/2025 20:41:56 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ME2947S Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0787062	.0247368	.5202568	.1350289	.1169472	40.31779	2.124153
Stddev	.0040167	.0029729	.0024322	.0075419	.0023534	.31296	.028094
%RSD	5.103435	12.01824	.4674947	5.585422	2.012386	.7762254	1.322585

#1	.0793181	.0281523	.5174725	.1264427	.1149369	40.21975	2.107844
#2	.0744186	.0227311	.5213313	.1380612	.1163689	40.66803	2.156592
#3	.0823818	.0233269	.5219668	.1405826	.1195359	40.06559	2.108021

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0533874	.0605024	447.2305	3.153374	.5840974	.3775835	248.9420
Stddev	.0004212	.0000746	1.3130	.009641	.0005619	.0015378	1.4918
%RSD	.7889582	.1233392	.2935952	.3057355	.0961995	.4072803	.5992568

#1	.0535001	.0605808	448.2774	3.160329	.5837930	.3765099	248.5897
#2	.0529213	.0604323	447.6568	3.157424	.5837534	.3793453	250.5785
#3	.0537408	.0604942	445.7572	3.142368	.5847458	.3768955	247.6580

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	12.14268	107.5454	1.984073	.0322783	.6198362	.6311057	1.773477
Stddev	.11071	.5111	.001579	.0003052	.3053886	.0036424	.018483
%RSD	.9117039	.4752406	.0795632	.9455060	49.26924	.5771446	1.042212

#1	12.08372	107.5305	1.982895	.0319422	.3033388	.6342852	1.774611
#2	12.27038	108.0638	1.983458	.0325381	.6434215	.6271316	1.791368
#3	12.07393	107.0419	1.985867	.0323546	.9127484	.6319002	1.754453

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	5.821773	2.698849	.3275075	.0549246	3.549640	7.756334	.0132753
Stddev	.093494	.003739	.0159618	.0004335	.005883	.010565	.0012137
%RSD	1.605939	.1385432	4.873710	.7893626	.1657343	.1362072	9.142399

#1	5.800307	2.695566	.3252407	.0544859	3.543339	7.748983	.0120848
#2	5.924133	2.698062	.3444816	.0553528	3.550591	7.751577	.0132300
#3	5.740879	2.702919	.3128004	.0549350	3.554989	7.768441	.0145109

Sample Name: Q1163-04DLX2 Acquired: 1/28/2025 20:41:56 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ME2947S Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Li6707	Sr4077
Units	ppm	ppm	ppm
Avg	.9904305	.0804534	.6438386
Stddev	.0019354	.0016171	.0082105
%RSD	.1954122	2.009922	1.275241

#1	.9894615	.0788576	.6397412
#2	.9891710	.0820909	.6532914
#3	.9926590	.0804117	.6384831

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3370.506	75077.42	11346.62	2399.035	3666.878
Stddev	5.881	226.04	77.15	11.671	1.821
%RSD	.1744824	.3010723	.6799552	.4864986	.0496704

#1	3373.495	75059.64	11299.02	2395.700	3668.760
#2	3374.292	74860.79	11435.63	2389.394	3666.751
#3	3363.731	75311.82	11305.20	2412.011	3665.124

Sample Name: PB166236TB Acquired: 1/28/2025 20:45:57 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: LEB236 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0034162	-.001305	.0012528	-.005142	.0017185	.0015383
Stddev	.0029545	.002547	.0015908	.003043	.0005653	.0060217
%RSD	86.48503	195.2425	126.9817	59.17487	32.89726	391.4439

#1	.0066587	-.004027	.0000481	-.006862	.0011302	-.005343
#2	.0008766	-.000909	.0030560	-.006934	.0022576	.005845
#3	.0027131	.001022	.0006541	-.001629	.0017676	.004112

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.000445	.0000409	-.000031	.0245543	.0014614	-.000222
Stddev	.001504	.0000275	.000064	.0043022	.0003745	.000210
%RSD	338.3499	67.35844	209.8025	17.52115	25.62610	94.48398

#1	.001125	.0000712	.000040	.0267084	.0012123	-.000102
#2	-.000584	.0000174	-.000084	.0196006	.0018921	-.000464
#3	-.001874	.0000340	-.000048	.0273540	.0012799	-.000100

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0009754	.0188736	.0022195	-.005432	.0030301	-.000052
Stddev	.0009402	.0026379	.0002038	.011680	.0004192	.000086
%RSD	96.39365	13.97648	9.181102	215.0088	13.83466	166.6399

#1	.0004730	.0161173	.0022930	-.018066	.0025460	-.000142
#2	.0003931	.0213744	.0019892	-.003203	.0032699	-.000042
#3	.0020600	.0191291	.0023763	.004972	.0032743	.000029

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	F 1548.497	.0010279	.0001312	-.734294	.0044747	-.001177
Stddev	4.398	.0002861	.0021070	.021165	.0015878	.000579
%RSD	.2840319	27.82968	1605.476	2.882406	35.48293	49.21174

#1	1550.754	.0013419	.0023974	-.744772	.0027522	-.001104
#2	1543.428	.0009598	-.001769	-.748178	.0058797	-.001789
#3	1551.309	.0007821	-.000235	-.709934	.0047923	-.000638

Sample Name: PB166236TB Acquired: 1/28/2025 20:45:57 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: LEB236 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0004436	.0612303	.0065380	.0030259	.0008663	-.002505
Stddev	.0001903	.0010561	.0036972	.0011527	.0007796	.000906
%RSD	42.91121	1.724853	56.55028	38.09220	89.99264	36.17559

#1	.0005621	.0612999	.0107943	.0028214	.0013882	-.003070
#2	.0005446	.0601411	.0046964	.0042672	.0012404	-.001460
#3	.0002240	.0622499	.0041232	.0019893	-.000030	-.002985

Elem	Sr4077
Units	ppm
Avg	.0000187
Stddev	.0000561
%RSD	300.5285

#1	.0000331
#2	.0000662
#3	-.000043

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3161.834	68105.06	11576.92	2235.126	3540.568
Stddev	5.447	318.20	59.88	13.742	9.877
%RSD	.1722785	.4672126	.5172008	.6148116	.2789781

#1	3156.303	67995.61	11516.55	2233.297	3539.395
#2	3167.193	67856.04	11577.91	2222.389	3550.980
#3	3162.005	68463.54	11636.29	2249.690	3531.330

Sample Name: Q1164-01 Acquired: 1/28/2025 20:50:07 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ME2946 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0037419	-.004480	.0012597	-.012131	.0075687	.2393526
Stddev	.0034073	.003850	.0014660	.001334	.0014747	.0090095
%RSD	91.05931	85.93106	116.3756	10.99248	19.48408	3.764123

#1	.0059037	-.008076	.0022568	-.011485	.0058691	.2299406
#2	-.000186	-.000418	-.000424	-.011244	.0083285	.2478969
#3	.005508	-.004948	.001946	-.013665	.0085086	.2402202

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.6397138	.0003699	-.000147	493.5365	-.000479	.0008173
Stddev	.0029006	.0000454	.000150	.9155	.000313	.0002049
%RSD	.4534232	12.27759	102.1092	.1854887	65.37456	25.06767

#1	.6388062	.0004044	-.000209	494.5559	-.000177	.0006224
#2	.6429597	.0003184	.000024	492.7844	-.000803	.0007986
#3	.6373755	.0003869	-.000256	493.2694	-.000458	.0010308

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0057725	.1154094	2.995863	107.2681	.0286472	-.000104
Stddev	.0015745	.0108563	.018597	.2316	.0009622	.000049
%RSD	27.27585	9.406782	.6207602	.2159108	3.358789	47.45147

#1	.0043321	.1037721	2.998180	107.1017	.0284877	-.000142
#2	.0074535	.1171921	3.013193	107.5326	.0296792	-.000048
#3	.0055319	.1252640	2.976216	107.1699	.0277748	-.000122

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	F 1499.906	.0037018	.1778136	10.50945	.0340612	1.755119
Stddev	3.365	.0022635	.0017235	.05856	.0031261	.011270
%RSD	.2243620	61.14558	.9692825	.5571709	9.177799	.6421029

#1	1503.266	.0062948	.1768425	10.53673	.0355663	1.755206
#2	1496.535	.0021214	.1798036	10.54939	.0361499	1.743806
#3	1499.917	.0026891	.1767948	10.44223	.0304673	1.766345

Sample Name: Q1164-01 Acquired: 1/28/2025 20:50:07 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ME2946 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0840907	F 46.51507	F 12.60843	-.001712	-.013637	.0720131
Stddev	.0005042	.07180	.06997	.000451	.000475	.0010537
%RSD	.5995383	.1543568	.5549265	26.35404	3.480931	1.463165
#1	.0846129	46.58261	12.67323	-.001355	-.013336	.0732209
#2	.0840524	46.52293	12.53424	-.002219	-.013392	.0715368
#3	.0836068	46.43966	12.61783	-.001563	-.014185	.0712817

Elem	Sr4077
Units	ppm
Avg	1.295930
Stddev	.009101
%RSD	.7022422
#1	1.295113
#2	1.305411
#3	1.287265

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	2947.244	64221.11	10860.59	2064.217	3253.594
Stddev	18.220	82.96	63.11	4.558	12.448
%RSD	.6181997	.1291741	.5811000	.2207938	.3825965
#1	2963.351	64224.72	10839.51	2069.436	3265.736
#2	2950.910	64136.40	10931.54	2062.191	3254.185
#3	2927.469	64302.19	10810.72	2061.023	3240.861

Sample Name: Q1164-02 Acquired: 1/28/2025 20:54:17 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ME2947 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0033605	-.009051	.0045824	-.013287	.0064193	.2320891
Stddev	.0028305	.004631	.0009976	.001971	.0005988	.0111587
%RSD	84.22724	51.16537	21.77091	14.83253	9.327980	4.807919

#1	.0007751	-.013498	.0035445	-.011423	.0057299	.2448212
#2	.0029217	-.009401	.0046684	-.015349	.0067183	.2240097
#3	.0063847	-.004255	.0055342	-.013088	.0068097	.2274363

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.547137	.0003536	.0011411	643.5712	-.000533	.0058147
Stddev	.004866	.0000724	.0000264	4.9249	.000206	.0002107
%RSD	.3145382	20.48520	2.312310	.7652497	38.68146	3.623958

#1	1.550113	.0003506	.0011646	638.2034	-.000362	.0060228
#2	1.549778	.0002827	.0011125	644.6288	-.000762	.0058199
#3	1.541521	.0004274	.0011463	647.8815	-.000474	.0056015

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0076493	.0249122	4.216201	32.84333	.0200378	-.000252
Stddev	.0013022	.0058288	.006077	.09152	.0003191	.000146
%RSD	17.02418	23.39746	.1441346	.2786584	1.592276	57.95884

#1	.0065836	.0199594	4.219168	32.87599	.0197133	-.000389
#2	.0072634	.0313355	4.209211	32.73996	.0200492	-.000269
#3	.0091009	.0234418	4.220225	32.91405	.0203511	-.000098

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	F 1579.502	.0006041	.4959351	5.893291	.0057672	.2326500
Stddev	2.007	.0004281	.0026044	.043578	.0020022	.0009275
%RSD	.1270528	70.87425	.5251556	.7394494	34.71700	.3986481

#1	1578.827	.0007719	.4947128	5.854757	.0066424	.2316122
#2	1581.760	.0009229	.4989259	5.884532	.0034764	.2329403
#3	1577.920	.0001175	.4941666	5.940582	.0071829	.2333976

Sample Name: Q1164-02 Acquired: 1/28/2025 20:54:17 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ME2947 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0143075	9.410834	5.671311	-.001081	-.017341	.0199932
Stddev	.0003250	.010833	.006872	.000763	.000529	.0002894
%RSD	2.271303	.1151128	.1211751	70.61127	3.050512	1.447545

#1	.0144449	9.405307	5.665746	-.001166	-.017193	.0196663
#2	.0139364	9.423316	5.669194	-.001798	-.017928	.0200966
#3	.0145412	9.403879	5.678992	-.000279	-.016902	.0202167

Elem	Sr4077
Units	ppm
Avg	1.678255
Stddev	.012545
%RSD	.7475265

#1	1.664270
#2	1.681974
#3	1.688520

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	2934.932	64447.47	10997.12	2056.365	3224.473
Stddev	13.456	250.58	77.06	5.130	4.029
%RSD	.4584827	.3888086	.7006880	.2494569	.1249607

#1	2945.583	64660.16	11080.57	2055.562	3228.508
#2	2939.404	64511.00	10982.10	2061.850	3224.461
#3	2919.809	64171.24	10928.67	2051.685	3220.449

Sample Name: Q1164-03 Acquired: 1/28/2025 20:58:36 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ME2947D Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0044190	-.007085	.0036007	-.015777	.0049826	.1855270
Stddev	.0014153	.003226	.0012592	.003447	.0023969	.0088042
%RSD	32.02731	45.53103	34.96944	21.84865	48.10513	4.745528

#1	.0060408	-.006149	.0028205	-.016768	.0032141	.1901591
#2	.0037823	-.004431	.0029284	-.018620	.0077106	.1910482
#3	.0034340	-.010676	.0050534	-.011943	.0040231	.1753737

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.537721	.0004008	.0012710	645.8310	-.000746	.0054126
Stddev	.010936	.0000320	.0000899	5.6178	.000300	.0001802
%RSD	.7112103	7.986111	7.074774	.8698591	40.15130	3.329635

#1	1.542067	.0004372	.0012809	647.4589	-.000945	.0055695
#2	1.545816	.0003885	.0013555	650.4552	-.000891	.0052157
#3	1.525279	.0003768	.0011765	639.5790	-.000402	.0054526

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0081681	.0270567	4.178425	32.89643	.0197110	.0001233
Stddev	.0013431	.0005190	.023928	.18262	.0002846	.0001993
%RSD	16.44283	1.918213	.5726587	.5551502	1.443974	161.5740

#1	.0078928	.0276404	4.188406	33.04183	.0195445	-.000023
#2	.0096275	.0268827	4.195746	32.95601	.0200396	.000043
#3	.0069840	.0266471	4.151122	32.69146	.0195488	.000350

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	F 1555.984	.0011058	.4876108	5.904053	.0037652	.2335010
Stddev	6.501	.0012551	.0036813	.076089	.0027940	.0006100
%RSD	.4178328	113.5105	.7549694	1.288765	74.20572	.2612384

#1	1555.451	-.000014	.4909323	5.858258	.0069429	.2327967
#2	1562.736	.002462	.4882476	5.991887	.0026587	.2338555
#3	1549.766	.000869	.4836527	5.862015	.0016939	.2338509

Sample Name: Q1164-03 Acquired: 1/28/2025 20:58:36 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ME2947D Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0145421	9.250952	5.608536	-.000834	-.016602	.0204262
Stddev	.0005391	.035314	.013838	.001034	.000758	.0001004
%RSD	3.707020	.3817314	.2467396	123.9182	4.568124	.4917038
#1	.0150982	9.231555	5.608458	-.000575	-.017282	.0203988
#2	.0145063	9.229588	5.622413	.000045	-.016741	.0205374
#3	.0140218	9.291713	5.594737	-.001973	-.015784	.0203422

Elem	Sr4077
Units	ppm
Avg	1.680247
Stddev	.002578
%RSD	.1534362
#1	1.677396
#2	1.682415
#3	1.680930

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	2944.364	63971.96	10940.04	2052.588	3239.890
Stddev	5.044	192.38	41.02	4.177	7.396
%RSD	.1713095	.3007208	.3749335	.2035063	.2282845
#1	2947.641	64046.71	10987.40	2057.190	3246.695
#2	2946.896	63753.43	10915.76	2051.537	3240.956
#3	2938.556	64115.75	10916.97	2049.036	3232.019

Sample Name: Q1164-02LX5 Acquired: 1/28/2025 21:02:57 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ME2947L Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.000356	-.002539	.0004949	-.001093	.0020542	.1014241	.2889304
Stddev	.002248	.001905	.0019249	.002491	.0016698	.0037488	.0022533
%RSD	631.6418	75.02849	388.9243	227.9870	81.28779	3.696193	.7798658

#1	.001737	-.002568	-.000881	-.002193	.0039822	.1055546	.2870837
#2	-.002732	-.004428	-.000329	.001759	.0011130	.0982372	.2914411
#3	-.000073	-.000619	.002695	-.002844	.0010675	.1004806	.2882666

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001373	.0002183	125.3094	-.000696	.0010845	.0022028	.0121470
Stddev	.0000066	.0000234	.7218	.000585	.0003842	.0031688	.0023687
%RSD	4.791281	10.73689	.5760205	84.11614	35.42478	143.8521	19.50009

#1	.0001352	.0002454	124.5577	-.000620	.0014380	.0046773	.0096790
#2	.0001446	.0002039	125.9970	-.000152	.0011400	.0032999	.0123601
#3	.0001319	.0002057	125.3735	-.001316	.0006756	-.001369	.0144019

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.8355517	6.421307	.0038410	-.000254	304.9486	.0006154	.0932079
Stddev	.0049003	.061254	.0001382	.000360	.7996	.0009772	.0012269
%RSD	.5864737	.9539151	3.597965	141.7735	.2622027	158.7906	1.316327

#1	.8299818	6.357796	.0036825	-.000308	305.6061	-.000485	.0917916
#2	.8391997	6.426103	.0039367	.000130	304.0585	.001383	.0938871
#3	.8374737	6.480022	.0039036	-.000584	305.1812	.000948	.0939451

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.442577	-.000345	.0534189	.0034510	1.784056	1.158560	-.002103
Stddev	.031839	.002551	.0002529	.0001073	.007683	.010847	.000461
%RSD	2.207120	738.4832	.4733699	3.109942	.4306465	.9362227	21.93099

#1	1.454723	.001339	.0531834	.0033508	1.785499	1.147332	-.002375
#2	1.406452	-.003280	.0536862	.0035643	1.790915	1.159369	-.002365
#3	1.466555	.000904	.0533872	.0034380	1.775754	1.168980	-.001571

Sample Name: Q1164-02LX5 Acquired: 1/28/2025 21:02:57 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ME2947L Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Li6707	Sr4077
Units	ppm	ppm	ppm
Avg	-.002804	.0063017	.3153138
Stddev	.000225	.0022182	.0017648
%RSD	8.017739	35.20017	.5597079

#1	-.003054	.0047867	.3134394
#2	-.002740	.0052706	.3169435
#3	-.002619	.0088478	.3155585

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3311.605	70714.70	11115.44	2308.809	3777.856
Stddev	20.099	319.82	26.98	11.452	17.580
%RSD	.6069178	.4522692	.2427432	.4960226	.4653444

#1	3292.737	71014.96	11086.57	2321.968	3763.329
#2	3309.334	70378.38	11140.02	2303.360	3772.840
#3	3332.742	70750.76	11119.72	2301.098	3797.398

Sample Name: CCV026 Acquired: 1/28/2025 21:11:22 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: CCV026 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	5.023703	4.934285	25.09389	5.014920	5.034738	394.2481	10.16543
Stddev	.019684	.002738	.10439	.023929	.008752	2.7346	.14722
%RSD	.3918185	.0554979	.4160162	.4771552	.1738243	.6936117	1.448288
#1	5.016457	4.936674	25.09557	4.996901	5.024777	396.1329	10.32069
#2	5.008669	4.931296	24.98866	5.005790	5.038240	395.4996	10.14777
#3	5.045983	4.934884	25.19743	5.042070	5.041196	391.1117	10.02784
Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.5169747	2.569112	404.8855	16.02950	2.539182	15.37745	403.1055
Stddev	.0006204	.009893	1.3169	.04711	.007886	.06610	.7670
%RSD	.1200033	.3850867	.3252484	.2938746	.3105737	.4298716	.1902663
#1	.5162894	2.573345	405.3657	16.07462	2.539468	15.33381	403.8802
#2	.5171367	2.557807	405.8949	16.03325	2.531157	15.34504	403.0896
#3	.5174980	2.576186	403.3959	15.98063	2.546921	15.45350	402.3465
Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	15.51538	404.6799	2.538579	1.295772	401.9557	2.541147	15.35078
Stddev	.00863	.6635	.007363	.000533	1.6626	.012825	.03323
%RSD	.0556214	.1639625	.2900485	.0410973	.4136241	.5046914	.2164903
#1	15.50635	405.0629	2.539739	1.295228	400.6766	2.526852	15.33852
#2	15.51624	405.0630	2.530705	1.295794	401.3553	2.544946	15.32543
#3	15.52355	403.9137	2.545294	1.296293	403.8350	2.551643	15.38840
Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	154.1346	5.152559	5.372881	5.001973	5.098785	5.086739	5.089266
Stddev	.4466	.016513	.007289	.008320	.017288	.025022	.018722
%RSD	.2897782	.3204826	.1356587	.1663250	.3390665	.4919155	.3678685
#1	154.4283	5.141081	5.366218	4.996750	5.101179	5.081286	5.089874
#2	154.3550	5.145112	5.371760	4.997601	5.080425	5.064892	5.070248
#3	153.6206	5.171484	5.380666	5.011567	5.114752	5.114038	5.107677

Sample Name: CCV026 Acquired: 1/28/2025 21:11:22 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: CCV026 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Li6707	Sr4077
Units	ppm	ppm	ppm
Avg	5.106333	5.091577	5.129190
Stddev	.019890	.008277	.031465
%RSD	.3895240	.1625531	.6134407

#1	5.104513	5.096143	5.098922
#2	5.087416	5.096565	5.161728
#3	5.127071	5.082023	5.126918

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	2962.050	64226.63	10435.84	2065.735	3235.015
Stddev	4.183	109.31	25.14	3.077	5.293
%RSD	.1412139	.1702017	.2409014	.1489674	.1636201

#1	2963.793	64149.98	10451.11	2062.334	3235.976
#2	2965.080	64178.10	10449.59	2068.327	3239.761
#3	2957.278	64351.81	10406.82	2066.543	3229.306

Sample Name: CCB026 Acquired: 1/28/2025 21:15:41 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: CCB026 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0004193	.0012068	.0003768	-.000263	.0014297	-.000965	.0024448
Stddev	.0019895	.0013685	.0004773	.003273	.0006000	.004195	.0003251
%RSD	474.4641	113.3993	126.6658	1246.397	41.96540	434.7720	13.29877

#1	-.001559	-.000004	.0001907	.002698	.0009436	.003863	.0027537
#2	.000397	.000933	.0000206	.000291	.0021002	-.003031	.0021056
#3	.002420	.002692	.0009192	-.003777	.0012453	-.003726	.0024750

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0000208	.0000251	-.000773	.0004269	-.000080	.0005824	.0102342
Stddev	.0000704	.0000304	.008492	.0002678	.000146	.0029438	.0008317
%RSD	339.3935	121.0209	1098.979	62.73970	183.1964	505.4508	8.126859

#1	-.000060	.0000595	-.005224	.0001177	-.000240	.0001366	.0102531
#2	.000072	.0000017	.009019	.0005890	.000047	.0037236	.0093932
#3	.000050	.0000142	-.006113	.0005738	-.000046	-.002113	.0110563

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0003332	-.002756	-.000055	.0001068	-.163498	-.000430	-.001476
Stddev	.0003167	.013613	.000234	.0002562	.044618	.000273	.000775
%RSD	95.04921	493.9991	429.3990	239.9098	27.28946	63.66042	52.51427

#1	.0000455	-.017957	.000212	-.000187	-.115472	-.000617	-.002041
#2	.0002816	.001380	-.000146	.000282	-.171360	-.000116	-.001794
#3	.0006725	.008310	-.000229	.000226	-.203662	-.000556	-.000592

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.5122053	-.001845	.0063849	.0005480	.0038144	.0035680	.0005891
Stddev	.0458323	.002497	.0009083	.0000577	.0034153	.0051286	.0003919
%RSD	8.948028	135.3049	14.22581	10.53744	89.53833	143.7417	66.52026

#1	.4613688	-.004728	.0073935	.0005734	.0005632	.0050979	.0009497
#2	.5248825	-.000404	.0056314	.0004819	.0073730	-.002152	.0001721
#3	.5503646	-.000403	.0061298	.0005886	.0035069	.007758	.0006455

Sample Name: CCB026 Acquired: 1/28/2025 21:15:41 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: CCB026 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Li6707	Sr4077
Units	ppm	ppm	ppm
Avg	.0011509	.0022069	.0000761
Stddev	.0008144	.0005904	.0000474
%RSD	70.76521	26.75294	62.26168

#1	.0020762	.0015295	.0000392
#2	.0008334	.0024791	.0001295
#3	.0005430	.0026121	.0000596

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3678.363	78247.57	11031.94	2597.717	4602.640
Stddev	5.617	277.49	83.50	8.657	6.791
%RSD	.1527025	.3546280	.7569286	.3332414	.1475466

#1	3678.621	78133.91	10938.10	2591.659	4595.119
#2	3672.622	78044.95	11098.06	2593.861	4604.476
#3	3683.847	78563.84	11059.66	2607.632	4608.324

Sample Name: Q1164-04 Acquired: 1/28/2025 21:19:51 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ME2947S Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0491870	.0443500	.0223960	.1041318	.1080306	2.007813
Stddev	.0009703	.0021929	.0014338	.0046637	.0033522	.004296
%RSD	1.972765	4.944647	6.401953	4.478627	3.103040	.2139412

#1	.0481902	.0447951	.0217561	.1028198	.1044111	2.011224
#2	.0501285	.0462862	.0213937	.1093109	.1086521	2.002989
#3	.0492424	.0419686	.0240383	.1002646	.1110286	2.009225

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	3.500299	.0522094	.0538742	619.7693	.2151624	.5193349
Stddev	.011715	.0001097	.0002267	3.6999	.0010909	.0017942
%RSD	.3346781	.2101550	.4207236	.5969743	.5070024	.3454829

#1	3.513706	.0522142	.0538222	624.0396	.2139412	.5184391
#2	3.495153	.0523166	.0536780	617.7466	.2160404	.5181649
#3	3.492038	.0520973	.0541223	617.5218	.2155056	.5214006

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2567458	1.063358	4.511753	31.88995	.5327578	.0431918
Stddev	.0016248	.017190	.016322	.09446	.0020438	.0002063
%RSD	.6328325	1.616563	.3617711	.2961909	.3836282	.4775453

#1	.2554987	1.072423	4.527820	31.82286	.5329525	.0434030
#2	.2585832	1.074119	4.512251	31.99797	.5306237	.0429909
#3	.2561555	1.043533	4.495187	31.84902	.5346974	.0431815

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	F 1516.479	.5047375	.9854668	6.135956	.0076741	.2409113
Stddev	9.647	.0036677	.0048432	.040974	.0038484	.0000996
%RSD	.6361217	.7266476	.4914651	.6677646	50.14854	.0413600

#1	1527.608	.5038969	.9893086	6.132298	.0042242	.2410231
#2	1510.506	.5087525	.9800263	6.096934	.0118248	.2408318
#3	1511.323	.5015631	.9870654	6.178636	.0069732	.2408790

Sample Name: Q1164-04 Acquired: 1/28/2025 21:19:51 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: ME2947S Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0142004	9.352411	5.579787	-.002307	-.016856	.0208020
Stddev	.0002160	.046692	.009672	.000772	.000212	.0008247
%RSD	1.521246	.4992476	.1733449	33.45401	1.259668	3.964268

#1	.0144102	9.357322	5.587562	-.001863	-.016664	.0206500
#2	.0139787	9.303458	5.568956	-.003198	-.016819	.0200638
#3	.0142124	9.396453	5.582844	-.001860	-.017084	.0216920

Elem	Sr4077
Units	ppm
Avg	1.610038
Stddev	.005982
%RSD	.3715262

#1	1.616215
#2	1.604273
#3	1.609625

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	2984.872	65001.29	10791.79	2100.538	3255.685
Stddev	8.906	71.61	12.27	5.758	12.346
%RSD	.2983631	.1101697	.1136822	.2741190	.3792015

#1	2986.953	65083.97	10800.33	2105.293	3256.115
#2	2992.554	64960.78	10797.29	2102.186	3267.810
#3	2975.110	64959.11	10777.73	2094.136	3243.130

Sample Name: Q1182-01 Acquired: 1/28/2025 21:24:06 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MBHH96 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0019573	-.008306	.0035861	-.005627	.0041635	.1661480
Stddev	.0028921	.001401	.0008227	.004155	.0021762	.0085545
%RSD	147.7575	16.86774	22.94165	73.84372	52.26818	5.148709

#1	.0052862	-.006688	.0034479	-.001077	.0016703	.1565010
#2	.0000625	-.009088	.0044691	-.006581	.0051382	.1691329
#3	.0005232	-.009141	.0028412	-.009221	.0056819	.1728101

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	2.003843	.0008583	.0008404	208.1300	.0000435	.0178355
Stddev	.026529	.0000341	.0000879	2.0784	.0001688	.0003652
%RSD	1.323895	3.975658	10.46166	.9985942	388.3545	2.047667

#1	2.030524	.0008872	.0009403	209.9146	-.000075	.0180392
#2	2.003534	.0008207	.0008062	208.6273	.000237	.0180535
#3	1.977470	.0008672	.0007748	205.8481	-.000031	.0174139

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1542379	.0286711	4.303415	24.32286	.0916039	.0001843
Stddev	.0025083	.0073626	.043245	.21529	.0006538	.0002490
%RSD	1.626267	25.67941	1.004894	.8851411	.7137839	135.0662

#1	.1530846	.0272437	4.344974	24.43982	.0923531	-.000098
#2	.1571155	.0366429	4.306611	24.45436	.0913105	.000279
#3	.1525137	.0221268	4.258661	24.07441	.0911481	.000372

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	F 1459.614	-.001043	.4379165	4.650714	.0017923	.1601423
Stddev	3.224	.000864	.0035670	.066289	.0019474	.0013836
%RSD	.2208647	82.83306	.8145349	1.425359	108.6539	.8639503

#1	1462.429	-.000446	.4369965	4.698244	.0039870	.1586940
#2	1460.317	-.000650	.4418534	4.678909	.0011187	.1602824
#3	1456.097	-.002034	.4348997	4.574988	.0002711	.1614504

Sample Name: Q1182-01 Acquired: 1/28/2025 21:24:06 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MBHH96 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0004953	2.160858	4.746261	-.000644	-.004590	.0310912
Stddev	.0002734	.014251	.014824	.000692	.000271	.0002107
%RSD	55.19731	.6594877	.3123367	107.5098	5.903533	.6777497

#1	.0003637	2.177140	4.735089	-.001434	-.004899	.0311901
#2	.0008096	2.154775	4.763079	-.000351	-.004477	.0312342
#3	.0003125	2.150658	4.740616	-.000147	-.004393	.0308492

Elem	Sr4077
Units	ppm
Avg	1.019998
Stddev	.013854
%RSD	1.358284

#1	1.033625
#2	1.020443
#3	1.005927

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3112.943	66705.76	11075.56	2186.633	3381.746
Stddev	12.710	238.99	98.98	12.376	8.942
%RSD	.4082862	.3582778	.8936507	.5659650	.2644328

#1	3123.302	66625.93	11184.70	2192.445	3382.910
#2	3116.766	66516.91	11050.38	2172.421	3390.049
#3	3098.760	66974.45	10991.61	2195.032	3372.278

Sample Name: Q1182-02 Acquired: 1/28/2025 21:28:10 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MBHH97 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.000968	-.005243	.0069816	-.003710	.0026865	.1572707
Stddev	.002640	.003657	.0012292	.000966	.0006263	.0006701
%RSD	272.8273	69.74751	17.60588	26.02439	23.31375	.4260596

#1	.002053	-.001024	.0081472	-.004670	.0033250	.1580014
#2	-.002835	-.007501	.0056975	-.002739	.0020731	.1571256
#3	-.002121	-.007203	.0071001	-.003722	.0026615	.1566850

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	2.421517	.0007165	.0007688	144.7667	.0000505	.0093629
Stddev	.004419	.0000630	.0000910	.3194	.0001822	.0002553
%RSD	.1824911	8.789681	11.83103	.2206144	360.8212	2.727012

#1	2.420523	.0006682	.0007686	144.5963	.0002196	.0092367
#2	2.417680	.0006935	.0008599	144.5688	-.000142	.0096568
#3	2.426349	.0007877	.0006780	145.1352	.000074	.0091953

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0706252	.0181194	2.339605	22.52395	.0299822	.0001114
Stddev	.0010145	.0024178	.004118	.08909	.0001846	.0001895
%RSD	1.436473	13.34357	.1760170	.3955392	.6157484	170.1146

#1	.0714535	.0164236	2.339219	22.46963	.0301628	.0000768
#2	.0709285	.0208879	2.335693	22.47546	.0297938	.0003158
#3	.0694937	.0170467	2.343902	22.62677	.0299900	-.000058

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	F 1383.631	.0002323	.7100713	4.700541	.0051898	.2531236
Stddev	6.840	.0002956	.0035465	.004259	.0021321	.0014493
%RSD	.4943525	127.2456	.4994622	.0906155	41.08314	.5725823

#1	1389.583	.0004783	.7125335	4.704977	.0031049	.2547198
#2	1376.159	.0003143	.7060063	4.696484	.0050983	.2518900
#3	1385.150	-.000096	.7116741	4.700164	.0073662	.2527611

Sample Name: Q1182-02 Acquired: 1/28/2025 21:28:10 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MBHH97 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0007795	3.586812	4.996916	-.000154	-.002694	.0307052
Stddev	.0001083	.013504	.023460	.001318	.000529	.0005616
%RSD	13.89770	.3764823	.4694943	853.9580	19.63360	1.829033

#1	.0008853	3.585511	5.018001	.000472	-.002666	.0304653
#2	.0006688	3.574006	4.971644	-.001669	-.003236	.0303033
#3	.0007845	3.600920	5.001104	.000733	-.002180	.0313469

Elem	Sr4077
Units	ppm
Avg	.6987470
Stddev	.0015466
%RSD	.2213386

#1	.6992378
#2	.6970146
#3	.6999887

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3110.839	66724.88	11209.75	2168.429	3427.333
Stddev	8.943	95.04	25.90	7.917	13.812
%RSD	.2874765	.1424306	.2310546	.3651246	.4029895

#1	3119.533	66779.19	11186.34	2160.404	3439.095
#2	3111.316	66780.30	11237.57	2168.648	3430.780
#3	3101.667	66615.14	11205.33	2176.234	3412.124

Sample Name: Q1182-03 Acquired: 1/28/2025 21:32:12 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MBHH98 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0028535	-.006865	.0033486	-.006896	.0017857	.1798946
Stddev	.0026329	.003084	.0015883	.001619	.0016443	.0082376
%RSD	92.27033	44.92164	47.43067	23.47364	92.08297	4.579135

#1	.0047712	-.004731	.0043100	-.008684	.0032520	.1890912
#2	.0039377	-.010400	.0042204	-.006475	.0020973	.1731926
#3	-.000148	-.005463	.0015154	-.005529	.0000079	.1774000

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.704799	.0007322	.0021505	162.0137	-.000428	.0074597
Stddev	.006319	.0000313	.0001176	.4985	.000300	.0001980
%RSD	.3706509	4.271026	5.470196	.3076601	69.98841	2.654312

#1	1.705525	.0007680	.0022050	161.8241	-.000183	.0074253
#2	1.698149	.0007185	.0020154	161.6378	-.000762	.0076726
#3	1.710724	.0007101	.0022309	162.5791	-.000340	.0072811

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0085411	.0402049	4.208998	25.72037	.0132809	.0002920
Stddev	.0022467	.0050703	.009185	.05273	.0003231	.0002365
%RSD	26.30432	12.61120	.2182242	.2049977	2.432585	81.00481

#1	.0080384	.0357415	4.216029	25.67533	.0135799	.0005636
#2	.0065883	.0457178	4.198606	25.70742	.0133245	.0001322
#3	.0109965	.0391554	4.212358	25.77837	.0129382	.0001800

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	F 1469.106	-.000279	.5723451	10.44761	.0302345	.2204927
Stddev	3.236	.001503	.0020838	.16349	.0038620	.0032669
%RSD	.2202548	538.5082	.3640860	1.564891	12.77359	1.481616

#1	1471.496	.000245	.5707724	10.38280	.0309300	.2186955
#2	1470.397	-.001974	.5715543	10.32647	.0260719	.2242636
#3	1465.424	.000891	.5747086	10.63358	.0337014	.2185191

Sample Name: Q1182-03 Acquired: 1/28/2025 21:32:12 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MBHH98 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0009537	2.870625	4.555234	.0000817	-.003125	.0082168
Stddev	.0007432	.011664	.016814	.0007609	.000232	.0015683
%RSD	77.92813	.4063277	.3691119	931.5579	7.434359	19.08638

#1	.0003494	2.882759	4.538998	-.000125	-.002919	.0064072
#2	.0007281	2.859495	4.572572	-.000555	-.003377	.0090611
#3	.0017835	2.869622	4.554133	.000924	-.003080	.0091819

Elem	Sr4077
Units	ppm
Avg	1.215512
Stddev	.005708
%RSD	.4696229

#1	1.218586
#2	1.208925
#3	1.219024

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3116.154	65720.19	10891.89	2163.039	3409.314
Stddev	10.878	254.10	51.38	7.001	6.520
%RSD	.3490947	.3866317	.4717077	.3236488	.1912453

#1	3104.236	65916.65	10942.68	2169.417	3402.116
#2	3125.550	65810.69	10839.94	2164.151	3414.823
#3	3118.676	65433.24	10893.05	2155.549	3411.003

Sample Name: Q1182-04 Acquired: 1/28/2025 21:36:15 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MBHH99 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0040922	-.005809	.0024526	-.013756	.0039893	.1795565
Stddev	.0049076	.002385	.0014803	.001377	.0004517	.0031369
%RSD	119.9244	41.04844	60.35603	10.00990	11.32279	1.747007

#1	.0002564	-.003645	.0022371	-.015139	.0039403	.1817423
#2	.0096225	-.008366	.0010919	-.013743	.0044635	.1759623
#3	.0023978	-.005418	.0040288	-.012385	.0035641	.1809650

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	2.814171	.0006888	.0008936	465.9109	-.000633	.0010401
Stddev	.020435	.0000715	.0000611	4.0014	.000254	.0005931
%RSD	.7261378	10.38258	6.839486	.8588426	40.17525	57.02322

#1	2.790681	.0006405	.0009585	469.3917	-.000459	.0011805
#2	2.823977	.0006551	.0008371	461.5391	-.000925	.0015503
#3	2.827854	.0007710	.0008852	466.8021	-.000515	.0003894

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0108254	.0256764	6.041126	21.50819	.0105753	.0001720
Stddev	.0017715	.0014320	.012667	.10467	.0005974	.0002359
%RSD	16.36435	5.577186	.2096726	.4866717	5.649147	137.0991

#1	.0123740	.0272954	6.026610	21.62875	.0103709	.0002182
#2	.0088937	.0245757	6.049939	21.44052	.0112481	.0003814
#3	.0112084	.0251580	6.046827	21.45529	.0101070	-.000083

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	F 1501.041	.0010817	.3348250	8.464149	.0092671	.1456009
Stddev	6.555	.0008215	.0033045	.023401	.0011673	.0003381
%RSD	.4367234	75.94551	.9869437	.2764674	12.59648	.2322076

#1	1494.462	.0020086	.3328325	8.443734	.0081454	.1459506
#2	1501.089	.0004434	.3386394	8.459029	.0091807	.1455764
#3	1507.572	.0007932	.3330029	8.489686	.0104752	.1452757

Sample Name: Q1182-04 Acquired: 1/28/2025 21:36:15 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MBHH99 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0008961	2.905986	4.011359	-.001205	-.012657	.0169750
Stddev	.0002850	.025971	.012090	.000944	.000764	.0005493
%RSD	31.80637	.8936987	.3013873	78.31925	6.036977	3.235776

#1	.0006084	2.914744	4.011325	-.002074	-.013538	.0167746
#2	.0009015	2.876769	4.023465	-.000201	-.012164	.0165541
#3	.0011783	2.926447	3.999286	-.001340	-.012271	.0175964

Elem	Sr4077
Units	ppm
Avg	3.635408
Stddev	.038821
%RSD	1.067849

#1	3.623723
#2	3.603773
#3	3.678729

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	2982.687	63637.31	10565.84	2073.918	3230.103
Stddev	4.452	131.40	39.81	9.551	10.256
%RSD	.1492500	.2064811	.3768141	.4605227	.3175225

#1	2987.392	63485.96	10520.30	2069.350	3226.859
#2	2982.125	63703.70	10594.06	2067.509	3241.589
#3	2978.543	63722.27	10583.15	2084.895	3221.860

Sample Name: Q1182-05 Acquired: 1/28/2025 21:40:36 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MBHH99D Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0046086	-.005377	.0018304	-.012087	.0056768	.2595986
Stddev	.0013460	.001307	.0008941	.001053	.0009362	.0109720
%RSD	29.20514	24.31214	48.85042	8.710875	16.49218	4.226514

#1	.0057470	-.005297	.0009534	-.010872	.0053328	.2472755
#2	.0049558	-.004111	.0017970	-.012665	.0067364	.2683078
#3	.0031231	-.006722	.0027407	-.012725	.0049613	.2632125

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	2.785996	.0006757	.0009303	465.9590	-.000458	.0010535
Stddev	.014569	.0000446	.0000365	2.6139	.000517	.0003701
%RSD	.5229285	6.603625	3.927243	.5609723	112.8723	35.13274

#1	2.798546	.0006266	.0009724	464.8632	.000068	.0009516
#2	2.770019	.0006867	.0009115	464.0714	-.000966	.0007450
#3	2.789424	.0007138	.0009070	468.9425	-.000476	.0014639

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0079061	.0164996	6.042084	21.43275	.0103361	.0001823
Stddev	.0008161	.0015183	.023643	.09789	.0004658	.0004467
%RSD	10.32303	9.201911	.3912977	.4567282	4.506180	245.0343

#1	.0079538	.0150211	6.063082	21.52795	.0108504	.0006038
#2	.0086973	.0180548	6.016476	21.33238	.0099428	.0002291
#3	.0070671	.0164228	6.046696	21.43792	.0102151	-.000286

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	F 1532.019	-.000574	.3275670	8.167431	.0067433	.1459336
Stddev	1.748	.001158	.0024713	.069013	.0008827	.0028277
%RSD	.1141190	201.8391	.7544405	.8449796	13.09026	1.937649

#1	1533.914	.000621	.3275637	8.198948	.0066987	.1452963
#2	1531.676	-.000651	.3250974	8.088286	.0076474	.1490255
#3	1530.468	-.001691	.3300400	8.215058	.0058837	.1434789

Sample Name: Q1182-05 Acquired: 1/28/2025 21:40:36 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MBHH99D Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0011711	2.855257	4.054142	-.000262	-.011908	.0172021
Stddev	.0002364	.005192	.020582	.000553	.000833	.0009035
%RSD	20.18838	.1818316	.5076764	211.0798	6.992389	5.252488

#1	.0010375	2.849270	4.034550	.000026	-.010946	.0176444
#2	.0010318	2.857992	4.075588	-.000899	-.012391	.0177993
#3	.0014441	2.858510	4.052289	.000087	-.012386	.0161627

Elem	Sr4077
Units	ppm
Avg	3.599954
Stddev	.016146
%RSD	.4484953

#1	3.615318
#2	3.583127
#3	3.601416

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3018.131	64399.70	10540.91	2113.774	3263.315
Stddev	5.869	88.89	49.40	5.968	7.285
%RSD	.1944479	.1380294	.4686348	.2823362	.2232334

#1	3021.995	64394.12	10585.66	2114.364	3269.483
#2	3021.019	64491.25	10487.90	2119.425	3265.184
#3	3011.378	64313.73	10549.18	2107.533	3255.278

Sample Name: Q1182-04LX5 Acquired: 1/28/2025 21:44:57 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MBHH99L Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0005162	-.000724	.0013021	-.002519	.0017417	.0604541	.5125926
Stddev	.0012911	.001008	.0011199	.002073	.0013545	.0039238	.0035302
%RSD	250.1217	139.2540	86.01151	82.30108	77.76828	6.490473	.6886857

#1	.0019078	-.001624	.0001070	-.001310	.0007552	.0647260	.5157183
#2	-.000643	.000365	.0023275	-.004912	.0011838	.0596253	.5087638
#3	.000284	-.000913	.0014717	-.001333	.0032860	.0570109	.5132956

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001957	.0001401	88.74989	-.000485	.0003059	.0032017	.0073030
Stddev	.0000545	.0000713	.45815	.000351	.0002395	.0038494	.0066711
%RSD	27.84949	50.88150	.5162303	72.44062	78.29203	120.2278	91.34628

#1	.0001715	.0000578	88.95088	-.000088	.0000487	.0003974	.0067319
#2	.0002581	.0001824	88.22560	-.000754	.0003466	.0016174	.0009359
#3	.0001575	.0001802	89.07320	-.000613	.0005225	.0075904	.0142413

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.163789	4.114898	.0020279	.0001395	287.4523	.0007468	.0594708
Stddev	.004762	.020246	.0005168	.0001190	1.1233	.0018597	.0017557
%RSD	.4091431	.4920054	25.48403	85.32177	.3907616	249.0449	2.952177

#1	1.166024	4.092701	.0018575	.0000384	286.2356	.0014992	.0596280
#2	1.158321	4.119645	.0016179	.0001094	287.6715	.0021124	.0576419
#3	1.167023	4.132348	.0026084	.0002707	288.4498	-.001371	.0611427

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.981265	.0001036	.0323554	.0007890	.5337826	.8112657	-.001832
Stddev	.061065	.0015500	.0007677	.0003932	.0020094	.0048880	.000073
%RSD	3.082119	1496.606	2.372628	49.83405	.3764361	.6025172	3.978812

#1	1.913551	.0012752	.0319643	.0011949	.5328027	.8128577	-.001749
#2	1.998090	.0006894	.0318620	.0004098	.5324513	.8057802	-.001883
#3	2.032153	-.001654	.0332398	.0007624	.5360939	.8151593	-.001865

Sample Name: Q1182-04LX5 Acquired: 1/28/2025 21:44:57 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MBHH99L Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Li6707	Sr4077
Units	ppm	ppm	ppm
Avg	-.001484	.0075462	.6777376
Stddev	.000605	.0007558	.0043015
%RSD	40.76686	10.01605	.6346904

#1	-.000954	.0068825	.6806985
#2	-.001355	.0073873	.6728034
#3	-.002143	.0083689	.6797108

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3349.681	70292.23	10660.49	2350.843	3794.620
Stddev	5.912	198.32	45.96	10.550	8.948
%RSD	.1765056	.2821426	.4310954	.4487868	.2358128

#1	3353.172	70177.36	10713.08	2349.215	3797.887
#2	3353.016	70521.23	10628.02	2362.113	3801.477
#3	3342.854	70178.09	10640.37	2341.202	3784.498

Sample Name: Q1182-06 Acquired: 1/28/2025 21:49:03 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MBHH99S Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0479320	.0504893	.0242613	.1063578	.1052111	2.078005
Stddev	.0019050	.0014612	.0026911	.0025325	.0004768	.002380
%RSD	3.974379	2.894137	11.09236	2.381135	.4531333	.1145142

#1	.0463789	.0499800	.0237174	.1046817	.1047238	2.080751
#2	.0500576	.0521371	.0218837	.1092711	.1052330	2.076562
#3	.0473596	.0493510	.0271829	.1051206	.1056765	2.076701

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	4.784816	.0547530	.0566087	459.6590	.2236040	.5319323
Stddev	.029346	.0001890	.0001446	1.0770	.0011541	.0022170
%RSD	.6133193	.3451767	.2554809	.2343077	.5161127	.4167745

#1	4.753183	.0547889	.0564473	458.4349	.2248557	.5297424
#2	4.790109	.0549215	.0567264	460.0807	.2225823	.5318792
#3	4.811155	.0545486	.0566524	460.4613	.2233739	.5341754

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2703558	1.079129	6.485107	21.20729	.5426456	.0427937
Stddev	.0004965	.005893	.004617	.10032	.0016718	.0000303
%RSD	.1836352	.5461283	.0711933	.4730639	.3080828	.0707879

#1	.2701125	1.073754	6.480898	21.32158	.5418348	.0428230
#2	.2709270	1.085431	6.484379	21.16651	.5415339	.0427625
#3	.2700280	1.078203	6.490045	21.13378	.5445682	.0427954

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	F 1509.332	.5254819	.8343592	8.458671	.0091497	.1498111
Stddev	1.447	.0032212	.0048298	.045322	.0015762	.0008132
%RSD	.0958710	.6129973	.5788627	.5358000	17.22714	.5428129

#1	1510.007	.5266252	.8364122	8.416440	.0074682	.1497711
#2	1510.319	.5218451	.8288421	8.453020	.0105937	.1506436
#3	1507.671	.5279756	.8378234	8.506553	.0093870	.1490187

Sample Name: Q1182-06 Acquired: 1/28/2025 21:49:03 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: MBHH99S Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0005787	2.855984	4.065421	-.000676	-.012563	.0165070
Stddev	.0004778	.014035	.020140	.001082	.000584	.0007671
%RSD	82.57275	.4914131	.4954096	160.1561	4.651454	4.646774

#1	.0001084	2.855548	4.083577	-.000164	-.012682	.0162816
#2	.0005640	2.842172	4.068931	-.001919	-.013079	.0158780
#3	.0010637	2.870231	4.043757	.000056	-.011929	.0173616

Elem	Sr4077
Units	ppm
Avg	3.572574
Stddev	.042558
%RSD	1.191236

#1	3.581148
#2	3.526382
#3	3.610193

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3048.981	64494.60	10465.72	2146.684	3265.733
Stddev	13.312	78.52	28.87	10.235	16.048
%RSD	.4366120	.1217458	.2758695	.4767894	.4913967

#1	3061.354	64550.39	10440.84	2153.253	3275.724
#2	3050.694	64528.60	10458.93	2151.908	3274.252
#3	3034.896	64404.81	10497.38	2134.891	3247.222

Sample Name: PB166272BL Acquired: 1/28/2025 21:53:18 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: PBW272 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0003845	.0020363	-.000876	-.000231	-.000329	-.000886	.0040571
Stddev	.0030566	.0029657	.000673	.001675	.000562	.003219	.0007564
%RSD	794.9684	145.6409	76.84022	726.7641	170.8328	363.1785	18.64380

#1	.0030541	.0051545	-.000123	.000755	-.000950	-.000557	.0048857
#2	-.002950	-.000749	-.001418	.000718	-.000181	-.004258	.0038818
#3	.001049	.001703	-.001087	-.002165	.000145	.002155	.0034037

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0000909	-.000032	.0052332	-.000151	-.000200	.0025622	.0015435
Stddev	.0000558	.000044	.0076769	.000281	.000075	.0018653	.0056502
%RSD	61.33418	137.1401	146.6957	186.1606	37.33987	72.80139	366.0569

#1	.0000308	-.000082	.0136353	-.000461	-.000255	.0045918	-.002455
#2	.0001408	-.000012	.0034794	.000085	-.000229	.0009230	.008008
#3	.0001011	-.000002	-.001415	-.000076	-.000115	.0021718	-.000922

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0002541	-.015852	-.000396	-.000057	-.157442	-.001240	-.000444
Stddev	.0000654	.009959	.000148	.000391	.267126	.000406	.001405
%RSD	25.74116	62.82260	37.34938	689.9593	169.6661	32.77084	316.1953

#1	.0003288	-.004768	-.000493	-.000183	-.092705	-.001476	-.000409
#2	.0002264	-.024045	-.000470	.000382	-.450987	-.001474	.000943
#3	.0002071	-.018744	-.000226	-.000369	.071365	-.000771	-.001867

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.3946768	-.001469	.0010209	.0004451	.0057137	-.000694	.0002667
Stddev	.0200696	.001420	.0002154	.0001988	.0022930	.002367	.0007313
%RSD	5.085076	96.65896	21.09961	44.66315	40.13147	340.8932	274.1695

#1	.3853106	-.000345	.0011035	.0006352	.0068643	.000861	-.000469
#2	.4177173	-.000997	.0007764	.0004615	.0030732	-.003418	.000275
#3	.3810024	-.003064	.0011828	.0002386	.0072036	.000474	.000994

Sample Name: PB166272BL Acquired: 1/28/2025 21:53:18 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: PBW272 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Li6707	Sr4077
Units	ppm	ppm	ppm
Avg	.0010878	.0031524	.0000420
Stddev	.0004989	.0015462	.0000791
%RSD	45.86028	49.04634	188.3378

#1	.0014052	.0016295	-.000015
#2	.0005128	.0031070	.000009
#3	.0013455	.0047208	.000132

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3656.377	79600.54	10466.26	2604.653	4526.666
Stddev	13.728	334.24	320.07	13.458	12.558
%RSD	.3754494	.4198940	3.058108	.5167067	.2774160

#1	3655.648	79216.60	10096.68	2591.972	4525.244
#2	3670.455	79826.54	10653.39	2618.774	4539.874
#3	3643.028	79758.47	10648.71	2603.214	4514.880

Sample Name: PB166272BS Acquired: 1/28/2025 21:57:27 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: LCS272 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0200362	.0542458	.0194209	.0684245	.1132443	.3449733	.3640817
Stddev	.0022624	.0047114	.0015052	.0015109	.0012290	.0013051	.0026541
%RSD	11.29137	8.685219	7.750151	2.208156	1.085270	.3783341	.7289943

#1	.0180438	.0544384	.0207389	.0679978	.1131409	.3447343	.3651476
#2	.0195691	.0588579	.0177808	.0701028	.1120702	.3463814	.3660372
#3	.0224956	.0494411	.0197430	.0671728	.1145217	.3438042	.3610603

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0116617	.0106906	9.488449	.0227856	.1025461	.0560073	.1994910
Stddev	.0001076	.0000675	.045933	.0002676	.0006728	.0019706	.0063151
%RSD	.9222846	.6317348	.4840921	1.174424	.6560676	3.518522	3.165580

#1	.0115520	.0106177	9.507711	.0224818	.1021101	.0542840	.2029648
#2	.0116662	.0107031	9.521616	.0229863	.1022073	.0581558	.1922016
#3	.0117669	.0107510	9.436022	.0228887	.1033209	.0555820	.2033065

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0306665	8.655945	.0835822	.0197429	9.783538	.1104176	.1110192
Stddev	.0004819	.017501	.0003250	.0002431	.405406	.0017614	.0011802
%RSD	1.571358	.2021806	.3887877	1.231229	4.143755	1.595215	1.063056

#1	.0306004	8.636584	.0838443	.0198222	10.24604	.1110222	.1102429
#2	.0311780	8.670640	.0832186	.0199365	9.48967	.1084336	.1123773
#3	.0302210	8.660610	.0836836	.0194701	9.61490	.1117972	.1104374

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	9.267017	.0180596	.0011794	.0215638	.1751683	.9320771	.0144001
Stddev	.053423	.0005437	.0004190	.0007014	.0040458	.0043027	.0009463
%RSD	.5764801	3.010772	35.52511	3.252575	2.309677	.4616204	6.571473

#1	9.210180	.0181944	.0016315	.0212790	.1794270	.9272962	.0133751
#2	9.316200	.0174611	.0008042	.0210496	.1747023	.9356381	.0145845
#3	9.274671	.0185232	.0011024	.0223628	.1713757	.9332970	.0152406

Sample Name: PB166272BS Acquired: 1/28/2025 21:57:27 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: LCS272 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Li6707	Sr4077
Units	ppm	ppm	ppm
Avg	.2150256	.0302183	.1808439
Stddev	.0006446	.0008505	.0012518
%RSD	.2998027	2.814448	.6922025

#1	.2149020	.0311771	.1812181
#2	.2157231	.0295548	.1818659
#3	.2144516	.0299231	.1794477

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3612.846	75192.45	10615.65	2556.093	4337.854
Stddev	22.590	309.60	31.76	11.220	22.264
%RSD	.6252817	.4117396	.2991428	.4389418	.5132409

#1	3608.567	74992.06	10628.06	2563.665	4329.506
#2	3637.271	75036.26	10639.32	2543.203	4363.085
#3	3592.702	75549.03	10579.56	2561.411	4320.971

Sample Name: PB166267TB Acquired: 1/28/2025 22:01:31 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: LEB267 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0006536	-.000253	.0014702	.0013778	.0001848	-.005183	.0048700
Stddev	.0027963	.002718	.0012149	.0019036	.0023920	.001808	.0005035
%RSD	427.8448	1075.041	82.63131	138.1594	1294.446	34.88156	10.33965

#1	.0016198	-.003148	.0028314	.0035454	.0014088	-.003107	.0046786
#2	.0028386	.000145	.0010832	-.000022	-.002572	-.006029	.0044902
#3	-.002498	.002244	.0004960	.000610	.001717	-.006413	.0054412

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0000053	-.000050	.0007952	.0001970	-.000201	.0003799	.0078923
Stddev	.0000436	.000052	.0090738	.0002040	.000174	.0014184	.0053157
%RSD	819.1321	104.7915	1141.011	103.5517	86.54600	373.3570	67.35253

#1	-.000033	-.000052	-.006882	.0002314	-.000027	-.001248	.0114582
#2	-.000004	-.000101	.010809	-.000022	-.000201	.001040	.0104360
#3	.000053	.000003	-.001541	.000382	-.000375	.001348	.0017827

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0010137	-.003519	-.000375	.0000438	.0233717	.0003044	.0004602
Stddev	.0001174	.013460	.000222	.0001668	.4026598	.0025277	.0011724
%RSD	11.58159	382.4325	59.22821	380.6231	1722.850	830.2577	254.7740

#1	.0010095	-.007059	-.000629	-.000148	.3631565	-.002010	.0010379
#2	.0011331	.011356	-.000224	.000126	-.421375	-.000078	.0012315
#3	.0008984	-.014856	-.000270	.000154	.128333	.003001	-.000889

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-1.07488	.0015535	-.000748	.0003283	7.582394	-.001613	.0003240
Stddev	.01221	.0008979	.000420	.0001668	.010310	.001543	.0003267
%RSD	1.135760	57.80079	56.11524	50.80458	.1359746	95.68294	100.8405

#1	-1.08861	.0007103	-.001053	.0001817	7.571831	-.003384	.0001252
#2	-1.07078	.0024976	-.000269	.0005097	7.582920	-.000891	.0001457
#3	-1.06525	.0014525	-.000922	.0002934	7.592431	-.000563	.0007010

Sample Name: PB166267TB Acquired: 1/28/2025 22:01:31 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: LEB267 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Li6707	Sr4077
Units	ppm	ppm	ppm
Avg	.0003049	-.002650	.0000198
Stddev	.0001056	.000985	.0000217
%RSD	34.63865	37.16999	109.3053

#1	.0002345	-.002187	.0000439
#2	.0002539	-.003781	.0000137
#3	.0004264	-.001982	.0000019

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3789.819	80825.65	11246.44	2723.458	4766.942
Stddev	2.455	246.33	22.21	3.800	14.834
%RSD	.0647894	.3047710	.1975016	.1395352	.3111785

#1	3792.247	80543.32	11253.99	2721.760	4774.940
#2	3789.874	80996.79	11221.44	2727.811	4776.060
#3	3787.337	80936.84	11263.89	2720.802	4749.826

Sample Name: Q1160-01 Acquired: 1/28/2025 22:05:39 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: YE8C9 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0097570	.0038954	.0092391	-.002621	.0018986	33.79118
Stddev	.0009959	.0052643	.0010171	.004352	.0011882	.06313
%RSD	10.20679	135.1420	11.00871	166.0137	62.58295	.1868230

#1	.0105845	.0073038	.0081320	.002122	.0021248	33.85685
#2	.0100349	-.002168	.0094532	-.006429	.0006136	33.73094
#3	.0086517	.006550	.0101322	-.003557	.0029575	33.78576

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0848198	.0066146	.0032397	127.7809	.0350632	.3100688
Stddev	.0004889	.0000336	.0000267	.3133	.0000297	.0007087
%RSD	.5764418	.5084962	.8241457	.2451478	.0846702	.2285569

#1	.0844508	.0065758	.0032094	127.8221	.0350784	.3102280
#2	.0853743	.0066355	.0032596	128.0716	.0350289	.3092940
#3	.0846341	.0066325	.0032501	127.4491	.0350821	.3106843

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2444267	22.67278	7.801851	100.6264	.4358550	-.000466
Stddev	.0019715	.05946	.017459	.1563	.0013360	.000199
%RSD	.8065968	.2622722	.2237839	.1553022	.3065237	42.82329

#1	.2437241	22.69096	7.802117	100.7067	.4357737	-.000681
#2	.2466533	22.72103	7.819176	100.7261	.4345615	-.000428
#3	.2429027	22.60635	7.784261	100.4463	.4372297	-.000288

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	8.095635	.0189991	1.321288	2.508036	.3523276	.9706987
Stddev	.259405	.0012098	.008429	.009237	.0043146	.0016213
%RSD	3.204254	6.367516	.6379029	.3682938	1.224597	.1670295

#1	8.121434	.0196896	1.319860	2.499049	.3475377	.9703889
#2	8.341177	.0176022	1.330339	2.517504	.3559093	.9692545
#3	7.824295	.0197054	1.313664	2.507554	.3535359	.9724525

Sample Name: Q1160-01 Acquired: 1/28/2025 22:05:39 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: YE8C9 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.000777	F 353.3625	F 35.28192	-.002492	.0030257	.0709411
Stddev	.000123	1.0755	.14225	.000674	.0002286	.0003266
%RSD	15.84189	.3043597	.4031896	27.06357	7.554038	.4603300

#1	-.000649	352.4776	35.26268	-.002557	.0028492	.0705782
#2	-.000894	353.0504	35.43281	-.003131	.0029440	.0712113
#3	-.000787	354.5596	35.15027	-.001787	.0032839	.0710338

Elem	Sr4077
Units	ppm
Avg	.7934738
Stddev	.0008471
%RSD	.1067576

#1	.7941725
#2	.7937173
#3	.7925316

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4117.931	88296.46	12945.28	2949.214	3986.966
Stddev	10.828	256.82	62.52	23.703	13.314
%RSD	.2629550	.2908559	.4829284	.8037105	.3339505

#1	4122.750	88380.88	12977.13	2934.286	3994.494
#2	4125.514	88008.06	12873.25	2936.812	3994.812
#3	4105.530	88500.44	12985.45	2976.546	3971.593

Sample Name: Q1160-02 Acquired: 1/28/2025 22:09:37 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: YE8C9D Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0099849	.0083704	.0109085	-.000084	.0018731	34.36482
Stddev	.0028179	.0032600	.0014638	.000218	.0000361	.13610
%RSD	28.22200	38.94697	13.41882	257.9028	1.924782	.3960573

#1	.0074267	.0058808	.0094046	-.000323	.0018315	34.51908
#2	.0095225	.0120605	.0123286	.000103	.0018926	34.26165
#3	.0130054	.0071701	.0109922	-.000032	.0018952	34.31373

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0876207	.0068741	.0033456	130.1697	.0357166	.3139562
Stddev	.0008390	.0001005	.0000435	.8396	.0005656	.0014698
%RSD	.9575574	1.461527	1.299524	.6450173	1.583604	.4681529

#1	.0884965	.0068506	.0033918	131.1258	.0356921	.3136667
#2	.0868241	.0069843	.0033055	129.5526	.0351637	.3126526
#3	.0875414	.0067875	.0033394	129.8308	.0362941	.3155492

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2520949	23.07931	8.003358	102.8908	.4404506	-.000625
Stddev	.0004296	.10940	.055528	.7836	.0021418	.000071
%RSD	.1704061	.4739974	.6938095	.7615909	.4862677	11.31566

#1	.2519818	23.19191	8.067258	103.7204	.4393972	-.000693
#2	.2525698	22.97343	7.975988	102.1631	.4390394	-.000552
#3	.2517332	23.07259	7.966829	102.7889	.4429150	-.000630

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	8.306350	.0184576	1.362461	2.493078	.3594699	.9875464
Stddev	.289231	.0012369	.010994	.032848	.0009356	.0061570
%RSD	3.482042	6.701447	.8069129	1.317563	.2602812	.6234608

#1	8.571636	.0193794	1.372267	2.508334	.3604636	.9804439
#2	7.998003	.0170519	1.364539	2.515525	.3593403	.9913706
#3	8.349411	.0189414	1.350576	2.455377	.3586059	.9908247

Sample Name: Q1160-02 Acquired: 1/28/2025 22:09:37 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: YE8C9D Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.000661	F 357.2950	F 36.52532	-.002995	.0033625	.0731782
Stddev	.000170	1.4025	.11289	.000462	.0008530	.0009655
%RSD	25.70727	.3925369	.3090818	15.40736	25.36756	1.319441

#1	-.000467	357.2192	36.61397	-.003130	.0024928	.0740836
#2	-.000730	355.9320	36.56377	-.003375	.0041977	.0721621
#3	-.000784	358.7340	36.39823	-.002482	.0033968	.0732891

Elem	Sr4077
Units	ppm
Avg	.8049442
Stddev	.0047579
%RSD	.5910822

#1	.8102070
#2	.8036780
#3	.8009474

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4076.495	87622.40	12762.61	2912.664	3941.762
Stddev	10.948	469.27	18.36	16.150	14.080
%RSD	.2685624	.5355575	.1438253	.5544691	.3571932

#1	4084.970	87084.25	12749.73	2894.468	3942.905
#2	4080.380	87946.29	12754.47	2925.300	3955.235
#3	4064.134	87836.66	12783.63	2918.222	3927.145

Sample Name: Q1160-01LX5 Acquired: 1/28/2025 22:13:35 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: YE8C9L Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0023193	.0030660	.0034102	.0005041	-.000295	7.136090
Stddev	.0022207	.0009980	.0001979	.0016610	.001435	.045306
%RSD	95.74703	32.54859	5.801820	329.4643	486.4911	.6348793

#1	-.000227	.0019335	.0031824	.0003419	-.001952	7.093488
#2	.003329	.0034479	.0035099	.0022402	.000533	7.131097
#3	.003856	.0038167	.0035384	-.001070	.000534	7.183685

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0183753	.0017524	.0006292	27.33490	.0080890	.0617358
Stddev	.0004940	.0000267	.0000672	.09036	.0002142	.0005565
%RSD	2.688328	1.521611	10.67720	.3305641	2.648395	.9014556

#1	.0189421	.0017499	.0006659	27.23921	.0082256	.0616148
#2	.0181469	.0017271	.0006701	27.34671	.0081993	.0612497
#3	.0180368	.0017802	.0005517	27.41877	.0078421	.0623429

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0542699	4.945202	1.656584	20.92098	.0874880	-.000201
Stddev	.0007568	.015475	.003862	.06852	.0002018	.000177
%RSD	1.394535	.3129260	.2331253	.3275163	.2306252	88.19626

#1	.0549997	4.927498	1.655070	20.85171	.0876233	-.000152
#2	.0534887	4.951962	1.653710	20.98872	.0872561	-.000054
#3	.0543215	4.956147	1.660974	20.92251	.0875847	-.000397

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.780698	.0044922	.2770585	.5592517	.0685807	.2459390
Stddev	.046145	.0006046	.0020378	.0238841	.0018577	.0024950
%RSD	2.591379	13.45924	.7355160	4.270718	2.708811	1.014479

#1	1.729352	.0038823	.2759258	.5330195	.0673784	.2461003
#2	1.794040	.0045031	.2794110	.5649954	.0676434	.2483494
#3	1.818701	.0050914	.2758387	.5797402	.0707204	.2433672

Sample Name: Q1160-01LX5 Acquired: 1/28/2025 22:13:35 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: YE8C9L Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.000082	F 70.30571	7.954888	-.001342	.0015372	.0151443
Stddev	.000070	.20127	.012504	.000338	.0002869	.0001591
%RSD	85.57332	.2862712	.1571819	25.20522	18.66429	1.050392

#1	-.000133	70.19855	7.954454	-.001430	.0018366	.0149649
#2	-.000109	70.18071	7.942608	-.001627	.0015104	.0152001
#3	-.000002	70.53789	7.967604	-.000968	.0012647	.0152680

Elem	Sr4077
Units	ppm
Avg	.1641490
Stddev	.0005505
%RSD	.3353427

#1	.1635981
#2	.1641499
#3	.1646990

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3713.950	78376.83	10658.98	2646.745	4293.025
Stddev	11.864	81.95	14.15	3.927	11.289
%RSD	.3194520	.1045557	.1327966	.1483884	.2629599

#1	3712.157	78458.08	10643.39	2647.968	4294.218
#2	3726.609	78378.19	10662.51	2642.351	4303.670
#3	3703.085	78294.20	10671.03	2649.915	4281.187

Sample Name: Q1160-03 Acquired: 1/28/2025 22:17:35 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: YE8C9S Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0424002	.0607961	.0303702	.0853372	.0815361	35.31000
Stddev	.0011077	.0032575	.0010670	.0007879	.0018400	.09629
%RSD	2.612395	5.358026	3.513396	.9232670	2.256683	.2726978

#1	.0436638	.0638708	.0291382	.0854581	.0799012	35.34352
#2	.0419400	.0573824	.0310025	.0844959	.0835287	35.20143
#3	.0415969	.0611350	.0309698	.0860577	.0811784	35.38504

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	1.635352	.0533390	.0569887	128.0453	.2239000	.8253892
Stddev	.003089	.0005208	.0001734	.4126	.0001418	.0008831
%RSD	.1889159	.9763619	.3043282	.3222550	.0633323	.1069886

#1	1.632569	.0536301	.0571870	128.2579	.2237454	.8253448
#2	1.634811	.0536491	.0568651	127.5697	.2239304	.8245291
#3	1.638676	.0527378	.0569140	128.3083	.2240241	.8262936

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.4565488	23.52709	8.238784	101.0338	.9598137	.0324949
Stddev	.0013339	.06794	.020158	.2176	.0024228	.0002321
%RSD	.2921617	.2887798	.2446778	.2154014	.2524221	.7142306

#1	.4550902	23.57864	8.251551	101.1308	.9594423	.0325331
#2	.4568496	23.45010	8.215545	100.7845	.9575981	.0322461
#3	.4577066	23.55254	8.249256	101.1859	.9624007	.0327056

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	7.803180	.4595987	1.723009	2.518081	.3506592	.9687824
Stddev	.179797	.0028968	.007334	.012202	.0018720	.0071436
%RSD	2.304152	.6302789	.4256280	.4845617	.5338551	.7373809

#1	7.977248	.4591471	1.719543	2.508039	.3525604	.9695792
#2	7.814136	.4626948	1.718051	2.514544	.3488178	.9754943
#3	7.618155	.4569543	1.731433	2.531661	.3505996	.9612738

Sample Name: Q1160-03 Acquired: 1/28/2025 22:17:35 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: YE8C9S Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.000874	F 351.1048	F 35.27602	-.003163	.0025212	.0702625
Stddev	.000405	.4398	.10790	.000054	.0001201	.0005405
%RSD	46.40173	.1252655	.3058659	1.717312	4.763142	.7692966

#1	-.001337	351.1857	35.31043	-.003128	.0025326	.0708716
#2	-.000583	350.6302	35.36251	-.003226	.0026351	.0700759
#3	-.000702	351.4986	35.15511	-.003135	.0023958	.0698399

Elem	Sr4077
Units	ppm
Avg	.7914218
Stddev	.0012810
%RSD	.1618642

#1	.7913661
#2	.7901696
#3	.7927298

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4121.638	88386.66	12994.63	2953.409	3993.635
Stddev	8.584	130.75	56.23	10.039	6.246
%RSD	.2082643	.1479299	.4327307	.3399177	.1563979

#1	4129.165	88435.40	13000.55	2949.275	3996.562
#2	4123.461	88486.03	12935.68	2964.855	3997.880
#3	4112.290	88238.54	13047.67	2946.097	3986.463

Sample Name: Q1160-04 Acquired: 1/28/2025 22:21:30 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: YE8D0 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.000059	.0065510	.0032340	-.002852	.0019838	36.31010
Stddev	.002761	.0009618	.0014017	.002355	.0014781	.17158
%RSD	4673.823	14.68193	43.34338	82.59480	74.51006	.4725284

#1	-.000648	.0054606	.0016305	-.000255	.0002932	36.11280
#2	.002949	.0072786	.0042267	-.003448	.0030320	36.39318
#3	-.002478	.0069139	.0038448	-.004851	.0026261	36.42433

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0831415	.0033786	.0024166	141.5855	.0392340	.3656425
Stddev	.0006616	.0000862	.0000848	.5223	.0003098	.0010993
%RSD	.7957701	2.550734	3.510725	.3688706	.7896171	.3006395

#1	.0824363	.0033706	.0024173	140.9931	.0392147	.3654701
#2	.0837486	.0032966	.0023314	141.7840	.0395530	.3646395
#3	.0832397	.0034684	.0025011	141.9794	.0389343	.3668177

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1175360	17.61194	4.500044	115.0355	.3554132	.0007124
Stddev	.0012210	.07441	.010105	.3968	.0012116	.0001218
%RSD	1.038796	.4225258	.2245566	.3449031	.3408875	17.10157

#1	.1161355	17.53433	4.488588	114.6394	.3556768	.0006812
#2	.1180959	17.61879	4.507694	115.0342	.3540916	.0006091
#3	.1183766	17.68269	4.503848	115.4329	.3564713	.0008467

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	7.137275	.0331823	.8342816	1.319661	.1427169	.4095108
Stddev	.550998	.0013268	.0048312	.014177	.0030411	.0027259
%RSD	7.720006	3.998605	.5790818	1.074278	2.130894	.6656405

#1	7.657341	.0345247	.8295873	1.334388	.1397748	.4126582
#2	6.559835	.0318716	.8392389	1.306107	.1458482	.4079702
#3	7.194649	.0331507	.8340186	1.318489	.1425277	.4079041

Sample Name: Q1160-04 Acquired: 1/28/2025 22:21:30 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: YE8D0 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.001012	F 321.2833	F 54.38498	-.003829	.0010433	.1284164
Stddev	.000509	.6033	.16778	.000730	.0004018	.0023545
%RSD	50.31172	.1877792	.3085102	19.05664	38.50705	1.833463
#1	-.000669	321.1907	54.55906	-.003814	.0011941	.1264654
#2	-.001597	320.7317	54.37158	-.003107	.0013479	.1277522
#3	-.000771	321.9276	54.22430	-.004566	.0005880	.1310316

Elem	Sr4077
Units	ppm
Avg	.7984798
Stddev	.0040101
%RSD	.5022148
#1	.7938651
#2	.8011181
#3	.8004561

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3619.361	77706.32	11225.19	2614.874	3985.400
Stddev	12.519	88.17	53.04	5.834	9.352
%RSD	.3458827	.1134619	.4724997	.2231108	.2346613
#1	3623.060	77805.60	11164.72	2621.512	3989.933
#2	3629.613	77676.20	11247.03	2612.550	3991.621
#3	3605.409	77637.15	11263.82	2610.559	3974.645

Sample Name: Q1160-05 Acquired: 1/28/2025 22:25:27 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: YE8D3 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0030874	-.011363	.0069706	.0209542	.0156385	.9659051
Stddev	.0006873	.001362	.0023444	.0032146	.0029842	.0033926
%RSD	22.26277	11.98282	33.63279	15.34129	19.08216	.3512395

#1	.0026980	-.012936	.0088091	.0244894	.0134626	.9675360
#2	.0038811	-.010599	.0043305	.0182064	.0190404	.9620049
#3	.0026832	-.010556	.0077721	.0201669	.0144125	.9681743

Elem	Ba4934	Be2348	Cd2144	Ca3736	Cr2677	Co2286
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.1174814	.0008503	.0030836	406.4894	-.001460	.0422310
Stddev	.0004523	.0001690	.0001152	3.4230	.000355	.0006748
%RSD	.3849935	19.87745	3.735293	.8420804	24.31456	1.598008

#1	.1172997	.0006838	.0031241	409.8727	-.001232	.0415567
#2	.1171482	.0010217	.0031731	406.5674	-.001869	.0422299
#3	.1179963	.0008455	.0029536	403.0281	-.001279	.0429064

Elem	Cu3247	Fe2598	Mn2576	Mg2790	Ni2316	Ag3280
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0324353	142.3597	8.287088	113.1810	.3048102	-.003523
Stddev	.0006223	.1414	.006816	.2206	.0002347	.000122
%RSD	1.918707	.0993492	.0822502	.1949229	.0769827	3.461194

#1	.0323906	142.4806	8.291139	113.4156	.3048390	-.003492
#2	.0330788	142.2042	8.290907	112.9777	.3045624	-.003658
#3	.0318366	142.3942	8.279219	113.1498	.3050290	-.003420

Elem	Na8183	V_2924	Zn2138	K_7698	P_1774	B_2496
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	3.290581	-.011401	.4627146	3.424255	.0017216	.3524340
Stddev	.356391	.001879	.0017196	.004089	.0005728	.0022048
%RSD	10.83063	16.48347	.3716250	.1194074	33.27326	.6256024

#1	3.332994	-.013339	.4610264	3.426421	.0014585	.3547407
#2	3.623867	-.009587	.4626535	3.426805	.0023787	.3503475
#3	2.914882	-.011279	.4644639	3.419539	.0013275	.3522139

Sample Name: Q1160-05 Acquired: 1/28/2025 22:25:27 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: YE8D3 Custom ID2: Custom ID3:
Comment:

Elem	Mo2020	S_1820	Si2516	Sn1899	Ti3361	Li6707
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.002070	F 377.5696	4.606108	-.003765	-.011130	.0104487
Stddev	.000150	.3822	.015443	.000847	.001085	.0008676
%RSD	7.245847	.1012141	.3352657	22.48491	9.749801	8.303453

#1	-.001967	377.3660	4.592610	-.004657	-.010864	.0112790
#2	-.002001	377.3324	4.622948	-.003667	-.010203	.0105190
#3	-.002242	378.0105	4.602766	-.002972	-.012324	.0095481

Elem	Sr4077
Units	ppm
Avg	4.461324
Stddev	.045931
%RSD	1.029546

#1	4.409822
#2	4.476108
#3	4.498043

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3483.111	75198.40	11306.35	2491.478	3757.211
Stddev	10.467	47.38	13.62	4.793	11.805
%RSD	.3005033	.0630096	.1204284	.1923814	.3141926

#1	3479.463	75185.36	11312.35	2496.950	3754.453
#2	3494.913	75158.91	11290.77	2489.463	3770.152
#3	3474.956	75250.94	11315.94	2488.021	3747.030

Sample Name: PB166267BL Acquired: 1/28/2025 22:29:45 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: PBW267 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0028171	.0013697	-.000258	.0031233	.0005619	-.004051	.0057744
Stddev	.0011465	.0033699	.001299	.0014078	.0015850	.002889	.0003801
%RSD	40.69831	246.0316	502.8939	45.07220	282.0784	71.31282	6.582604

#1	.0032477	-.000398	.001225	.0046844	.0014941	-.001108	.0060362
#2	.0036859	.005256	-.000807	.0027354	-.001268	-.006882	.0059486
#3	.0015176	-.000749	-.001194	.0019502	.001460	-.004161	.0053384

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	-.000018	-.000026	.0057151	.0000286	-.000101	-.000026	.0028930
Stddev	.000055	.000048	.0052636	.0001172	.000189	.001162	.0023876
%RSD	310.0777	184.9349	92.09891	410.1589	187.3944	4540.931	82.53146

#1	.000046	-.000079	.0104889	-.000068	-.000227	-.000542	.0042140
#2	-.000050	-.000015	.0065862	-.000005	-.000193	.001305	.0043282
#3	-.000049	.000015	.0000704	.000159	.000117	-.000840	.0001368

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0001177	-.005320	-.000555	-.000061	-.209768	.0006336	-.000327
Stddev	.0002709	.032075	.000469	.000269	.085194	.0023167	.000427
%RSD	230.1569	602.9326	84.49404	440.6264	40.61320	365.6198	130.6169

#1	.0002691	-.039753	-.001092	-.000194	-.308135	-.001965	-.000717
#2	-.000195	.000083	-.000342	-.000237	-.159652	.001382	-.000393
#3	.000279	.023711	-.000230	.000248	-.161517	.002484	.000129

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2411467	-.001498	.0007779	.0002859	.0305341	.0013913	.0000948
Stddev	.0303104	.000751	.0005887	.0002950	.0032037	.0102778	.0004254
%RSD	12.56926	50.16455	75.67472	103.1878	10.49222	738.7240	448.8750

#1	.2121675	-.001701	.0013646	-.000049	.0335433	.0061224	.0004486
#2	.2386402	-.000666	.0007817	.000507	.0271661	-.010400	-.000377
#3	.2726325	-.002127	.0001873	.000400	.0308928	.008451	.000213

Sample Name: PB166267BL Acquired: 1/28/2025 22:29:45 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: PBW267 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Li6707	Sr4077
Units	ppm	ppm	ppm
Avg	.0019379	.0009170	.0000750
Stddev	.0007305	.0012675	.0000514
%RSD	37.69431	138.2266	68.49764

#1	.0025356	-.000531	.0000654
#2	.0021544	.001458	.0001305
#3	.0011236	.001824	.0000291

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3606.457	76467.53	10564.07	2580.093	4461.661
Stddev	3.957	295.86	347.08	11.623	5.706
%RSD	.1097244	.3869063	3.285453	.4504842	.1278823

#1	3610.755	76345.18	10164.08	2566.943	4467.692
#2	3605.651	76252.47	10742.41	2588.992	4460.942
#3	3602.964	76804.93	10785.72	2584.343	4456.349

Sample Name: PB166267BS Acquired: 1/28/2025 22:33:55 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: LCS267 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0192581	.0543668	.0201406	.0702827	.1143627	.3349053	.3513750
Stddev	.0007549	.0027589	.0005431	.0009158	.0004990	.0027719	.0003101
%RSD	3.919893	5.074593	2.696495	1.303021	.4362926	.8276732	.0882605

#1	.0185196	.0572015	.0203586	.0699009	.1149224	.3337047	.3517088
#2	.0200284	.0542082	.0205408	.0696196	.1142014	.3380751	.3510957
#3	.0192264	.0516906	.0195224	.0713277	.1139644	.3329360	.3513205

Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0116081	.0105696	9.223882	.0225613	.1017724	.0533599	.1955088
Stddev	.0001248	.0001362	.024565	.0005012	.0002903	.0006522	.0008773
%RSD	1.075459	1.288521	.2663181	2.221499	.2852751	1.222331	.4487381

#1	.0115898	.0104145	9.250237	.0227562	.1014381	.0528636	.1960283
#2	.0114935	.0106244	9.201621	.0229358	.1019616	.0540986	.1960023
#3	.0117411	.0106698	9.219788	.0219919	.1019175	.0531174	.1944959

Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0296451	8.299225	.0831775	.0198510	9.632094	.1059706	.1079326
Stddev	.0001495	.047137	.0003625	.0006058	.187804	.0016114	.0007138
%RSD	.5042011	.5679682	.4357821	3.051542	1.949772	1.520660	.6613714

#1	.0298015	8.274046	.0833884	.0193061	9.807827	.1060986	.1072083
#2	.0296301	8.270023	.0827589	.0197437	9.654268	.1042989	.1086354
#3	.0295037	8.353604	.0833851	.0205033	9.434188	.1075142	.1079542

Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	8.698283	.0176447	.0009940	.0216474	.1915969	.8960091	.0145476
Stddev	.031174	.0014479	.0004176	.0001567	.0043157	.0067965	.0003640
%RSD	.3583897	8.205960	42.01402	.7240527	2.252494	.7585278	2.501981

#1	8.691636	.0165588	.0005202	.0215987	.1958402	.8973332	.0144440
#2	8.670969	.0192886	.0011528	.0218227	.1872122	.8886480	.0149522
#3	8.732244	.0170866	.0013089	.0215208	.1917384	.9020461	.0142467

Sample Name: PB166267BS Acquired: 1/28/2025 22:33:55 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: LCS267 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Li6707	Sr4077
Units	ppm	ppm	ppm
Avg	.2094522	.0262557	.1762470
Stddev	.0020223	.0004568	.0001329
%RSD	.9654939	1.739648	.0754022

#1	.2114577	.0267756	.1761765
#2	.2074136	.0259189	.1761641
#3	.2094851	.0260726	.1764002

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3641.114	76027.93	10680.62	2566.482	4399.485
Stddev	3.237	57.71	23.70	7.033	5.893
%RSD	.0889116	.0759105	.2219098	.2740190	.1339457

#1	3644.699	75968.71	10662.59	2563.384	4404.901
#2	3638.403	76084.01	10707.47	2561.530	4393.209
#3	3640.241	76031.09	10671.81	2574.531	4400.344

Sample Name: CCV027 Acquired: 1/28/2025 22:42:16 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: CCV027 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	4.907307	4.852962	25.04689	4.923128	4.884406	381.7447	9.889801
Stddev	.021109	.015244	.02200	.030312	.015037	4.0992	.135710
%RSD	.4301560	.3141181	.0878276	.6157134	.3078520	1.073803	1.372226
#1	4.894003	4.864100	25.02149	4.913387	4.875848	386.4734	10.04650
#2	4.896271	4.859197	25.05975	4.898884	4.875602	379.1984	9.81007
#3	4.931646	4.835589	25.05942	4.957113	4.901769	379.5624	9.81284
Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.5315071	2.593426	402.9040	16.14839	2.536246	15.30109	396.9716
Stddev	.0042154	.002247	2.2748	.02865	.005019	.02187	1.8215
%RSD	.7930958	.0866444	.5645929	.1774356	.1978779	.1429104	.4588594
#1	.5296009	2.591976	405.1991	16.15498	2.532764	15.30112	397.6434
#2	.5285815	2.592288	402.8627	16.17318	2.533976	15.32294	398.3618
#3	.5363388	2.596015	400.6501	16.11702	2.541999	15.27921	394.9095
Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	15.55853	402.5895	2.536807	1.293331	404.0980	2.557049	14.96040
Stddev	.09428	1.0875	.001726	.001848	1.6989	.004038	.06938
%RSD	.6059527	.2701308	.0680251	.1429016	.4204267	.1579043	.4637276
#1	15.59972	402.7039	2.535482	1.294212	404.8689	2.552935	14.97401
#2	15.62520	403.6153	2.536180	1.291208	405.2748	2.557208	15.02197
#3	15.45067	401.4493	2.538758	1.294575	402.1503	2.561006	14.88523
Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	149.9137	5.162288	5.492177	4.943637	5.043335	5.145239	5.093150
Stddev	.9426	.007876	.018226	.017596	.004460	.005813	.013087
%RSD	.6287875	.1525646	.3318554	.3559422	.0884328	.1129723	.2569543
#1	150.2443	5.167229	5.493488	4.933760	5.047757	5.140172	5.100144
#2	150.6466	5.153206	5.473330	4.933199	5.043410	5.151585	5.078051
#3	148.8503	5.166429	5.509711	4.963954	5.038838	5.143959	5.101252

Sample Name: CCV027 Acquired: 1/28/2025 22:42:16 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: CCV027 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Li6707	Sr4077
Units	ppm	ppm	ppm
Avg	5.102108	4.922893	4.974113
Stddev	.004718	.053165	.012221
%RSD	.0924690	1.079957	.2456847

#1	5.097226	4.934834	4.960027
#2	5.106643	4.969072	4.981890
#3	5.102455	4.864772	4.980422

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3009.261	63699.28	10167.84	2101.952	3252.012
Stddev	8.008	169.57	52.23	3.945	.381
%RSD	.2661168	.2662045	.5136572	.1876641	.0117145

#1	3014.846	63652.32	10193.46	2097.799	3252.422
#2	3012.851	63558.15	10202.31	2102.409	3251.668
#3	3000.086	63887.39	10107.75	2105.649	3251.948

Sample Name: CCB027 Acquired: 1/28/2025 22:46:34 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: CCB027 Custom ID2: Custom ID3:
Comment:

Elem	As1890	Tl1908	Pb2203	Se1960	Sb2068	Al3961	Ba4934
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0017893	.0016229	.0000342	-.000590	.0006056	-.001412	.0038626
Stddev	.0015817	.0001638	.0001812	.000891	.0009392	.002733	.0006957
%RSD	88.39847	10.09234	529.5868	151.1445	155.0957	193.6080	18.01204
#1	.0019816	.0018100	.0001585	-.000299	.0001813	-.004025	.0046570
#2	.0001202	.0015533	.0001179	.000120	-.000047	.001428	.0035690
#3	.0032660	.0015054	-.000174	-.001590	.001682	-.001639	.0033618
Elem	Be2348	Cd2144	Ca3736	Cr2677	Co2286	Cu3247	Fe2598
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0000193	.0000072	-.001457	.0002773	-.000161	.0005964	.0054929
Stddev	.0000910	.0000256	.007031	.0001626	.000102	.0008964	.0024699
%RSD	471.5888	353.9346	482.4714	58.64794	63.03637	150.3089	44.96529
#1	-.000055	.0000232	.006525	.0002746	-.000045	.0015385	.0026420
#2	.000121	.0000208	-.006732	.0001161	-.000204	.0004965	.0068499
#3	-.000008	-.000022	-.004165	.0004413	-.000235	-.000246	.0069869
Elem	Mn2576	Mg2790	Ni2316	Ag3280	Na8183	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.0000762	-.016223	-.000366	.0000080	-.020980	.0017934	-.001198
Stddev	.0003918	.010664	.000371	.0003223	.227716	.0024547	.001242
%RSD	513.8787	65.73629	101.3671	4008.863	1085.407	136.8772	103.5934
#1	-.000324	-.026713	.000062	.0001846	.071524	-.000959	-.000968
#2	.000459	-.016564	-.000600	-.000364	.145927	.003755	-.002539
#3	.000093	-.005392	-.000562	.000203	-.280390	.002585	-.000088
Elem	K_7698	P_1774	B_2496	Mo2020	S_1820	Si2516	Sn1899
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avg	.2883266	-.001103	.0058771	.0003109	.0056093	.0015477	.0003949
Stddev	.0322189	.001413	.0004701	.0001324	.0049761	.0033195	.0004325
%RSD	11.17443	128.0594	7.998355	42.59945	88.71028	214.4734	109.5355
#1	.2609299	-.001226	.0058107	.0003235	.0001955	.0028528	.0000471
#2	.3238222	-.002451	.0063768	.0001726	.0066492	-.002226	.0008791
#3	.2802277	.000367	.0054437	.0004366	.0099834	.004016	.0002584

Sample Name: CCB027 Acquired: 1/28/2025 22:46:34 Type: Unk
Method: EPA SFAM01.0(v58) Mode: CONC Corr. Factor: 1.000000
User: Kareem Custom ID1: CCB027 Custom ID2: Custom ID3:
Comment:

Elem	Ti3361	Li6707	Sr4077
Units	ppm	ppm	ppm
Avg	.0007146	.0011739	.0000053
Stddev	.0006064	.0014139	.0000804
%RSD	84.85741	120.4417	1512.730

#1	.0000164	.0007864	.0000957
#2	.0010185	-.000006	-.000058
#3	.0011090	.002741	-.000022

Int. Std.	Y_2243	Y_3600	Y_3710	Y_2243	In2306
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3691.909	78007.70	10866.66	2607.087	4580.001
Stddev	9.068	263.46	21.92	6.118	11.979
%RSD	.2456227	.3377371	.2017430	.2346689	.2615473

#1	3702.205	77709.07	10858.87	2600.042	4585.606
#2	3685.111	78106.77	10849.70	2611.062	4566.247
#3	3688.410	78207.27	10891.42	2610.157	4588.149

Prep Standard - Chemical Standard Summary

Order ID : Q1182
Test : TCLP ICP Metals
Prepbatch ID : PB166272,
Sequence ID/Qc Batch ID: LB134460,

Standard ID :
MP83499,MP83500,MP84041,MP84063,MP84070,MP84204,MP84206,MP84207,MP84208,MP84209,MP84210,MP84211,MP84212,MP84213,MP84214,MP84215,MP84216,MP84218,MP84219,WP 110801,WP110803,WP110804,

Chemical ID :
M5130,M5218,M5223,M5289,M5295,M5298,M5393,M5429,M5466,M5472,M5476,M5496,M5497,M5513,M5519,M5565,M5658,M5697,M5798,M5799,M5800,M5801,M5802,M5806,M5815,M5817,M5819,M5875,M5942,M5959,M5961,M5962,M5976,M5977,M5978,M5985,M5990,M6021,M6023,M6025,M6028,M6030,M6032,M6077,M 6118,M6120,M6121,M6126,M6127,M6128,M6144,W3038,W3112,W3113,

Metals STANDARD PREPARATION LOG

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
170	1:1HCL	MP83499	12/09/2024	01/30/2025	Eman Mughal	None	None	Sarabjit Jaswal
								12/09/2024

FROM 1250.00000ml of M6121 + 1250.00000ml of W3112 = Final Quantity: 2500.000 ml

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
902	ICP AES CAL BLK (SO/ICB/CCB)	MP83500	12/06/2024	01/24/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								12/09/2024

FROM 125.00000ml of M6121 + 2350.00000ml of W3112 + 25.00000ml of M6126 = Final Quantity: 2500.000 ml

Metals STANDARD PREPARATION LOG

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
169	1:1HNO3	MP84041	01/14/2025	07/14/2025	Eman Mughal	None	None	Sarabjit Jaswal
								01/16/2025

FROM 1250.00000ml of M6126 + 1250.00000ml of W3112 = Final Quantity: 2500.000 ml

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
994	ICPAES ISM01.2 S1 (CONC.)	MP84063	01/14/2025	02/14/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								01/16/2025

FROM 0.02000ml of M5815 + 0.03000ml of M5429 + 0.10000ml of M5798 + 0.10000ml of M6028 + 0.14000ml of M5799 + 0.20000ml of M5298 + 0.20000ml of M5476 + 0.20000ml of M5658 + 0.20000ml of M5801 + 0.20000ml of M5817 + 0.20000ml of M5976 + 0.20000ml of M6025 + 0.20000ml of M6030 + 0.30000ml of M6128 + 0.40000ml of M5496 + 0.50000ml of M5697 + 0.50000ml of M6023 + 0.70000ml of M5962 + 0.80000ml of M5961 + 1.00000ml of M5800 + 1.00000ml of M6021 + 1.20000ml of M5802 + 1.20000ml of M5819 + 10.00000ml of M5497 + 10.00000ml of M5519 + 10.00000ml of M5806 + 10.00000ml of M6127 + 2.00000ml of M5942 + 4.00000ml of M6032 + 34.24000ml of MP83500 = Final Quantity: 100.000 ml

Metals STANDARD PREPARATION LOG

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
921	ICPAES SPIKE SOL#6	MP84070	01/14/2025	02/14/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								01/16/2025

FROM 2.50000ml of M5962 + 50.00000ml of M5565 + 50.00000ml of M5990 + 147.50000ml of MP83500 = Final Quantity: 250.000 ml

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
902	ICP AES CAL BLK (SO/ICB/CCB)	MP84204	01/24/2025	02/24/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								01/27/2025

FROM 125.00000ml of M6121 + 2350.00000ml of W3112 + 25.00000ml of M6126 = Final Quantity: 2500.000 ml



<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
2480	ICP AES STD 6 ISM01.3	MP84206	01/24/2025	02/04/2025	Kareem Khairalla	None	None	Sarabjit Jaswal 01/27/2025
<u>FROM</u> 4.00000ml of M5289 + 4.00000ml of M5298 + 4.00000ml of M5497 + 4.00000ml of M6127 + 4.00000ml of M6144 + 30.00000ml of MP84204 = Final Quantity: 50.000 ml								

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1004	ICPAES ISM01.2 (S5)	MP84207	01/24/2025	02/04/2025	Kareem Khairalla	None	None	Sarabjit Jaswal 01/27/2025
<u>FROM</u> 0.25000ml of M5798 + 0.50000ml of M5429 + 0.50000ml of M5476 + 0.50000ml of M5815 + 0.50000ml of M5817 + 12.50000ml of M5519 + 12.50000ml of M5819 + 12.50000ml of M6128 + 12.50000ml of M6144 + 13.75000ml of M5697 + 14.50000ml of M5298 + 14.50000ml of M5496 + 14.50000ml of M5658 + 2.00000ml of M5513 + 22.50000ml of M5497 + 22.50000ml of M6127 + 5.00000ml of M5393 + 5.00000ml of M5802 + 5.00000ml of M5875 + 5.00000ml of M6077 + 303.50000ml of MP84204 = Final Quantity: 500.000 ml								

Metals STANDARD PREPARATION LOG

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1005	ICPAES ISM01.2(S4)	MP84208	01/24/2025	02/04/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								01/27/2025

FROM 250.00000ml of MP84204 + 250.00000ml of MP84207 = Final Quantity: 500.000 ml

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1007	ICPAES ISM01.2(S3)	MP84209	01/24/2025	02/04/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								01/27/2025

FROM 25.00000ml of MP84207 + 75.00000ml of MP84204 = Final Quantity: 100.000 ml

Metals STANDARD PREPARATION LOG

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1008	ICPAES ISM01.2(S2)	MP84210	01/24/2025	02/04/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								01/27/2025

FROM 12.50000ml of MP84207 + 87.50000ml of MP84204 = Final Quantity: 100.000 ml

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
994	ICPAES ISM01.2 S1 (CONC.)	MP84211	01/24/2025	02/04/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								01/27/2025

FROM 0.02000ml of M5815 + 0.03000ml of M5429 + 0.10000ml of M5798 + 0.10000ml of M6028 + 0.14000ml of M5799 + 0.20000ml of M5298 + 0.20000ml of M5476 + 0.20000ml of M5658 + 0.20000ml of M5801 + 0.20000ml of M5817 + 0.20000ml of M5977 + 0.20000ml of M6025 + 0.20000ml of M6030 + 0.30000ml of M6128 + 0.40000ml of M5496 + 0.50000ml of M5697 + 0.50000ml of M6023 + 0.70000ml of M5962 + 0.80000ml of M5961 + 1.00000ml of M5800 + 1.00000ml of M6021 + 1.20000ml of M5802 + 1.20000ml of M5819 + 10.00000ml of M5497 + 10.00000ml of M5519 + 10.00000ml of M6127 + 10.00000ml of M6144 + 2.00000ml of M5978 + 4.00000ml of M6032 + 34.24000ml of MP84204 = Final Quantity: 100.000 ml

Metals STANDARD PREPARATION LOG

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1003	ICPAES ISM01.2 S1	MP84212	01/24/2025	02/04/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								01/27/2025

FROM 0.50000ml of MP84211 + 99.50000ml of MP84204 = Final Quantity: 100.000 ml

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
912	ICP AES ICV SOLN	MP84213	01/24/2025	02/05/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								01/27/2025

FROM 0.02500ml of M5429 + 0.02500ml of M5815 + 0.02500ml of M5817 + 0.10000ml of M5466 + 0.25000ml of M5218 + 0.25000ml of M5472 + 10.00000ml of M5295 + 89.77500ml of MP84204 = Final Quantity: 100.000 ml

Metals STANDARD PREPARATION LOG

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
904	ICP AES ICSA SOLN	MP84214	01/24/2025	01/31/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								01/27/2025

FROM 25.00000ml of M5130 + 225.00000ml of MP84204 = Final Quantity: 250.000 ml

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
905	ICP AES ICSAB SOLN	MP84215	01/24/2025	01/31/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								01/27/2025

FROM 25.00000ml of M5130 + 25.00000ml of M5223 + 200.00000ml of MP84204 = Final Quantity: 250.000 ml



<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1119	ICPAES ISM01.2(CCV)	MP84216	01/24/2025	02/04/2025	Kareem Khairalla	None	None	Sarabjit Jaswal 01/27/2025
FROM 0.75000ml of M5497 + 0.75000ml of M6127 + 1.22500ml of M5496 + 1.25000ml of M5298 + 1.25000ml of M6144 + 19.77500ml of MP84204 + 25.00000ml of MP84207 = Final Quantity: 50.000 ml								

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
919	ICP AES INTERNAL STD	MP84218	01/24/2025	02/24/2025	Kareem Khairalla	None	None	Sarabjit Jaswal 01/27/2025
FROM 1.00000ml of M5959 + 10.00000ml of M5985 + 1969.00000ml of W3112 + 20.00000ml of M6126 = Final Quantity: 2000.000 ml								

Metals STANDARD PREPARATION LOG

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
903	ICP AES RINSE SOLN	MP84219	01/24/2025	02/24/2025	Kareem Khairalla	None	None	Sarabjit Jaswal
								01/27/2025

FROM 200.00000ml of M6126 + 9800.00000ml of W3112 = Final Quantity: 10000.000 ml

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
83	TCLP Fluid#1	WP110801	11/21/2024	05/21/2025	Jignesh Parikh	WETCHEM_S CALE_8 (WC SC-7)	None	Iwona Zarych
								11/21/2024

FROM 114.00000ml of W3038 + 19834.00000ml of W3112 + 52.00000gram of W3113 = Final Quantity: 20000.000 ml

Wet Chemistry STANDARD PREPARATION LOG

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1789	HCL for TCLP, 1N	WP110803	11/21/2024	05/09/2025	Jignesh Parikh	None	None	Iwona Zarych
								11/21/2024

FROM 83.00000ml of M6118 + 917.00000ml of W3112 = Final Quantity: 1000.000 ml

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1788	HNO3 for TCLP, 1N	WP110804	11/21/2024	05/13/2025	Jignesh Parikh	None	None	Iwona Zarych
								11/21/2024

FROM 64.00000ml of M6120 + 936.00000ml of W3112 = Final Quantity: 1000.000 ml

CHEMICAL RECEIPT LOG BOOK

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
EPA	PART A / ICSA (ICP) STOCK SOLN	ICSA-1211	01/31/2025	05/20/2024 / jaswal	04/20/2021 / bin	M5130

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CHEM-QC-4 / CHEM-QC-4, Second Source, 1000 ug/ml, B, Mo, Si, Sn, Ti	S2-MEB711674	11/02/2026	07/01/2022 / bin	09/10/2021 / bin	M5218

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
EPA	PART B / ICSAB (ICP) STOCK SOLN	ICSB-0710	01/31/2025	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.	58113 / Aluminum (Al) 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	02/05/2025	08/07/2024 / jaswal	04/20/2021 / bin	M5295

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58126 / Fe, 10000 PPM, 500 ml	020422	02/04/2025	05/02/2023 / jaswal	06/15/2022 / jaswal	M5298

CHEMICAL RECEIPT LOG BOOK

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	10/12/2022 / bin	09/19/2022 / bin	M5393

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57103 / Li, 10000 PPM, 125 ml	070622	07/06/2025	01/30/2023 / bin	01/26/2023 / bin	M5429

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57058 / Cerium, 1000PPM, 100ML	061322	06/13/2025	03/06/2023 / bin	03/01/2023 / bin	M5466

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57038 / Sr, 1000 PPM, 125 ml	082922	08/29/2025	01/14/2025 / Jaswal	03/16/2023 / jaswal	M5472

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	07/29/2024 / jaswal	03/16/2023 / jaswal	M5476

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58113 / Al, 10000 PPM, 500 ml	011623	01/16/2026	08/15/2023 / jaswal	03/17/2023 / bin	M5496

CHEMICAL RECEIPT LOG BOOK

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58120 / Ca, 10000 PPM, 500 ml	031523	03/15/2026	03/18/2023 / bin	03/17/2023 / bin	M5497

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 #
Absolute Standards, Inc.	57119 / Potassium (K) 10,000PPM	120822	12/08/2025	01/08/2024 / bin	03/17/2023 / bin	M5519

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CLPP-SPK-1 / SOIL/WATER SPIKE SOLN 1, 125mL	T2-MEB721963	07/27/2027	05/30/2023 / jaswal	05/26/2023 / jaswal	M5565

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

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58029 / Cu, 1000 PPM, 500 ml	102523	10/25/2026	04/03/2024 / jaswal	10/27/2023 / jaswal	M5697

CHEMICAL RECEIPT LOG BOOK

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57004 / Be, 1000 PPM, 125 ml	102523	10/25/2026	02/09/2024 / bin	02/09/2024 / bin	M5798

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57050 / Sn, 1000 PPM, 125 ml	071123	07/11/2026	02/09/2024 / bin	02/09/2024 / bin	M5799

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57027 / CO, 1000 PPM, 125 ml	091923	09/19/2026	05/31/2024 / bin	02/09/2024 / bin	M5800

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57033 / As, 1000 PPM, 125 ml	111323	11/13/2026	02/09/2024 / bin	02/09/2024 / bin	M5801

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	120523	12/05/2026	08/07/2024 / jaswal	01/03/2024 / jaswal	M5802

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58111 / Na, 10000 PPM, 500 ml	122223	12/22/2026	08/01/2024 / Jaswal	01/03/2024 / jaswal	M5806

CHEMICAL RECEIPT LOG BOOK

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

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

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
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 #
Inorganic Ventures	CGT11-1 / TITANIUM 125mL 1000ug/mL	T2-TI719972	06/17/2027	06/18/2024 / Jaswal	02/22/2024 / Jaswal	M5942

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	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

CHEMICAL RECEIPT LOG BOOK

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	041124	04/11/2027	07/02/2024 / Jaswal	06/11/2024 / Jaswal	M5961

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

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CGMO1-1 / MOLYBDENUM 125mL 1000ug/mL	T2-MO720876	07/17/2027	08/07/2024 / jaswal	02/22/2024 / Jaswal	M5976

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CGMO1-1 / MOLYBDENUM 125mL 1000ug/mL	T2-MO720876	07/17/2027	01/16/2025 / JANVI	02/22/2024 / Jaswal	M5977

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CGT11-1 / TITANIUM 125mL 1000ug/mL	T2-TI719972	06/17/2027	08/07/2024 / jaswal	02/22/2024 / Jaswal	M5978

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CGIN10-5 / INDIUM 1 x 500 ml	U2-IN729349	02/21/2028	10/08/2024 / Jaswal	06/14/2024 / Jaswal	M5985

CHEMICAL RECEIPT LOG BOOK

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	CLPP-SPK-5 / CLP Spike Standard 5	V2-MEB742037	03/12/2029	10/04/2024 / Jaswal	02/22/2024 / Jaswal	M5990

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

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

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

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57048 / Cd, 1000 PPM, 125 ml	070124	07/01/2027	08/05/2024 / kareem	08/05/2024 / Jaswal	M6028

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	57047 / Ag, 1000 PPM, 125 ml	122823	12/28/2026	08/05/2024 / kareem	08/05/2024 / Jaswal	M6030

CHEMICAL RECEIPT LOG BOOK

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

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Inorganic Ventures	Z9651Q / CHEM-CLP-4/.25L	V2-MEB746762	09/06/2029	01/23/2025 / kareem	09/19/2024 / kareem	M6077

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	BA-9530-33 / Hydrochloric Acid, Instra-Analyzed (cs/6x2.5L)	22E1662006	05/09/2025	11/09/2024 / Janvi	10/09/2024 / Janvi	M6118

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)	2310662003	05/13/2025	11/13/2024 / Eman	10/13/2024 / Eman	M6120

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)	0000275677	05/13/2025	11/13/2024 / Eman	10/13/2024 / Eman	M6121

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	06/03/2025	12/03/2024 / Janvi	11/12/2024 / Janvi	M6126

CHEMICAL RECEIPT LOG BOOK

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	112124	11/21/2027	01/13/2025 / kareem	01/13/2025 / kareem	M6127

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58025 / Mn, 1000 PPM, 500 ml	101124	10/11/2027	01/13/2025 / kareem	01/13/2025 / kareem	M6128

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Absolute Standards, Inc.	58111 / Na, 10000 PPM, 500 ml	072424	07/24/2027	01/23/2025 / kareem	01/13/2025 / Jaswal	M6144

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
PCI Scientific Supply, Inc.	PC01050-3 / ACETIC ACID, GLACIAL, ACS, 2.5L	511115	06/19/2028	06/20/2023 / jignesh	06/19/2023 / jignesh	W3038

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

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
PCI Scientific Supply, Inc.	PC19510-7 / Sodium Hydroxide Pellets 12 Kg	23B1556310	12/31/2025	07/08/2024 / lwona	07/08/2024 / lwona	W3113

Certificate of Analysis

R: 02/22/24 M5986, M5987, M5988, M5989, M5990

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1.0 ACCREDITATION / REGISTRATION

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



2.0 PRODUCT DESCRIPTION

Product Code: Multi Analyte Custom Grade Solution
 Catalog Number: CLPP-SPK-5
 Lot Number: V2-MEB742037
 Matrix: 5% (v/v) HNO₃
 Value / Analyte(s):
 100 µg/mL ea:
 Antimony,
 50 µg/mL ea:
 Selenium, Thallium,
 Cadmium,
 40 µg/mL ea:
 Arsenic,
 20 µg/mL ea:
 Lead

3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE	CERTIFIED VALUE	ANALYTE	CERTIFIED VALUE
Antimony, Sb	100.0 ± 0.7 µg/mL	Arsenic, As	40.00 ± 0.26 µg/mL
Cadmium, Cd	49.99 ± 0.22 µg/mL	Lead, Pb	19.99 ± 0.09 µg/mL
Selenium, Se	50.00 ± 0.23 µg/mL	Thallium, Tl	50.00 ± 0.22 µg/mL

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

Assay Information:

ANALYTE	METHOD	NIST SRM#	SRM LOT#
As	ICP Assay	3103a	100818
Cd	ICP Assay	3108	130116
Cd	EDTA	928	928
Cd	Calculated		See Sec. 4.2
Pb	ICP Assay	3128	101026
Pb	EDTA	928	928
Pb	Calculated		See Sec. 4.2
Sb	ICP Assay	3102a	140911
Se	ICP Assay	3149	100901
Se	Calculated		See Sec. 4.2
Tl	ICP Assay	3158	151215
Tl	Calculated		See Sec. 4.2

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

Characterization of CRM/RM by Two or More Methods

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

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

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

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

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

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

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

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

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

X_a = mean of Assay Method A with

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

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

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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

N/A

6.0 INTENDED USE

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

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

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

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

8.0 HAZARDOUS INFORMATION

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

9.0 HOMOGENEITY

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

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

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

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

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

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

March 12, 2024

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

11.2 Lot Expiration Date

- **March 12, 2029**

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

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

11.3 Period of Validity

- Sealed TCT Bag Open Date: _____

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

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Joseph Burns
Custom VS Manager



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director





CERTIFIED WEIGHT REPORT:

Part Number:	57056	Lot #	
Lot Number:	010924	Solvent:	Nitric Acid
Description:	Barium (Ba)		
Expiration Date:	010927	2%	40.0 (mL)
Recommended Storage:	Ambient (20 °C)		Nitric Acid
Nominal Concentration (µg/mL):	1000		
NIST Test Number:	6UTB	5E-05	Balance Uncertainty
Weight shown below was diluted to (mL):	2000.02	0.058	Flask Uncertainty

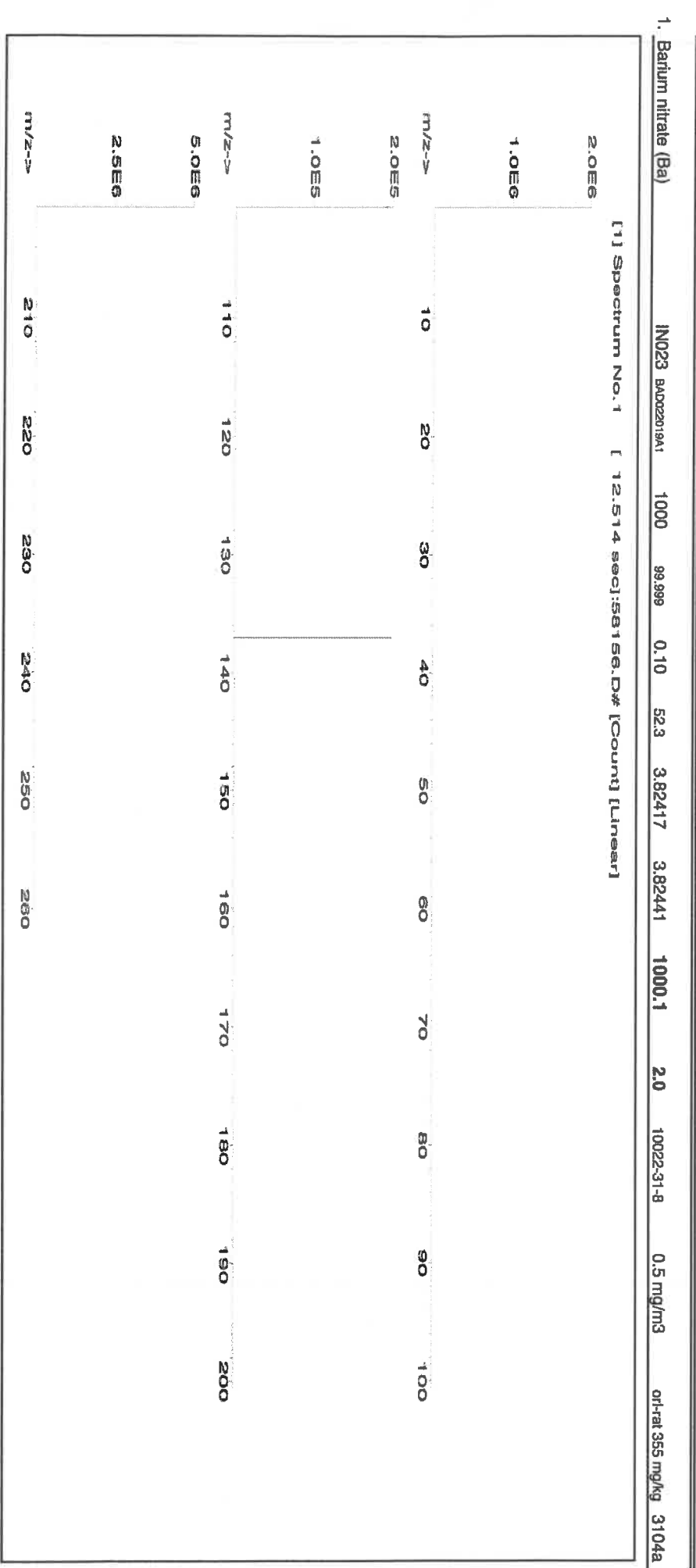
Formulated By: Giovanni Esposito

010924

Reviewed By: Pedro L. Renteria

010924

SDS Information									
Compound	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)
1. Barium nitrate (Ba)	IN023	BA0022019A1	1000	99.999	0.10	52.3	3.82417	3.82441	1000.1





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

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

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

(T) = Target analyte

Physical Characterization:

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

Certified by:

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



CERTIFIED WEIGHT REPORT:

Part Number:
Lot Number:
Description:

57048
070124
Cadmium (Cd)

Solvent: 24002546 Nitric Acid

Lot #

2% 40.0 Nitric Acid (mL)

Expiration Date: 070127

Recommended Storage: Ambient (20 °C)

Nominal Concentration (µg/mL): 1000

NIST Test Number: 6UTB

SE-05 Balance Uncertainty

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

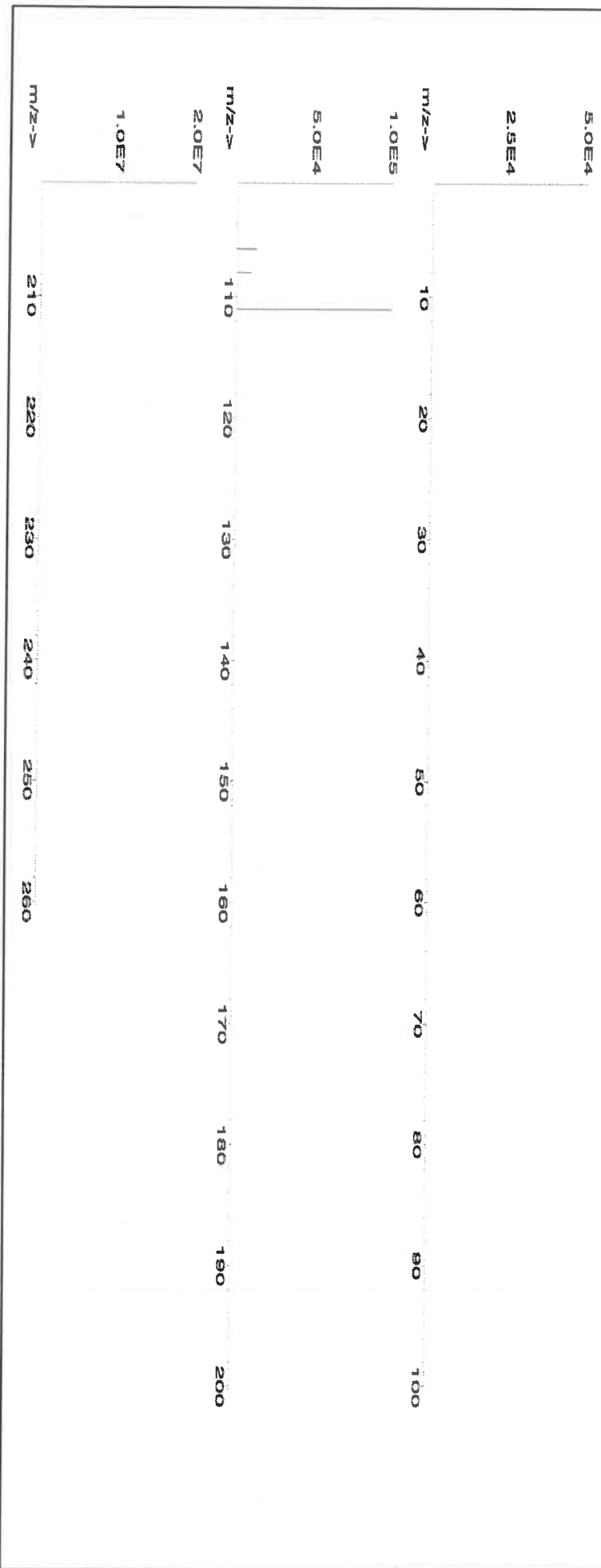
<i>Aleah O'Brady</i>	
Formulated By:	Aleah O'Brady
	070124
<i>Pedro L. Rentas</i>	
Reviewed By:	Pedro L. Rentas
	070124

SDS Information

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

1. Cadmium nitrate tetrahydrate (Cd) IN024 CDM09221A1 1000 99.999 0.10 36.5 5.4797 5.4804 1000.1 2.0 10022-68-1 0.01 mg/m3 orl-rat 60.2mg/kg 3108

[1] Spectrum No.1 [12.514 sec]:\$8148.D# [Count] [Linear]





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

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

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

(T) = Target analyte

Physical Characterization:

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

Certified by:

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



Refine your results. Redefine your industry.

Certificate of Analysis

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1.0 ACCREDITATION / REGISTRATION

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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) HNO ₃	
Value / Analyte(s):	5 000 µg/mL ea:	Potassium, Sodium,
	Calcium, Magnesium,	
	2 000 µg/mL ea:	Barium,
	Aluminum,	
	1 000 µg/mL ea:	
	Iron,	
	500 µg/mL ea:	Vanadium, Cobalt,
	Nickel,	
	Zinc,	
	Manganese,	
	250 µg/mL ea:	Copper,
	Silver,	
	200 µg/mL ea:	
	Chromium,	
	50 µg/mL ea:	
	Beryllium	

3.0 CERTIFIED VALUES AND UNCERTAINTIES

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

Density: 1.118 g/mL (measured at 20 ± 4 °C)

Assay Information:

ANALYTE	METHOD	NIST SRM#	SRM LOT#
Ag	ICP Assay	3151	160729
Ag	Volhard	999c	999c
Al	ICP Assay	3101a	140903
Al	EDTA	928	928
Ba	ICP Assay	3104a	140909
Ba	Gravimetric		See Sec. 4.2
Be	ICP Assay	3105a	090514
Be	Calculated		See Sec. 4.2
Ca	ICP Assay	3109a	130213
Ca	EDTA	928	928
Co	ICP Assay	3113	190630
Co	EDTA	928	928
Cr	ICP Assay	3112a	170630
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

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

Characterization of CRM/RM by Two or More Methods

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

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

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

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

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

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

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

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

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

X_a = mean of Assay Method A with

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

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

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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

N/A

6.0 INTENDED USE

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

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

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

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

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

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

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

8.0 HAZARDOUS INFORMATION

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

9.0 HOMOGENEITY

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

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

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

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

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- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

January 27, 2022

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

11.2 Lot Expiration Date

- **January 27, 2027**

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

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

11.3 Period of Validity

- Sealed TCT Bag Open Date: _____

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

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Thomas Kozikowski
Manager, Quality Control



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director





Refine your results. Redefine your industry.

Certificate of Analysis

300 Technology Drive
Christiansburg, VA 24073 USA
inorganicventures.com

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

1.0 ACCREDITATION / REGISTRATION

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



2.0 PRODUCT DESCRIPTION

Product Code: Multi Analyte Custom Grade Solution
Catalog Number: CLPP-CAL-3
Lot Number: T2-MEB714159
Matrix: 7% (v/v) HNO₃
Value / Analyte(s):
1 000 µg/mL ea:
Arsenic, Lead,
Selenium, Thallium,
500 µg/mL ea:
Cadmium

3.0 CERTIFIED VALUES AND UNCERTAINTIES

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

Density: 1.043 g/mL (measured at 20 ± 4 °C)

Assay Information:

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

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

Characterization of CRM/RM by Two or More Methods

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

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

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

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

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

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

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

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

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

X_a = mean of Assay Method A with

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

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

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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

N/A

6.0 INTENDED USE

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

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

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

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

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

8.0 HAZARDOUS INFORMATION

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

9.0 HOMOGENEITY

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

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

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

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

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

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

January 13, 2022

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

11.2 Lot Expiration Date

- **January 13, 2027**

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

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

11.3 Period of Validity

- Sealed TCT Bag Open Date: _____

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

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Thomas Kozikowski
Manager, Quality Control



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director





Certified Reference Material CRM



CERTIFIED WEIGHT REPORT:

Part Number:
Lot Number:
Description:

57182
110923
Lead (Pb)

Lot #
Solvent: 24002546 Nitric Acid

2% 40.0 (mL) Nitric Acid

Expiration Date:

110926

Recommended Storage:
Ambient (20 °C)

Nominal Concentration (µg/mL):

10000

NIST Test Number:

6UTB

Weight shown below was diluted to (mL):

2000.02

5E-05 Balance Uncertainty
0.058 Flask Uncertainty

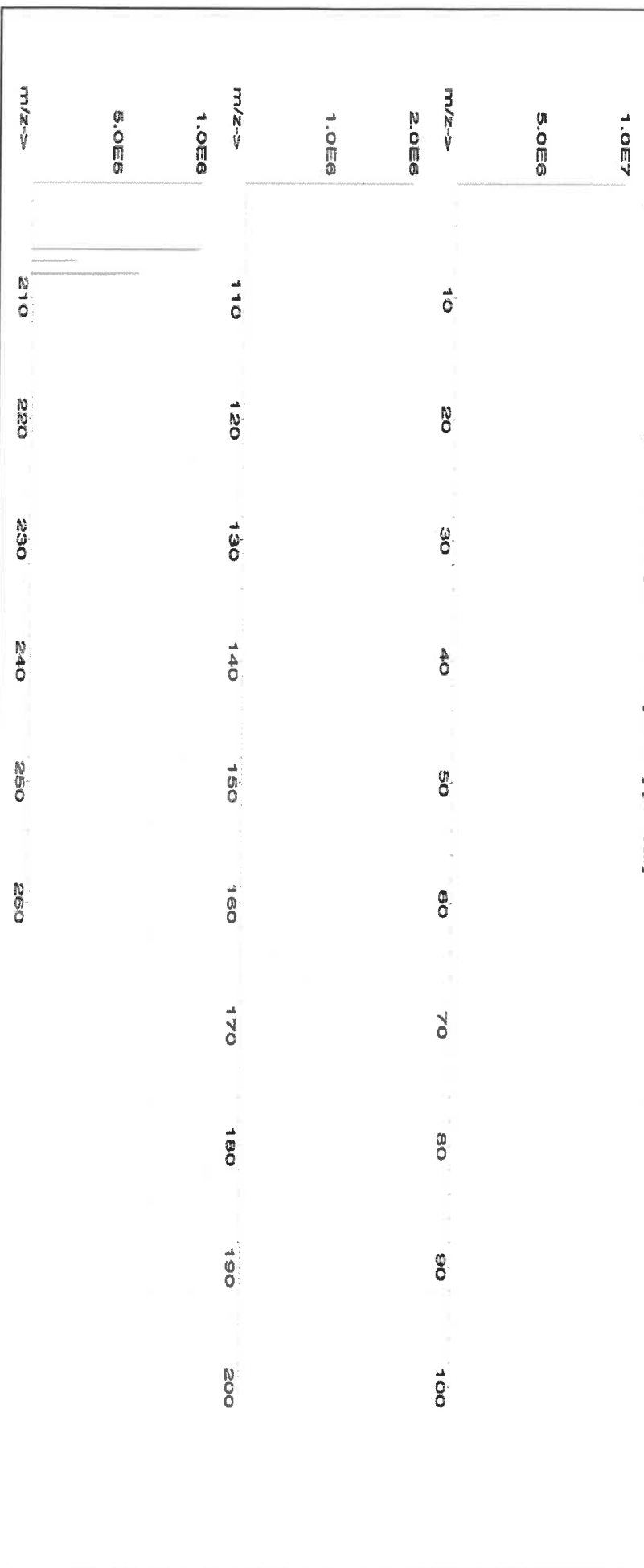
Formulated By:	Lawrence Barry
Reviewed By:	Pedro L. Rentas
110923	

Compound

RM#	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty Purity (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
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1. Lead(II) nitrate (Pb) IN029 PED12016A1 10000 99.999 0.10 62.5 32.0006 32.0040 10001.1 20.0 10099-74-8 0.05 mg/m3 Inhalant rat 83 mg/kg 3128

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





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

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

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

Physical Characterization:

(T)= Target analyte

Certified by:

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

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



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".**

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

(B) BREAKAGE OR MISSING ITEMS

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

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

(C) ANALYSIS OF SAMPLES

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



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
Co	50	(0.0)	-50.0	50.0	476	404	548
Cu	25	(2.0)	-23.0	27.0	511	434	588
Fe	100	101000	85600	116500	99300	84400	114500
Pb	10	(0.0)	-10.0	10.0	(49.0)	39.0	59.0
Mg	5000	255000	216000	294000	248000	210000	286000
Mn	15	(7.0)	-8.0	22.0	507	430	584
Ni	40	(2.0)	-38.0	42.0	954	810	1100
Se	35	(0.0)	-35.0	35.0	(46.0)	11.0	81.0
Ag	10	(0.0)	-10.0	10.0	201	170	232
Tl	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

ICSB
M5219
M5220
M5221
M5222
M5223

The acceptance ranges for all analytes in parentheses in the above table were determined using the listed certified value ± 1 times the associated CLP SOW CRQL. The acceptance ranges for all other analytes were determined using the certified value ± 15 percent of the listed certified value.

Certificate of Analysis

300 Technology Drive
 Christiansburg, VA 24073 USA
 inorganicventures.com

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1.0 ACCREDITATION / REGISTRATION

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2.0 PRODUCT DESCRIPTION

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

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

3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE	CERTIFIED VALUE	ANALYTE	CERTIFIED VALUE
Boron, B	1 000 ± 7 µg/mL	Molybdenum, Mo	1 000 ± 5 µg/mL
Silicon, Si	1 000 ± 7 µg/mL	Tin, Sn	1 000 ± 5 µg/mL
Titanium, Ti	1 001 ± 6 µg/mL		

Density: 1.032 g/mL (measured at 20 ± 4 °C)

Assay Information:

ANALYTE	METHOD	NIST SRM#	SRM LOT#
B	ICP Assay	3107	110830
Mo	ICP Assay	3134	130418
Si	ICP Assay	3150	130912
Sn	ICP Assay	3161a	140917
Ti	ICP Assay	3162a	130925

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

Characterization of CRM/RM by Two or More Methods

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

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

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

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

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

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

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

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

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

X_a = mean of Assay Method A with

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

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

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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

N/A

6.0 INTENDED USE

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

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

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

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

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

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

8.0 HAZARDOUS INFORMATION

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

9.0 HOMOGENEITY

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

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

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

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

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

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

November 02, 2021

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

11.2 Lot Expiration Date

- **November 02, 2026**

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

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

11.3 Period of Validity

- Sealed TCT Bag Open Date: _____

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

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Michael Booth
Director, Quality Control



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director





Instructions for QATS Reference Material: ICP-AES ICS

**QATS LABORATORY INORGANIC REFERENCE MATERIAL
INTERFERENCE CHECK SAMPLE SET FOR ICP-AES (ICSA WITH ICSB)**

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

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

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

Contains Heavy Metals
HAZARDOUS MATERIAL

Safety Data Sheets
Available Upon Request

(A) SAMPLE DESCRIPTION

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

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

(B) BREAKAGE OR MISSING ITEMS

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

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

(C) ANALYSIS OF SAMPLES

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





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
Co	50	(0.0)	-50.0	50.0	476	404	548
Cu	25	(2.0)	-23.0	27.0	511	434	588
Fe	100	101000	85600	116500	99300	84400	114500
Pb	10	(0.0)	-10.0	10.0	(49.0)	39.0	59.0
Mg	5000	255000	216000	294000	248000	210000	286000
Mn	15	(7.0)	-8.0	22.0	507	430	584
Ni	40	(2.0)	-38.0	42.0	954	810	1100
Se	35	(0.0)	-35.0	35.0	(46.0)	11.0	81.0
Ag	10	(0.0)	-10.0	10.0	201	170	232
Tl	25	(0.0)	-25.0	25.0	(108)	83.0	133
V	50	(0.0)	-50.0	50.0	491	417	565
Zn	60	(0.0)	-60.0	60.0	952	809	1095

The acceptance ranges for all analytes in parentheses in the above table were determined using the listed certified value ± 1 times the associated CLP SOW CRQL. The acceptance ranges for all other analytes were determined using the certified value ± 15 percent of the listed certified value.

ICSA
M5126
M5127
M5128
M5129
M5130

ICSB
M5219
M5220
M5221
M5222
M5223



M5289 R: 07/12/22
Certified Reference Material CRM

34



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

CERTIFIED WEIGHT REPORT:

Part Number: 58113
Lot Number: 070622
Description: Aluminum (Al)

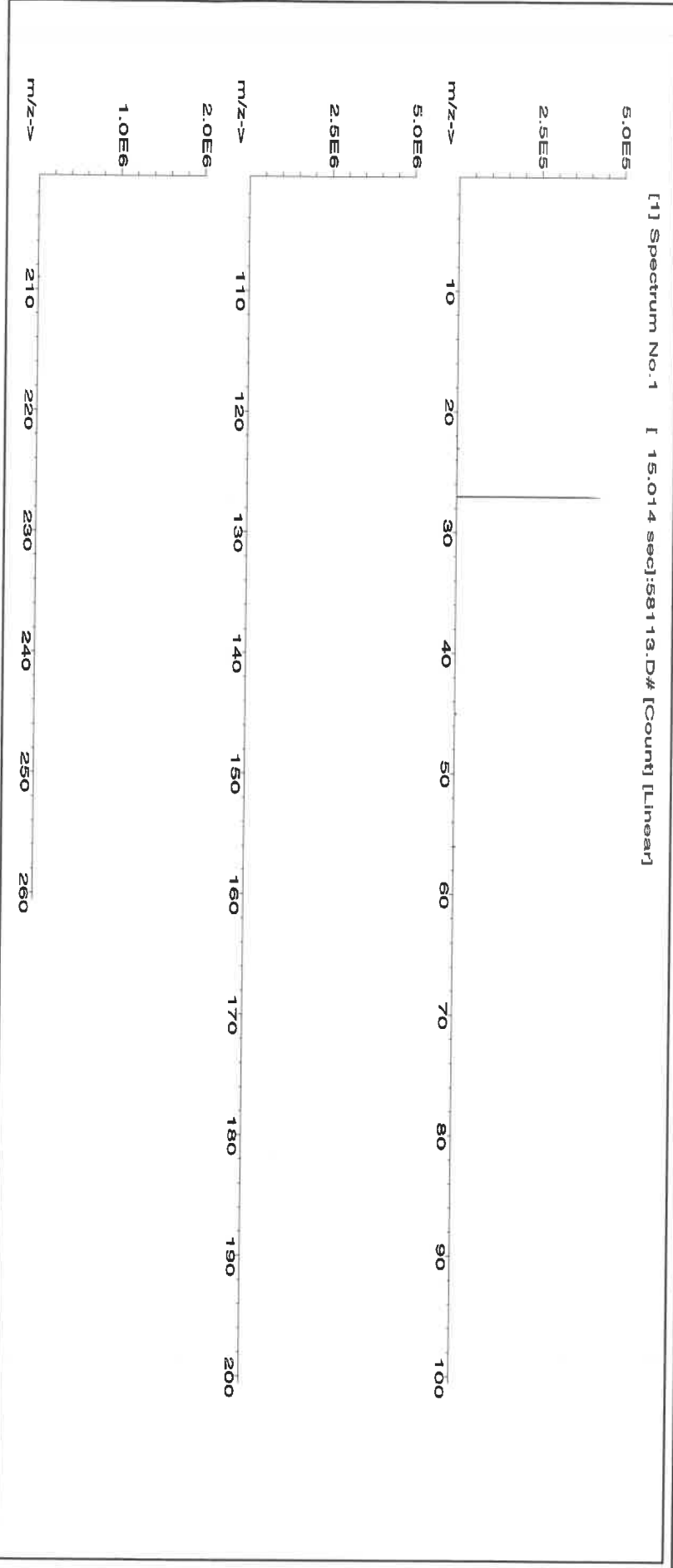
Lot #
Solvent: 20370011 Nitric Acid

Expiration Date: 070625
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 10000
NIST Test Number: 6UTB
Weight shown below was diluted to (mL): 2000.02
5E-05 Balance Uncertainty
0.058 Flask Uncertainty

Formulated By:	Lawrence Barry
070622	
Reviewed By:	Pedro L. Renteria
070622	

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

1. Aluminum nitrate nonahydrate (Al) IN022 ALD012021A1 10000 99.999 0.10 7.10 281.6956 281.6977 10000.1 20.0 7784-27-2 2 mg/m3 or-tal 3671 mg/kg 3101a





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

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

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

(T) = Target analyte

Physical Characterization:

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

Certified by:

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



R: 4/20/21

Instructions for QATS Reference Material: *Inorganic ICV Solutions*

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

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

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

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

M5291
M5292
M5293
M5294
M5295

(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% (v/v) nitric acid.





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) $K_2Cr_2O_7$ 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 $K_3Fe(CN)_6$, 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
Tl	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



Certified Reference Material CRM

CERTIFIED WEIGHT REPORT:

Part Number:
Lot Number:
Description:

58126
020422
Iron (Fe)

Lot #

Solvent: 20370011 Nitric Acid

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

020425
Ambient (20 °C)
10000
6UTB
5E-05 Balance Uncertainty
0.058 Flask Uncertainty

5.0%
150.0
(mL)
Nitric Acid

Weight shown below was diluted to (mL): 3000.41

Giovanni Esposito	
Formulated By:	Giovanni Esposito 020422
Pedro L. Rentas	
Reviewed By:	Pedro L. Rentas 020422

SDS Information

Expanded
Uncertainty
+/- (µg/mL)

(Solvent Safety Info. On Attached pg.)
LD50

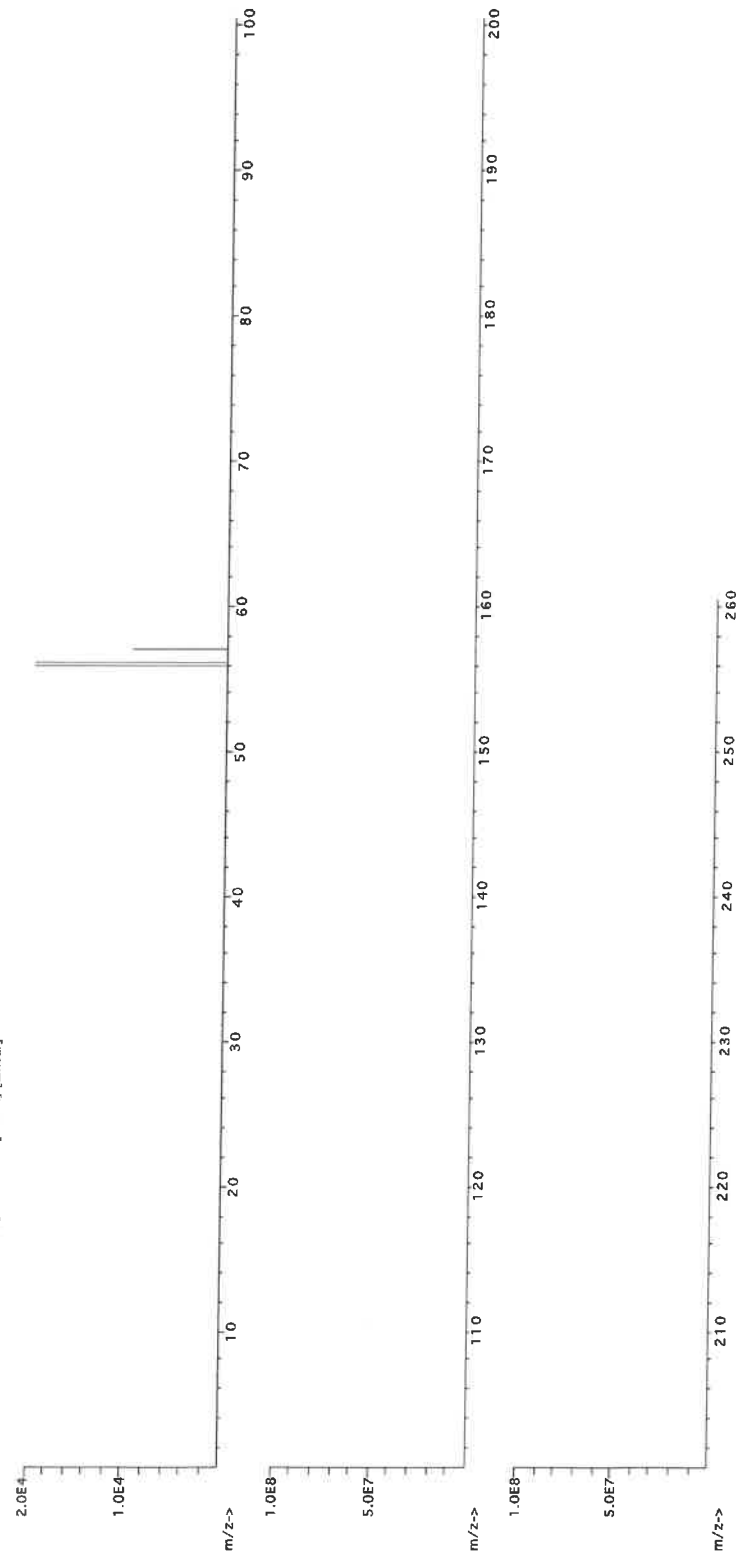
CAS# OSHA PEL (TWA)

NIST
SRM

Compound

1. Iron(III) nitrate nonahydrate (Fe) IN346 221035107 10000 99.999 0.10 100.0 30.0044 30.0090 10001.5 20.0 7782-61-8 5 mg/m3 or-hat 7500mg/kg 3126a

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





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

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

Al	<0.02	Cd	<0.02	Dy	<0.02	Hf	<0.02	Li	<0.02	Ni	<0.10	Pr	<0.02	Se	<0.2	Tb	<0.02	W	<0.02
Sb	<0.02	Ca	<0.2	Er	<0.02	Ho	<0.02	Lu	<0.02	Nb	<0.02	Re	<0.02	Si	<0.02	Te	<0.02	U	<0.02
As	<0.2	Ce	<0.02	Eu	<0.02	In	<0.02	Mg	<0.01	Os	<0.02	Rh	<0.02	Ag	<0.02	Tl	<0.02	V	<0.02
Ba	<0.02	Cs	<0.02	Gd	<0.02	Ir	<0.10	Mn	<0.10	Pd	<0.02	Rb	<0.02	Na	<0.2	Th	<0.02	Yb	<0.02
Be	<0.01	Cr	<0.5	Ga	<0.2	Fe	<0.2	Hg	<0.2	P	<0.02	Ru	<0.02	Sr	<0.02	Tm	<0.02	Y	<0.02
Bi	<0.02	Co	<0.10	Ge	<0.02	La	<0.10	Mo	<0.02	Pt	<0.02	Sm	<0.02	S	<0.02	Sn	<0.02	Zn	<0.02
B	<0.02	Cu	<0.10	Au	<0.02	Pb	<0.02	Nd	<0.02	K	<0.2	Sc	<0.02	Ta	<0.02	Ti	<0.02	Zr	<0.02

(T)= Target analyte

Physical Characterization:

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

Certified by:

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



Certified Reference Material CRM

M5429 R1 0126/23 (B)

CERTIFIED WEIGHT REPORT:

Part Number:
Lot Number:
Description:

57103
070622
Lithium (Li)

Solvent: 20510011 Nitric Acid

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

070625
Ambient (20 °C)
10000
6UTB

2% 20.0 (mL)

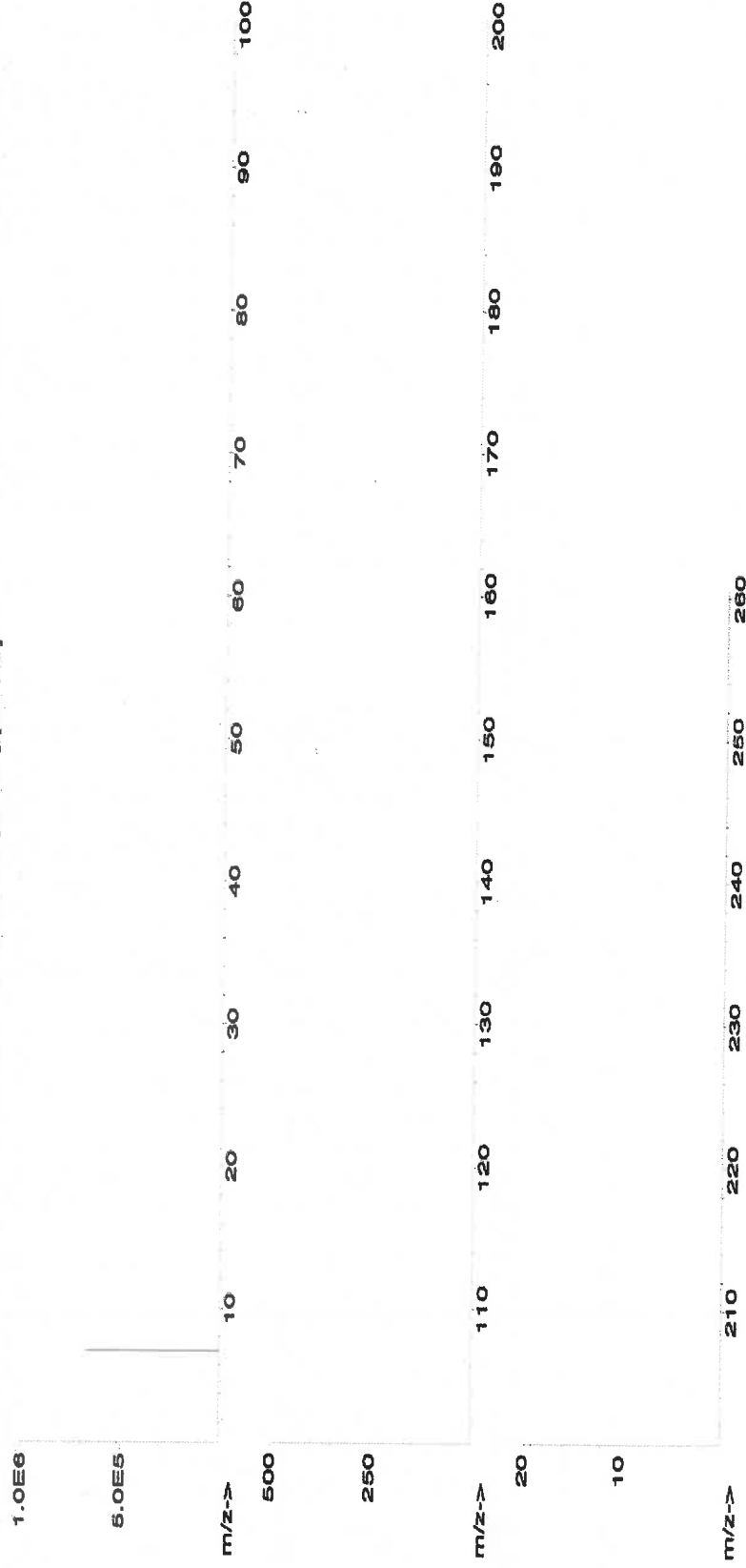
Weight shown below was diluted to (mL): 1000.12
5E-05 Balance Uncertainty
0.058 Flask Uncertainty

<i>Lawrence Barry</i>	
Formulated By:	Lawrence Barry
<i>Pedro L. Rentas</i>	
Reviewed By:	Pedro L. Rentas

Compound	RM#	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	SDS Information		
											(Solvent Safety Info. On Attached pg.)	CAS#	NIST SRM

1. Lithium nitrate (Li)	IN019	L2042019A1	10000	99.999	0.10	10.0	100.0134	100.0173	10000.4	20.0	7790-69-4	5 mg/m3	of-rat 1426 mg/kg NA
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[1] Spectrum No.1 [9.619 sec]:58103.D# [Count] [Linear]





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

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

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

(T) = Target analyte

Physical Characterization:

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

Certified by:

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



AN 5466

Certified Reference Material CRM



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

CERTIFIED WEIGHT REPORT:

Part Number: 57058
Lot Number: 061322
Description: Cerium (Ce)

Solvent: 20510011 Nitric Acid

Lot #

Expiration Date: 061325

2% 20.0 Nitric Acid (mL)

Recommended Storage: Ambient (20 °C)

Nominal Concentration (µg/mL): 1000

5E-05 Balance Uncertainty

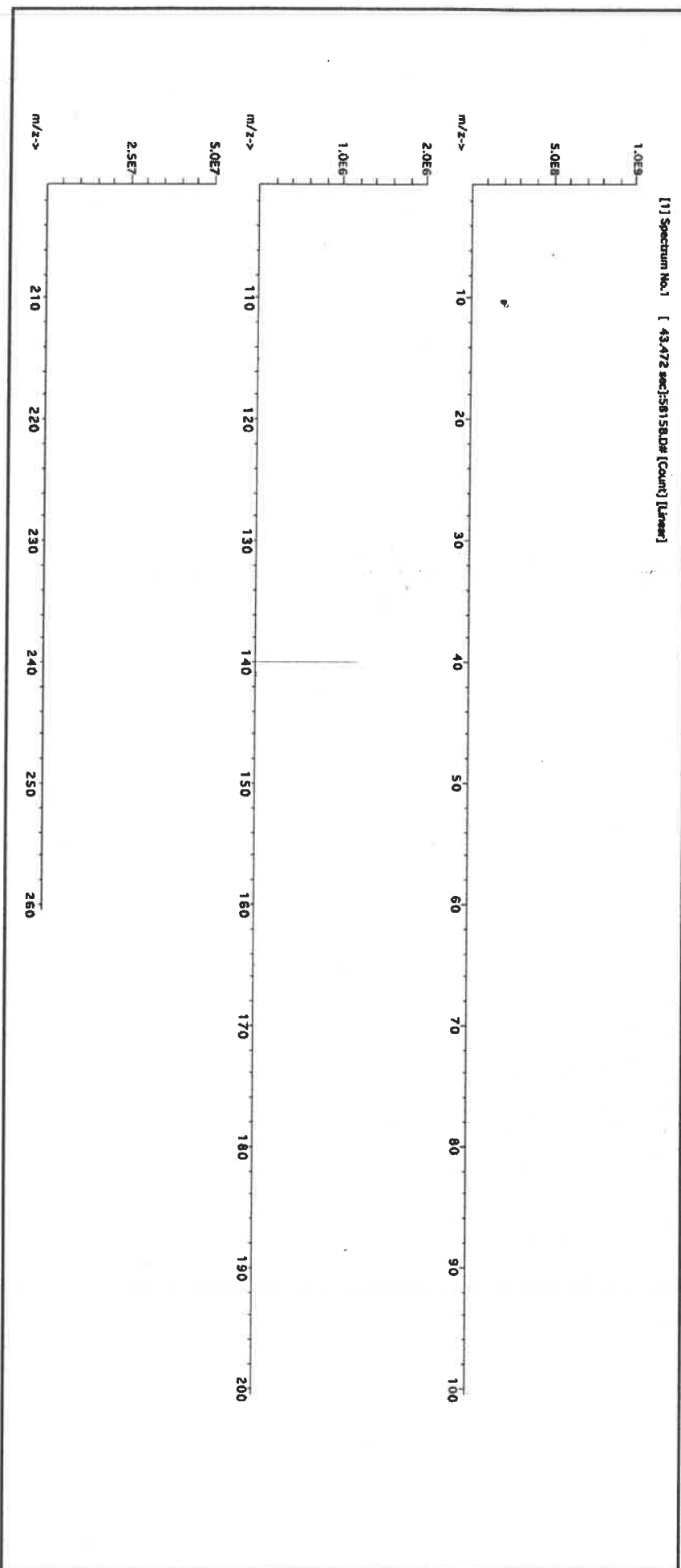
Weight shown below was diluted to (mL): 1000.12 **0.058 Flask Uncertainty**

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

1. Cerium nitrate hexahydrate (Ce)	IN146	Z512CEB1	1000	99.999	0.10	32.8	3.04919	3.04923	1000.0	2.0	10294-41-4	NA	NA
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SDS Information

Formulated By:	Lawrence Barry
	061322
Reviewed By:	Pedro L. Renteria
	061322





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

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

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

(T)= Target analyte

Physical Characterization:

Certified by:

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

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



Certified Reference Material CRM
MS496 R 17/20/23



CERTIFIED WEIGHT REPORT:

Part Number: **58113**

Lot Number: **011623**

Description: **Aluminum (Al)**

Solvent: **20510011 Nitric Acid**

Lot #

Expiration Date: **011626**

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

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

NIST Test Number: **6UTB**

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

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

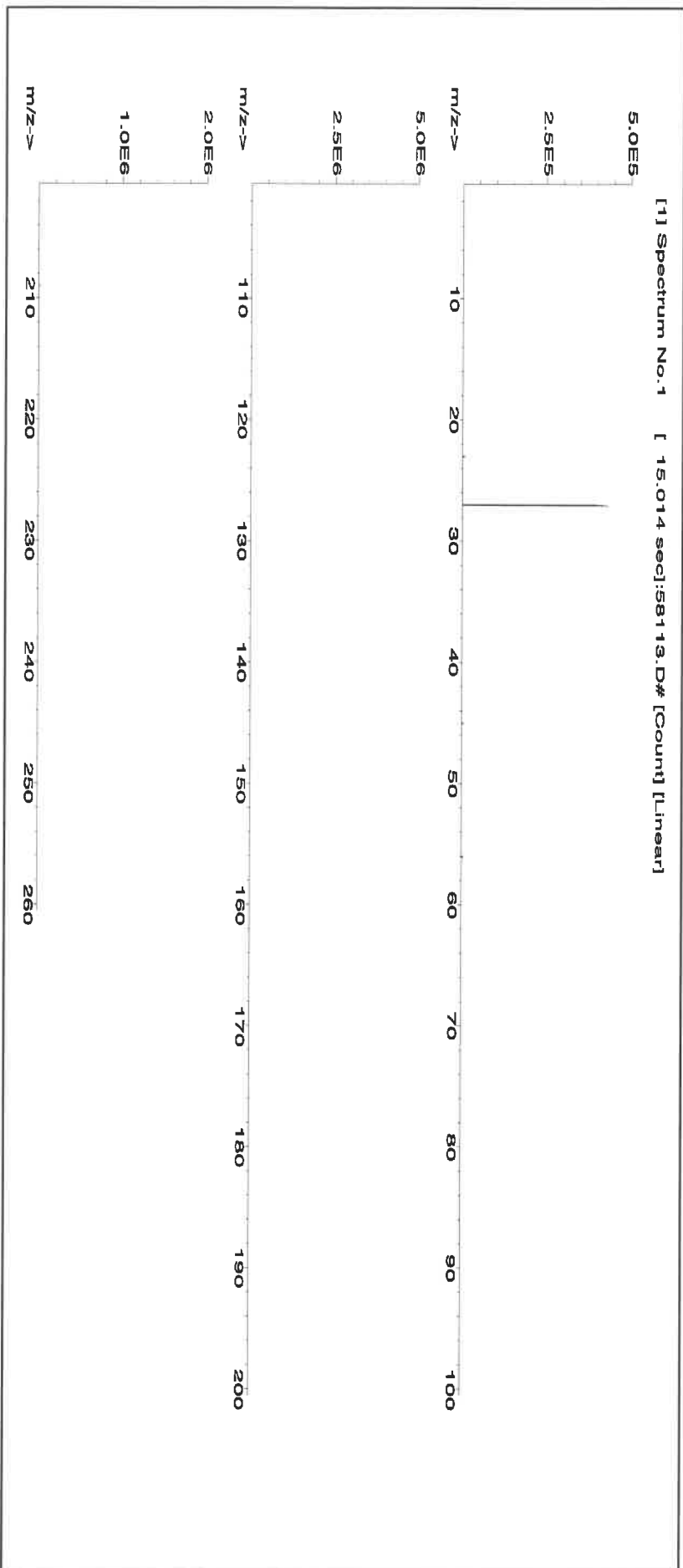
Giovanni Esposito	
Formulated By:	Giovanni Esposito
	011623
Pedro L. Rentas	
Reviewed By:	Pedro L. Rentas
	011623

SDS Information

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

1. Aluminum nitrate nonahydrate (Al) [NO22 ALUM112021A1] **10000** **99.999** **0.10** **7.30** **273.9779** **274.0078** **10001.1** **20.0** **7784-27-2** **2 mg/m3** **or-hat 3671 mg/kg 3101a**

[1] Spectrum No. 1 [15.014 sec]:58113.D# [Count] [Linear]





15497-15498 R203/17/23(2)

CERTIFIED WEIGHT REPORT:

Part Number:
Lot Number:
Description:

58120
031523
Calcium (Ca)

Solvent: 21110221 Nitric Acid

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

031526
Ambient (20 °C)
10000
6UTB
5E-05 Balance Uncertainty
0.058 Flask Uncertainty

2%
60.0
Nitric Acid
(mL)

Weight shown below was diluted to (mL): 3000.41

<i>Giovanni Esposito</i>	
Formulated By:	Giovanni Esposito 031523
<i>Pedro L. Rentas</i>	
Reviewed By:	Pedro L. Rentas 031523

SDS Information

(Solvent Safety Info. On Attached pg.)
NIST
SRM

Expanded
Uncertainty

Actual
Conc. (µg/mL)

Actual
Weight (g)

Target
Weight (g)

Assay
(%)

Purity
(%)

Nominal
Conc. (µg/mL)

Lot
Number

RM#

Compound

1. Calcium carbonate (Ca)

IN014 CAD072022A1

10000

99.999

0.10

39.9

75.1990

75.2093

10001.4

20.0

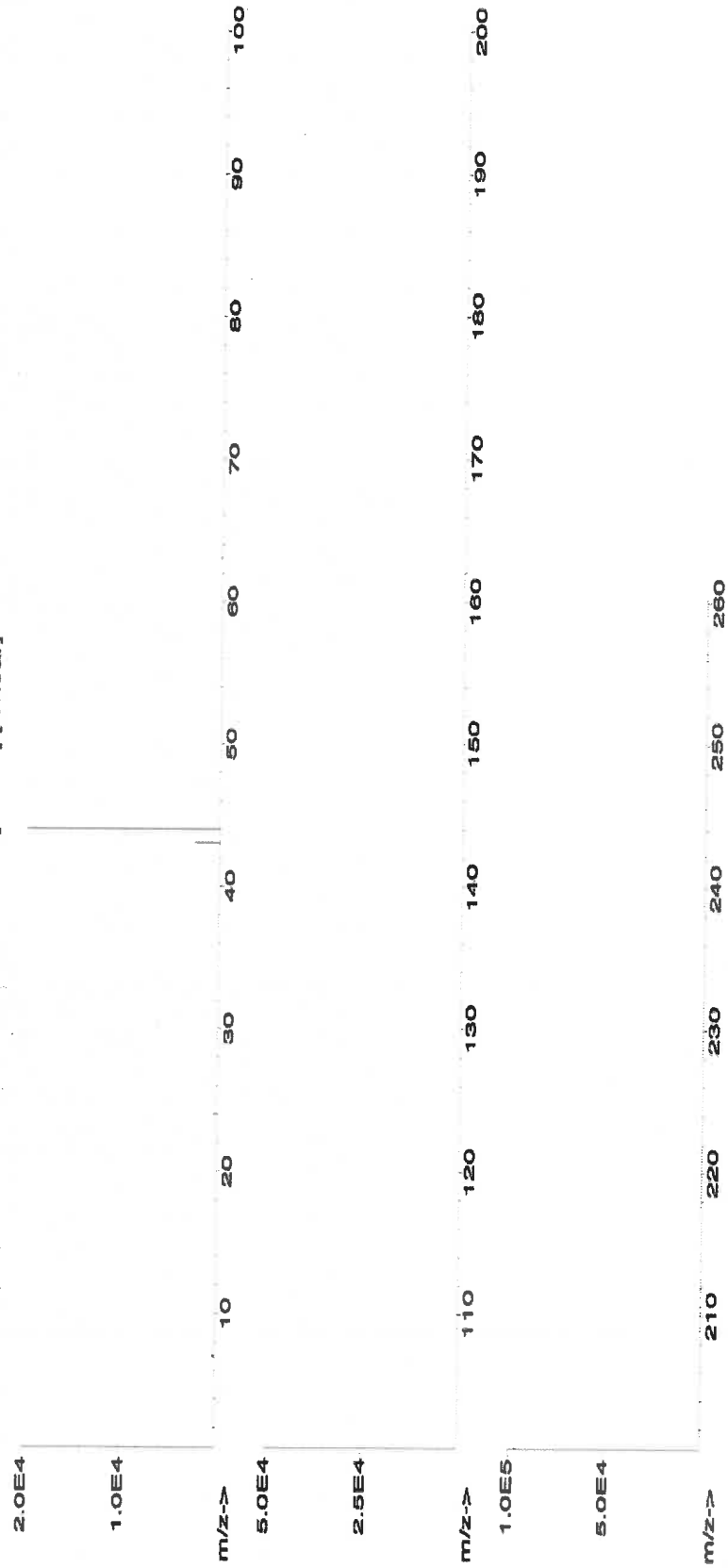
471-34-1

5 mg/m3

or:rat >2000mg/kg

3109a

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





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

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

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

(T) = Target analyte

Physical Characterization:

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

Certified by:

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



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

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

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

(T) = Target analyte

Physical Characterization:

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

Certified by:

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



Certified Reference Material CRM

CERTIFIED WEIGHT REPORT:

Part Number: **58119**
Lot Number: **120822**
Description: **Potassium (K)**

Solvent: 20510011 Nitric Acid

Lot #

Expiration Date: 120825
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 10000
NIST Test Number: 6UTB

2% 60.0 (mL) Nitric Acid

Weight shown below was diluted to (mL): 3000.4

5E-05 Balance Uncertainty
0.06 Flask Uncertainty

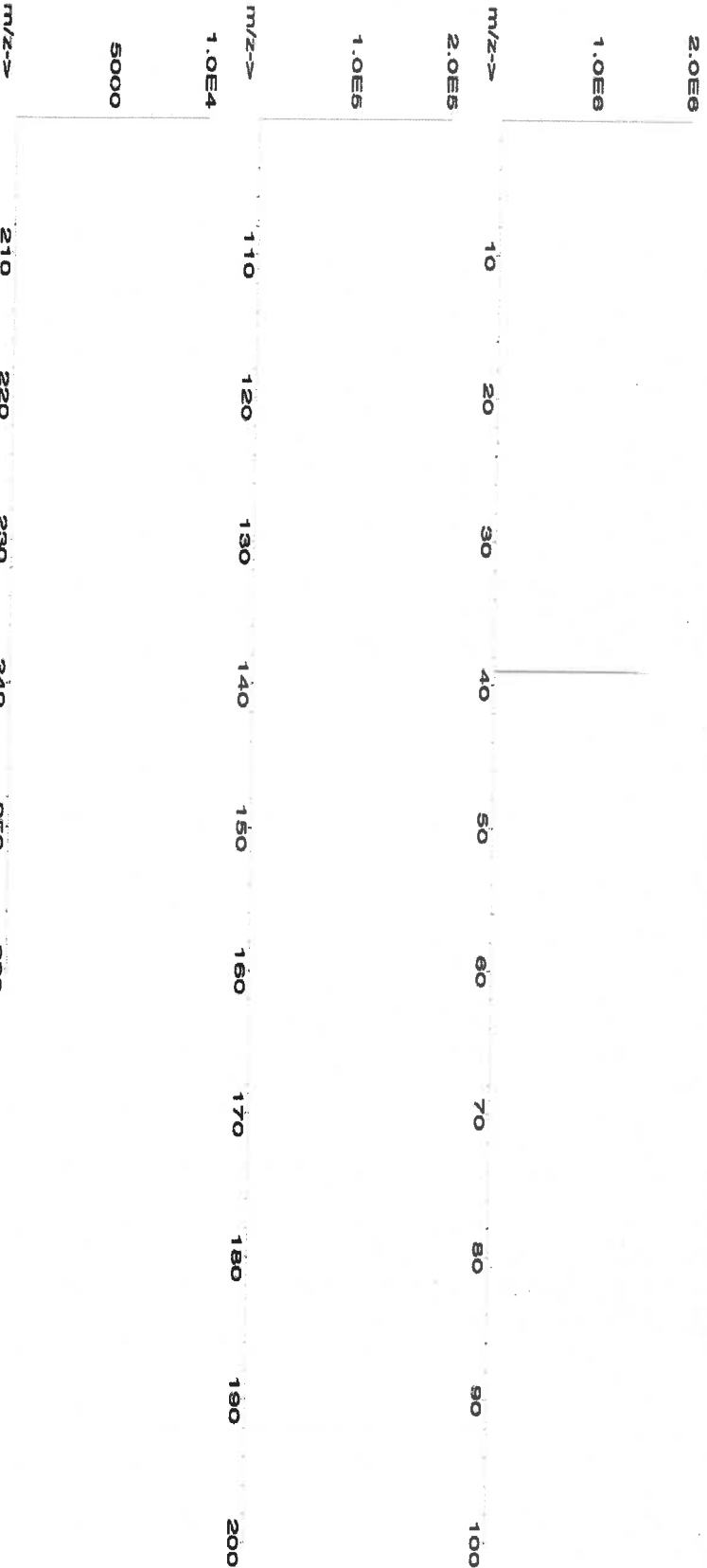
<i>Giovanni Esposito</i>	
Formulated By:	Giovanni Esposito
Reviewed By:	<i>Pedro L. Rantas</i>
	120822

Compound

Lot	Nominal	Purity	Uncertainty	Assay	Target	Actual	Actual	Expanded	SDS Information	NIST
Number	Conc. (µg/mL)	(%)	Purity (%)	(%)	Weight (g)	Weight (g)	Conc. (µg/mL)	Uncertainty +/- (µg/mL)	(Solvent Safety Info. On Attached pg.)	SRM

1. Potassium nitrate (K) IN034 KD022021A1 10000 99.989 0.10 37.6 79.7990 79.8075 10001.1 20.0 7757-79-1 5 mg/m3 crtat 3015 mg/kg 3141a

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





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

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

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

(T) = Target analyte

Physical Characterization:

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

Certified by:

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



Refine your results. Redefine your industry.

Certificate of Analysis

300 Technology Drive
Christiansburg, VA 24073 USA
inorganicventures.com

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

F: 540-585-3012

info@inorganicventures.com

1.0 ACCREDITATION / REGISTRATION

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



2.0 PRODUCT DESCRIPTION

Product Code: Multi Analyte Custom Grade Solution
Catalog Number: CLPP-SPK-1
Lot Number: T2-MEB721963
Matrix: 7% (v/v) HNO₃
Value / Analyte(s):
2 000 µg/mL ea:
Aluminum, Barium,
1 000 µg/mL ea:
Iron,
500 µg/mL ea:
Manganese, Nickel,
Vanadium, Zinc,
Cobalt,
250 µg/mL ea:
Copper,
200 µg/mL ea:
Chromium,
50 µg/mL ea:
Beryllium, Silver

3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE	CERTIFIED VALUE	ANALYTE	CERTIFIED VALUE
Aluminum, Al	2 000 ± 7 µg/mL	Barium, Ba	2 000 ± 9 µg/mL
Beryllium, Be	50.00 ± 0.26 µg/mL	Chromium, Cr	200.0 ± 1.1 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	Manganese, Mn	500.0 ± 2.0 µg/mL
Nickel, Ni	500.0 ± 2.2 µg/mL	Silver, Ag	50.00 ± 0.22 µg/mL
Vanadium, V	500.0 ± 2.2 µg/mL	Zinc, Zn	500.0 ± 2.2 µg/mL

Density: 1.070 g/mL (measured at 20 ± 4 °C)

Assay Information:

ANALYTE	METHOD	NIST SRM#	SRM LOT#
Ag	ICP Assay	3151	160729
Ag	Volhard	999c	999c
Ag	Calculated		See Sec. 4.2
Al	ICP Assay	3101a	140903
Al	EDTA	928	928
Ba	ICP Assay	3104a	140909
Ba	Gravimetric		See Sec. 4.2
Be	ICP Assay	3105a	090514
Be	Calculated		See Sec. 4.2
Co	ICP Assay	3113	190630
Co	EDTA	928	928
Cr	ICP Assay	3112a	170630
Cu	ICP Assay	3114	121207
Cu	EDTA	928	928
Fe	ICP Assay	3126a	140812
Fe	EDTA	928	928
Mn	ICP Assay	3132	050429
Mn	EDTA	928	928
Ni	ICP Assay	3136	120619
Ni	EDTA	928	928
V	IC Assay	3165	160906
V	EDTA	928	928
Zn	ICP Assay	3168a	120629
Zn	EDTA	928	928

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

Characterization of CRM/RM by Two or More Methods

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

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

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

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

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

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

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

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

$$X_{CRM/RM} = (\bar{X}_a) (u_{char\ a})$$

$\bar{X}_a$ = mean of Assay Method A with

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

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

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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

N/A

6.0 INTENDED USE

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

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

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

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

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

8.0 HAZARDOUS INFORMATION

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

9.0 HOMOGENEITY

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

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

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

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

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

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

July 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

- July 27, 2027

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

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

11.3 Period of Validity

- Sealed TCT Bag Open Date: _____

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

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Thomas Kozikowski
Manager, Quality Control



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director





CERTIFIED WEIGHT REPORT:

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

Lot #
21110221
Solvent: Nitric Acid

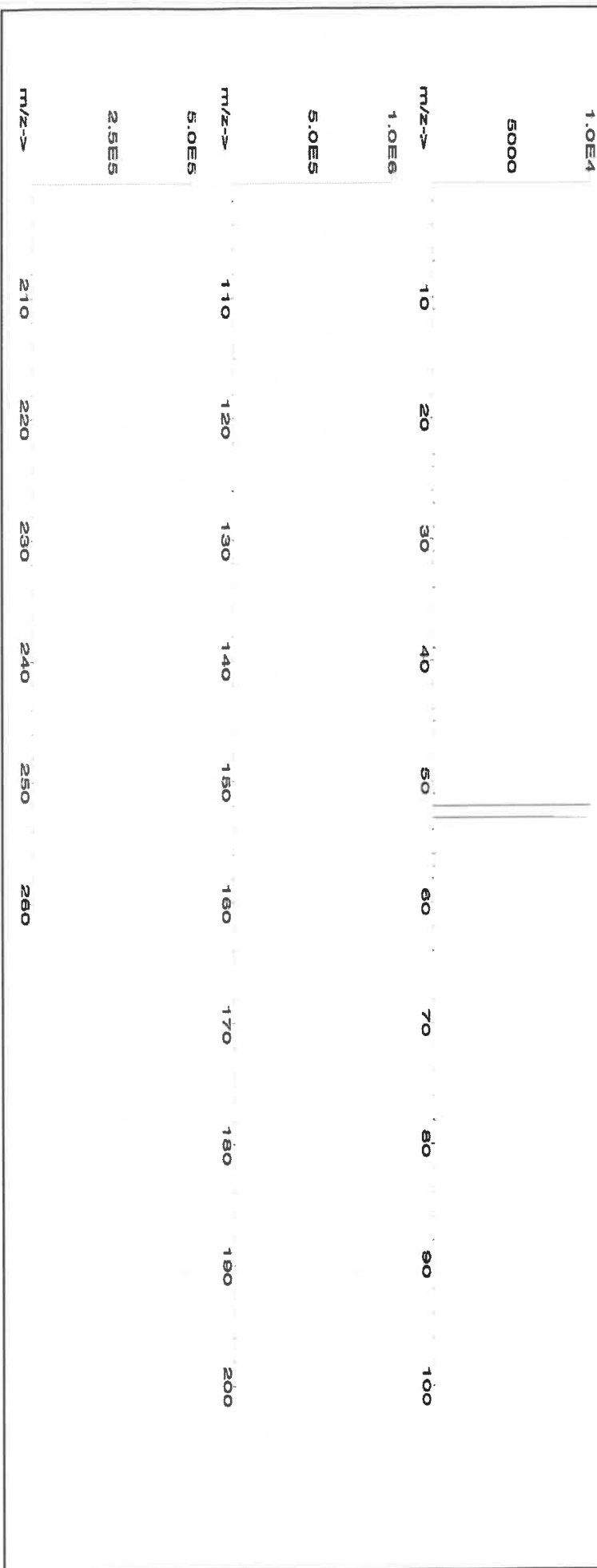
Formulated By:	Lawrence Barry
	060523
Reviewed By:	Pedro L. Ruelas
	060523

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

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

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

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





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

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

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

(T) = Target analyte

Physical Characterization:

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

Certified by:

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



CERTIFIED WEIGHT REPORT:

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

Lot # 24002546
Solvent: Nitric Acid

Expiration Date: 102526

2.0%

40.0 (mL)

Nitric Acid

Recommended Storage: Ambient (20 °C)

Nominal Concentration (µg/mL): 1000

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

NIST Test Number: 6UTB

5E-05 Balance Uncertainty

Volume shown below was diluted to (mL): 2000.02

0.058 Flask Uncertainty

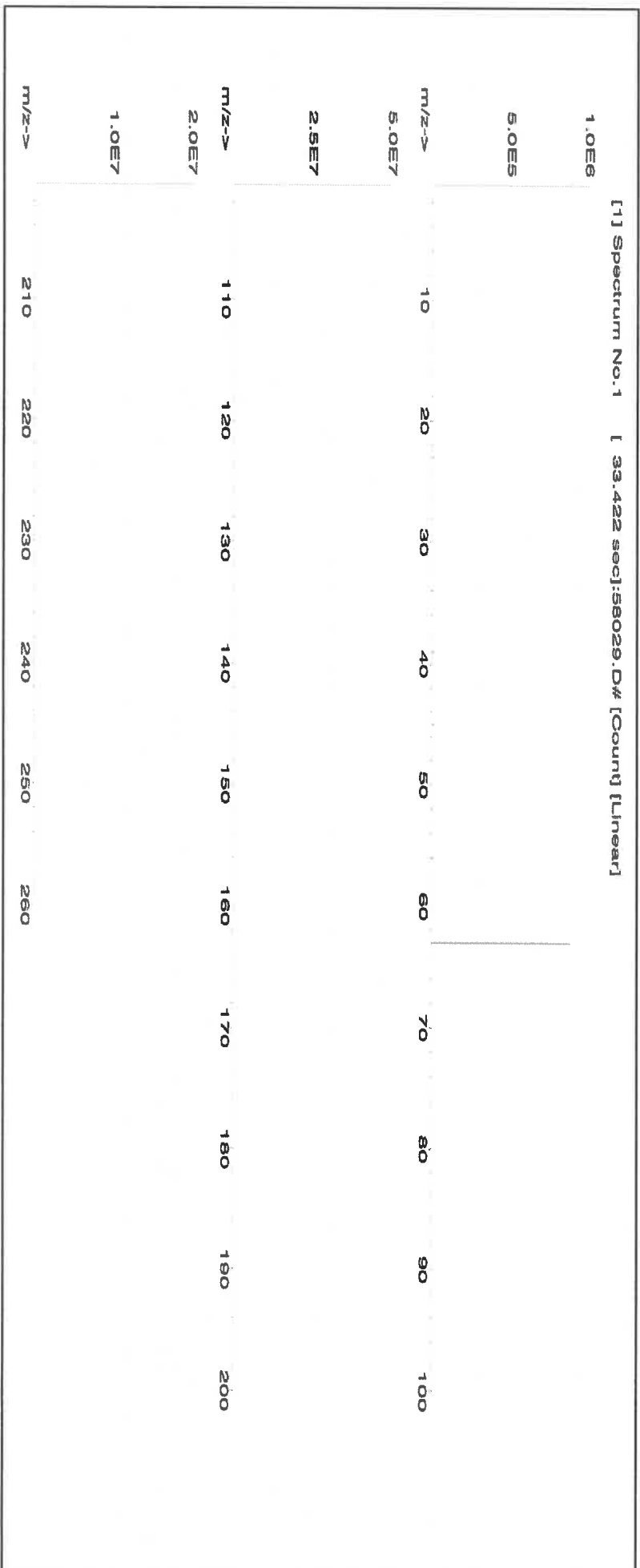
Compound

Part Number 58129 100223
Dilution Factor 0.1000
Initial Vol. (mL) 200.0
Uncertainty Pipette (mL) 0.084
Nominal Conc. (µg/mL) 1000
Initial Conc. (µg/mL) 10000.1
Final Conc. (µg/mL) 1000.0

Expanded Uncertainty 2.2 (µg/mL)
CAS# 10031-43-3
OSHA PEL (TWA) 1 mg/m3
LD50 or-rat 794 mg/kg
NIST SRM 3114

1. Copper(II) nitrate trihydrate (Cu)

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





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

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

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

(T) = Target analyte

Physical Characterization:

Certified by:

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

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



CERTIFIED WEIGHT REPORT:

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

Lot # 24002546
Solvent: Nitric Acid

Expiration Date:

102526

2.0%

40.0 (mL)

Nitric Acid

Recommended Storage:

Ambient (20 °C)

Nominal Concentration (µg/mL):

1000

NIST Test Number:

6UTB

Volume shown below was diluted to (mL):

5E-05

Balance Uncertainty
0.058

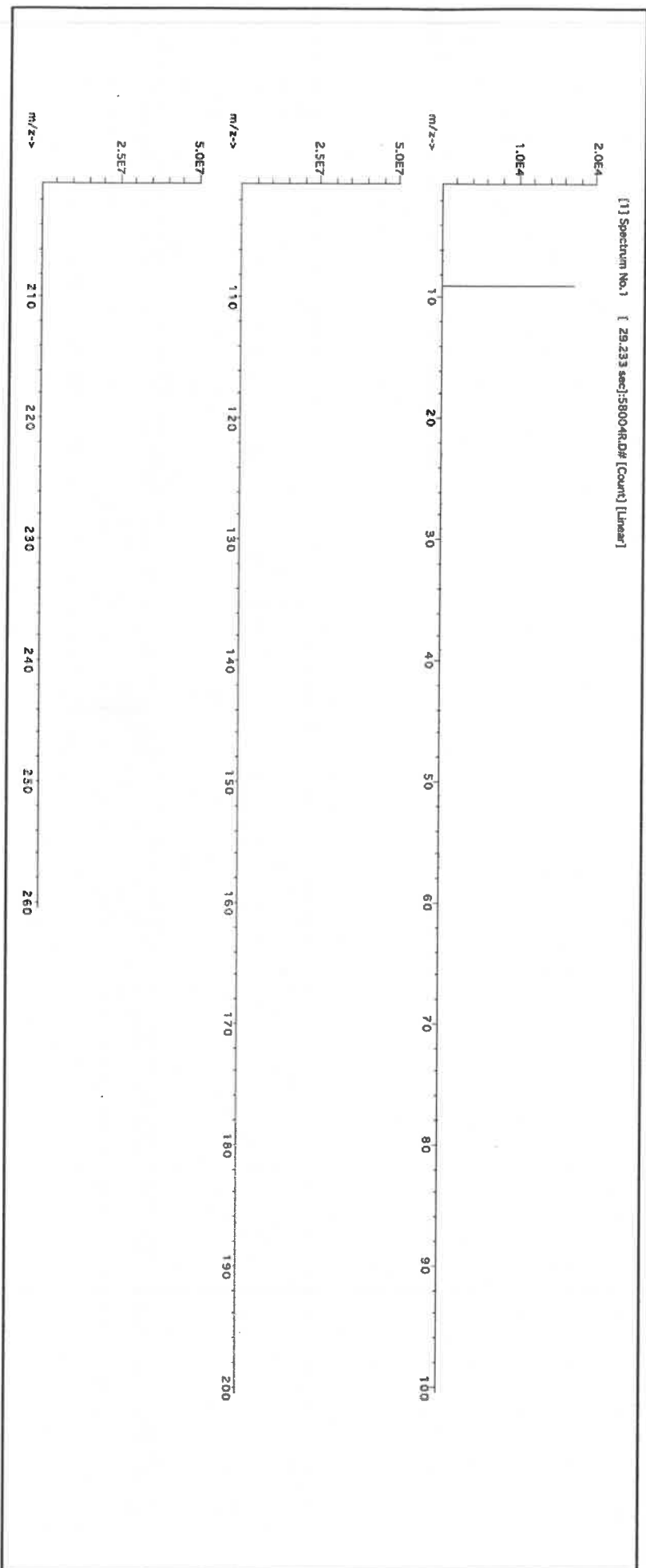
Flask Uncertainty

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

SDS Information

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





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

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

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

(T) = Target analyte

Physical Characterization:

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

Certified by:

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

* All standard containers are meticulously cleaned prior to use.

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

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

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



Certified Reference Material CRM



CERTIFIED WEIGHT REPORT:

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

Solvents: 21110221 Nitric Acid
22D0562008 Hydrochloric acid

Lot # R-02509124 M599

Expiration Date: 071126
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 1000
NIST Test Number: 6UTB

Weight shown below was diluted to (mL):

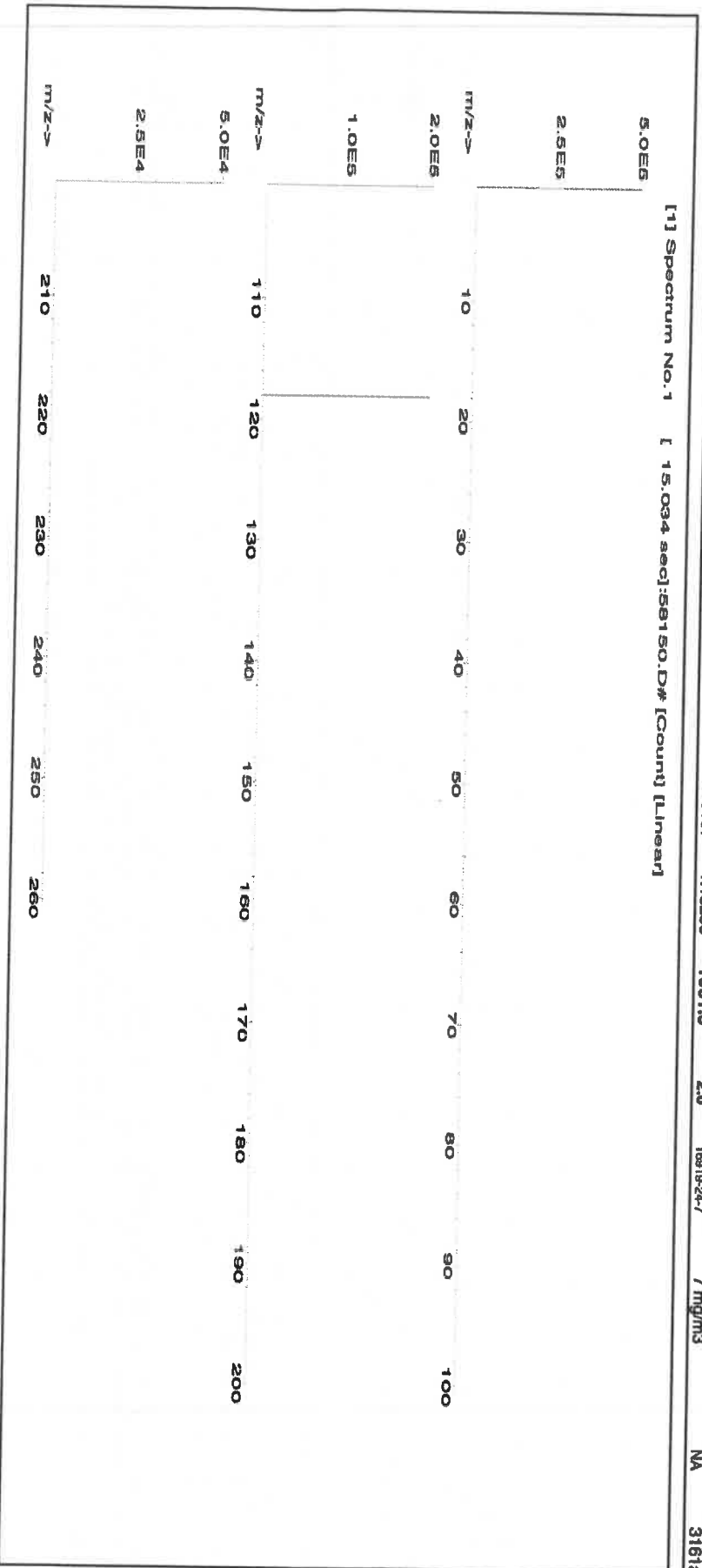
5E-05 Balance Uncertainty
0.058 Flask Uncertainty

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

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

1. Ammonium hexafluoroantimonate(V) (Sn) IN010 SMD042023A1 1000 99.999 0.10 44.2 1.13107 1.13286 1001.6 2.0 16919-24-7 7 mg/m3 NA 3161a

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





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

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

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

(T) = Target analyte

Physical Characterization:

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

Certified by:

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



R: 02/09/24 115800 (54)

CERTIFIED WEIGHT REPORT:

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

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

Volume shown below was diluted to (mL): 2000.02

5E-05 Balance Uncertainty
0.058 Flask Uncertainty

Lot # 24002546
Solvent: Nitric Acid

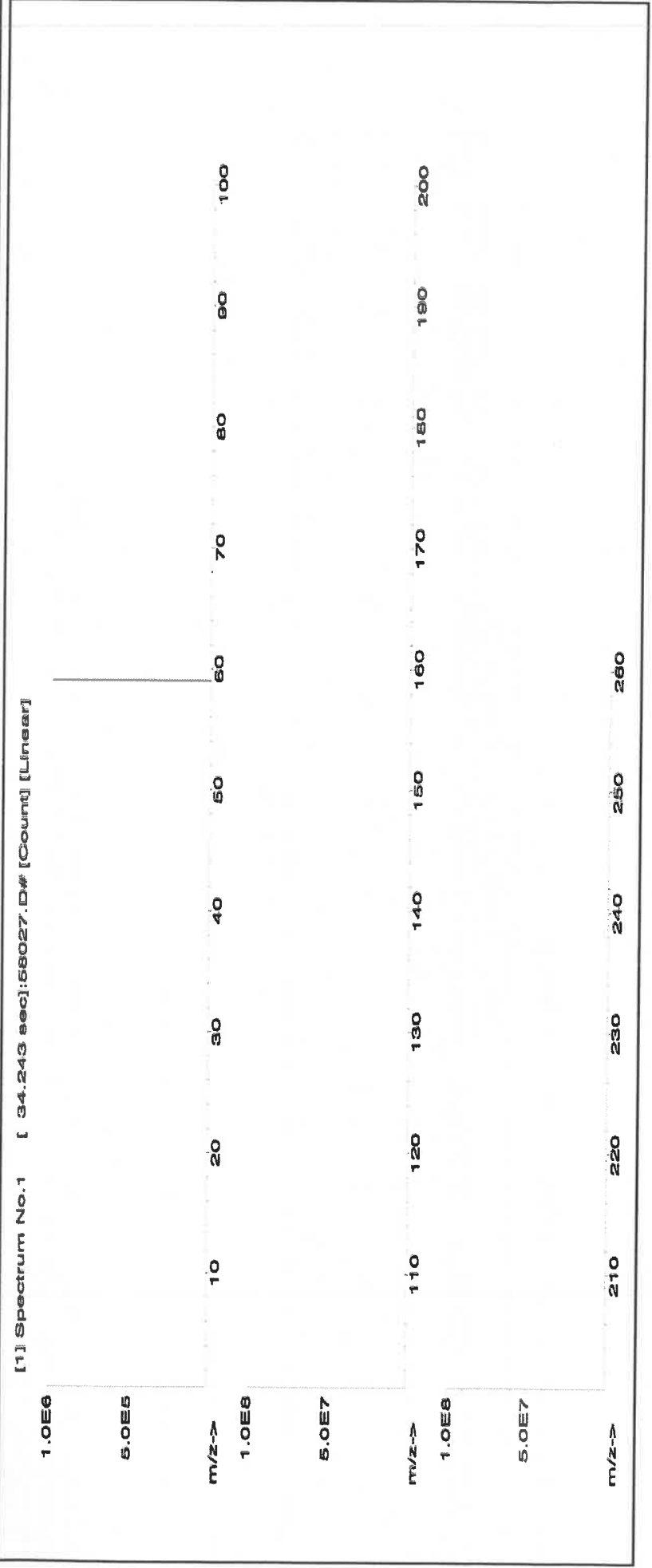
2.0% Nitric Acid
40.0 (mL)

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

SDS Information

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

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





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

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

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

(T)= Target analyte

Physical Characterization:

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

Certified by:

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



CERTIFIED WEIGHT REPORT:

Part Number:
Lot Number:
Description:

57033
111323
Arsenic (As)

Lot #
Solvent:

24002546
Nitric Acid

2.0%

80.0
(mL)

Nitric Acid

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

111326
Ambient (20 °C)
1000

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

6UTB
4000.0

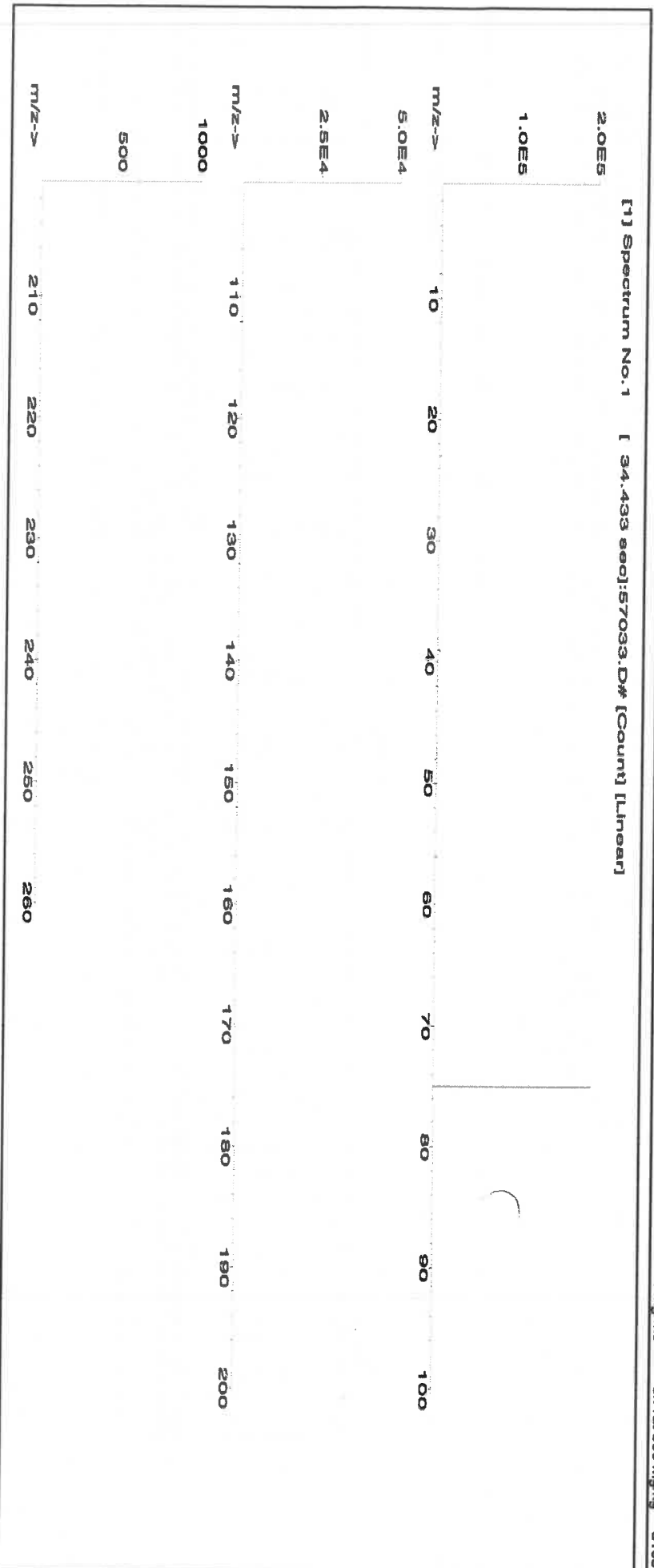
Formulated By:	Lawrence Barry	111323
Reviewed By:	Pedro L. Rendas	111323

Compound

Part Number	Lot Number	Dilution Factor	Initial Vol. (mL)	Uncertainty Pipette (mL)	Nominal Conc. (µg/mL)	Initial Conc. (µg/mL)	Final Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
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1. Arsenic (As) 58133 020522 0.1000 400.0 0.084 1000 10001.0 1000.0 2.0 7440-38-2 0.5 mg/m3 or-lat 500 mg/kg 3103a

[1] Spectrum No.1 [34.433 sec]:57033.D# [Count] [Linear]





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

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

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

(T) = Target analyte

Physical Characterization:

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

Certified by:

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

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

Solvent: 21110221 Nitric Acid

Lot #

R102109124 M5815

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

2% 40.0 (mL) Nitric Acid

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

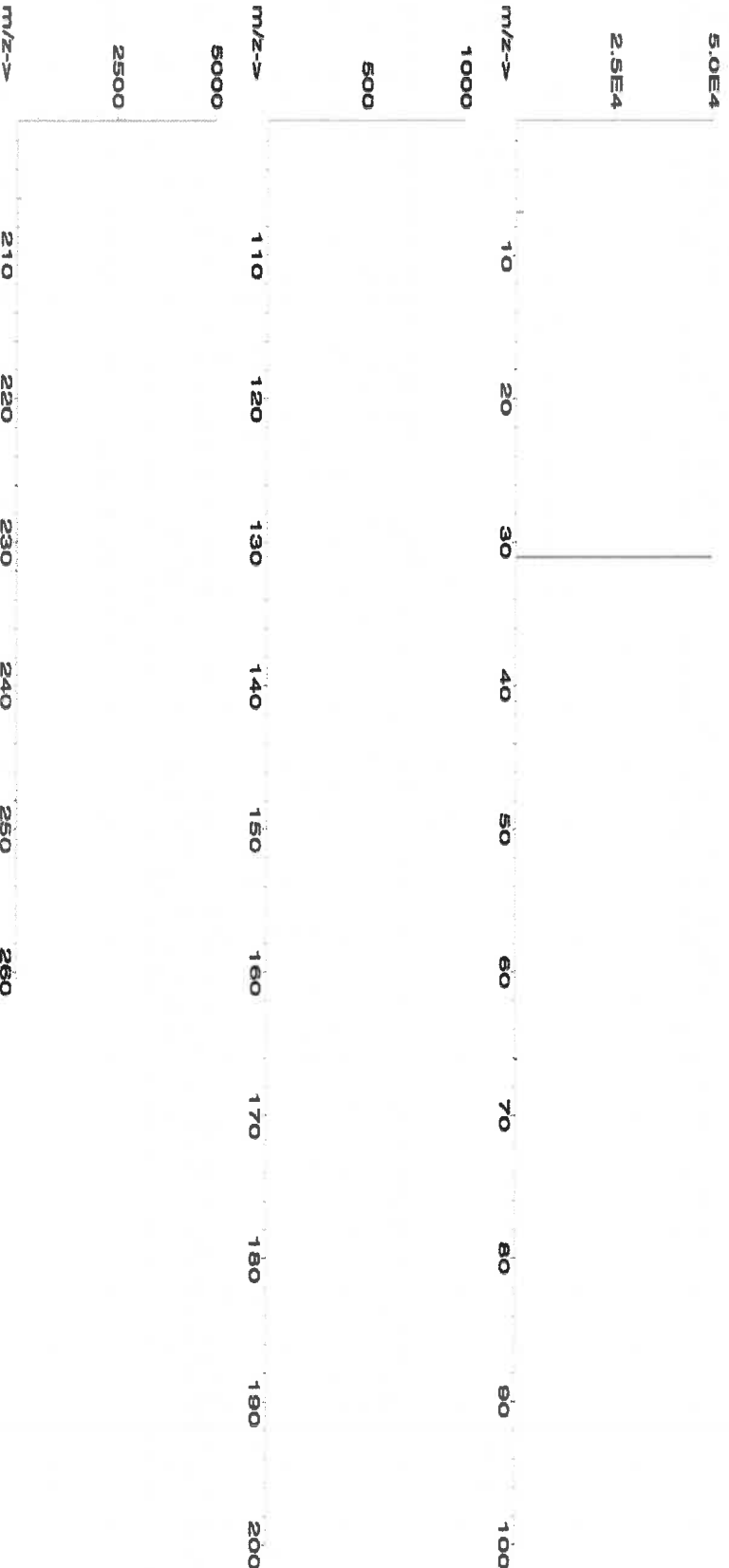
Formulated By: Lawrence Barry	041723
Reviewed By: Pedro L. Rentas	041723

SDS Information

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

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





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

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

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

(T) = Target analyte

Physical Characterization:

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

Certified by:

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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).



CERTIFIED WEIGHT REPORT:

Part Number:
Lot Number:
Description:

57116
071123
Sulfur (S)

Lot #
Solvent: 071123
ASTM Type 1 Water

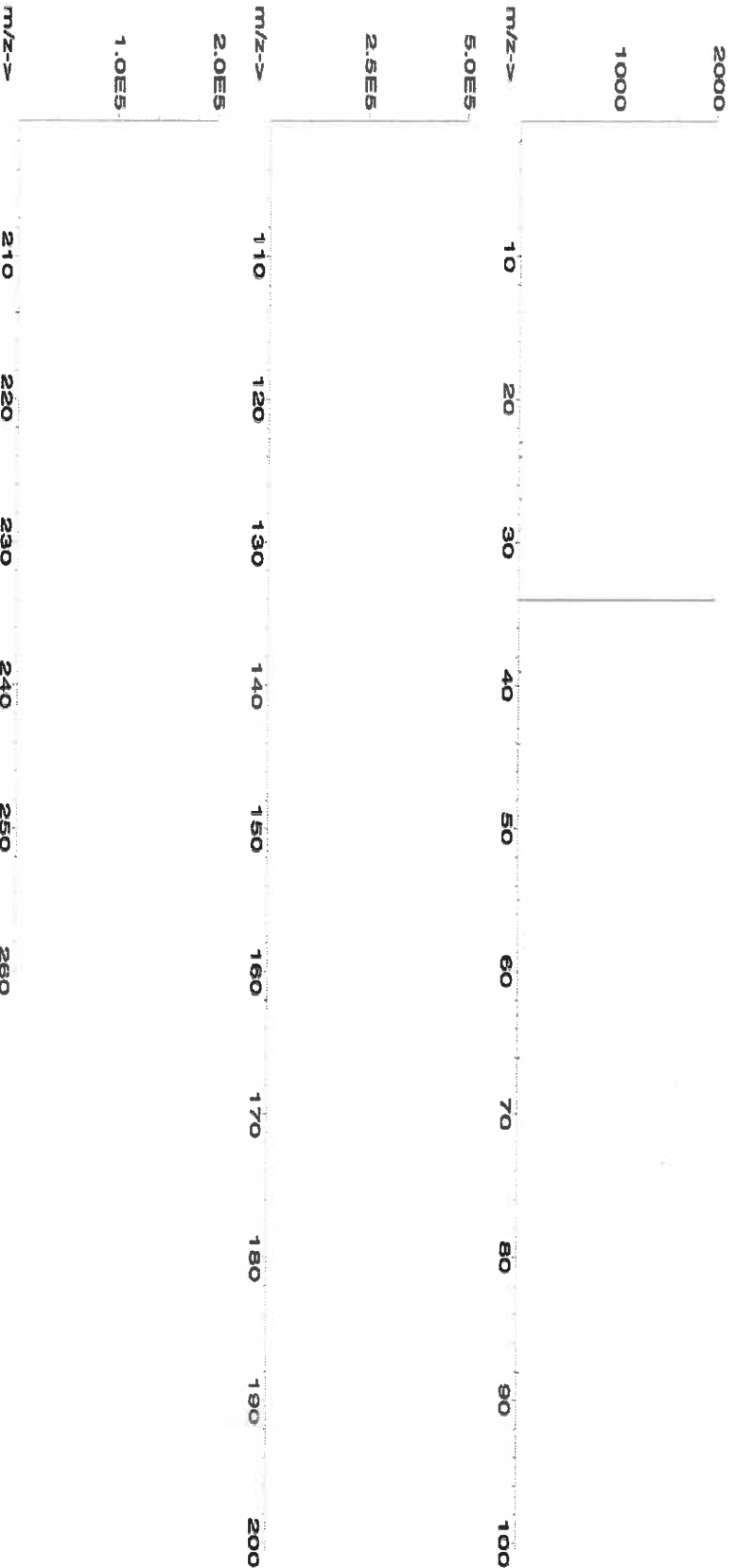
Formulated By:	Lawrence Barry
	071123
Reviewed By:	Pedro L. Rentas
	071123

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

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

1. Ammonium sulfate (S) IN117 SLBR725V 10000 99.9 0.10 24.3 82.4675 82.4692 10000.1 20.0 7783-20-2 NA oral 4250mg/kg 3181

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





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

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

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

Physical Characterization:

(T)= Target analyte

Certified by:

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

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



CERTIFIED WEIGHT REPORT:

Part Number: 58030
Lot Number: 111623
Description: Zinc (Zn)

Solvent: 24002546 Nitric Acid

Lot # R: 02109124 MS819

Expiration Date: 111626
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 1000
NIST Test Number: 6UTB

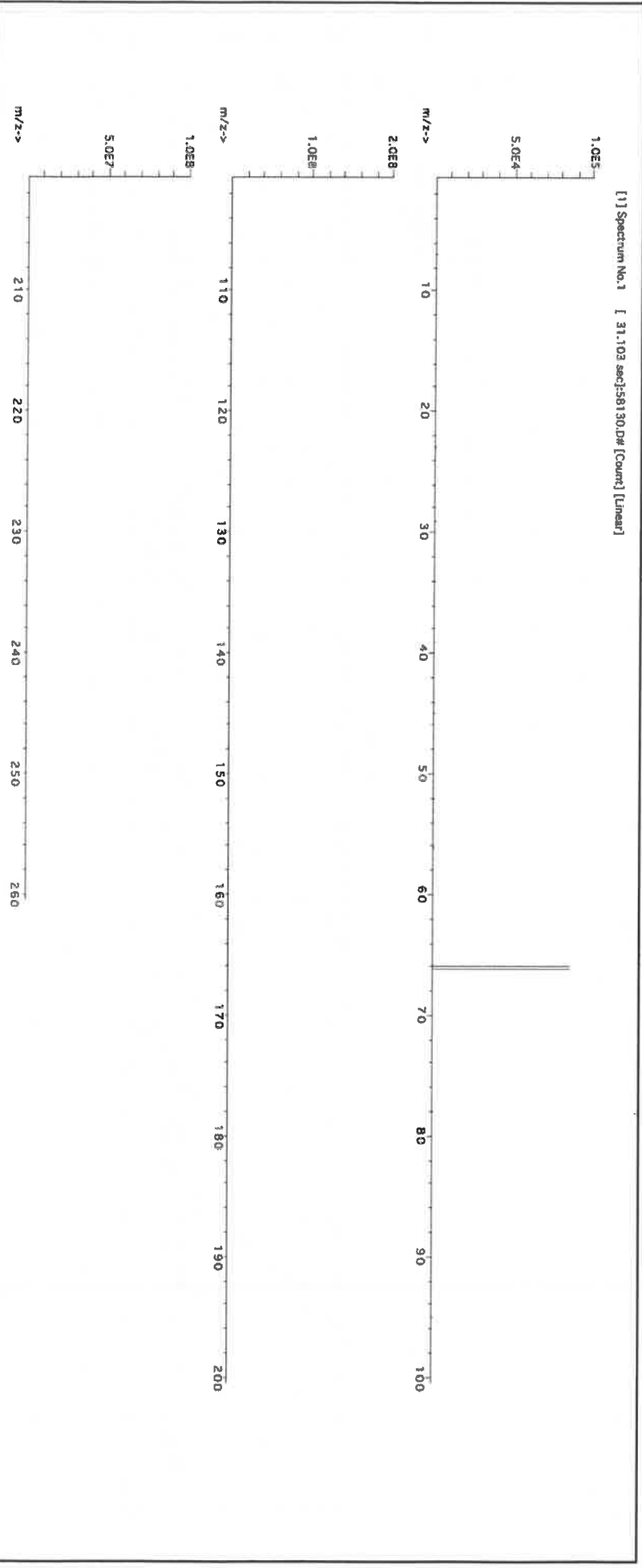
2% 60.0 (mL) Nitric Acid

Weight shown below was diluted to (mL): 3000.4
5E-05 Balance Uncertainty
0.06 Flask Uncertainty

Formulated By:	Benson Chan
	111623
Reviewed By:	Pedro L. Reintas
	111623

SDS Information									
Expanded					(Solvent Safety Info. On Attached pg.)				
Compound	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty Purity (%)	Assay Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	± (µg/mL)	CAS#
									OSHA PEL (TWA)
									LDSO
									NIST SRM

1. Zinc nitrate hexahydrate (Zn) IN016 ZNE03021A1 1000 99.999 0.10 24.3 12.3475 12.3502 1000.2 2.0 10196-16-6 1 mg/mL 3168 or-rat 1190mg/kg





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

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

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

(T) = Target analyte

Physical Characterization:

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

Certified by:

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

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R: 02/22/24 M.5942

1.0 ACCREDITATION / REGISTRATION

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



2.0 PRODUCT DESCRIPTION

Product Code: Single Analyte Custom Grade Solution
Catalog Number: CGT11
Lot Number: T2-TI719972
Matrix: 2% (v/v) HNO₃
tr. HF
Value / Analyte(s): 1 000 µg/mL ea:
Titanium
Starting Material: Ti Metal
Starting Material Lot#: 2094
Starting Material Purity: 99.9975%

3.0 CERTIFIED VALUES AND UNCERTAINTIES

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

Assay Information:

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

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

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

Characterization of CRM/RM by Two or More Methods

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

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

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

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

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

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

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

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

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

X_a = mean of Assay Method A with

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

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

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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

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

M	Ag	<	0.000536	M	Eu	<	0.000268	O	Na	<	0.032670	M	Se		0.001204	O	Zn	<	0.003267
O	Al		0.000872	O	Fe		0.003225	O	Nb	<	0.043560	O	Si		0.004735	O	Zr	<	0.043560
M	As	<	0.008586	M	Ga	<	0.000268	M	Nd	<	0.000268	M	Sm	<	0.000268				
M	Au	<	0.004577	M	Gd	<	0.000268	O	Ni	<	0.010890	M	Sn		0.000096				
O	B	<	0.008929	M	Ge	<	0.002146	M	Os	<	0.000269	O	Sr		0.000096				
M	Ba	<	0.002683	M	Hf		0.002161	O	P	<	0.054450	M	Ta		0.010560				
M	Be	<	0.005366	M	Hg	<	0.003231	M	Pb	<	0.001073	M	Tb	<	0.000268				
M	Bi	<	0.001609	M	Ho	<	0.000268	M	Pd	<	0.000268	M	Te	<	0.001341				
O	Ca		0.000676	M	In	<	0.002683	M	Pr	<	0.000268	M	Th	<	0.053663				
M	Cd	<	0.000268	M	Ir	<	0.000269	M	Pt	<	0.000536	s	Ti	<					
M	Ce	<	0.000268	M	K		0.001172	M	Rb	<	0.000268	M	Tl	<	0.000268				
M	Co	<	0.004293	M	La	<	0.000268	M	Re	<	0.000268	M	Tm	<	0.000268				
M	Cr		0.000752	O	Li	<	0.027225	M	Rh	<	0.000268	M	U	<	0.000268				
M	Cs	<	0.000268	M	Lu	<	0.000268	M	Ru	<	0.000269	M	V	<	0.019855				
O	Cu	<	0.010890	O	Mg	<	0.005445	i	S	<		M	W		0.000473				
M	Dy	<	0.000268	O	Mn	<	0.003267	M	Sb	<	0.006976	M	Y	<	0.002146				
M	Er	<	0.000268	M	Mo		0.000774	O	Sc	<	0.004900	M	Yb	<	0.000536				

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

6.0 INTENDED USE

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

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

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

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

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

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 47.87 +4 6 Ti(F)6-2

Chemical Compatibility - Soluble in concentrated HCl, HF, H3PO4 H2SO4 and HNO3. Avoid neutral to basic media. Unstable at ppm levels with metals that would pull F- away (i.e. Do not mix with Alkaline or Rare Earths or high levels of transition elements unless they are fluorinated). Stable with most inorganic anions with a tendency to hydrolyze forming the hydrated oxide in all dilute acids except HF.

Stability - 2-100 ppb levels stable (Alone or mixed with all other metals) as the Ti(F)6-2 for months in 1% HNO3 / LDPE container. 1-10,000 ppm single element solutions as the Ti(F)6-2 chemically stable for years in 2-5% HNO3 / trace HF in an LDPE container.

Ti Containing Samples (Preparation and Solution) - Metal (Soluble in H2O / HF caution -powder reacts violently); Oxide - low temperature history anatase or rutile (Dissolved by heating in 1:1:1 H2O / HF / H2SO4); Oxide - high temperature history (~800EC) brookite (fuse in Pt0 with K2S2O7); Ores (fuse in Pt0 with KF + K2S2O7 - no KF if silica not present); Organic Matrices (Dry ash at 450EC in Pt0 and dissolve by heating with 1:1:1 H2O / HF / H2SO4 or fuse ash with pyrosulfate if oxide is as plastic pigment and likely in brookite crystalline form).

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

Technique/Line	Estimated D.L.	Order	Interferences (underlined indicates severe)
ICP-MS 48 amu	14 ppt	N/A	32S16O, 32S14N, 14N16O18O, 14N17N2, 36Ar12C, 48Ca, [96X=2 (where X = Zr, Mo, Ru)]
ICP-OES 323.452 nm	0.0054 / 0.00092 µg/mL	1	Ce, Ar, Ni
ICP-OES 334.941 nm	0.0038 / 0.000028 µg/mL	1	Nb, Ta, Cr, U
ICP-OES 336.121 nm	0.0053 / 0.000034 µg/mL	1	W, Mo, Co

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

June 17, 2022

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

11.2 Lot Expiration Date

- June 17, 2027

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

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

11.3 Period of Validity

- Sealed TCT Bag Open Date: _____

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

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Thomas Kozikowski
Manager, Quality Control



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director



M5959 R: 6/14/24

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1.0 ACCREDITATION / REGISTRATION

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



2.0 PRODUCT DESCRIPTION

Product Code: Single Analyte Custom Grade Solution
Catalog Number: 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%

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Value: 10000 ± 30 µg/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, $X_{CRM/RM}$, where two or more methods of characterization are used is the weighted mean of the results:

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

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

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

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

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

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

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

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

X_a = mean of Assay Method A with

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

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

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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

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

M Ag <	0.004600	M Eu	0.009037	M Na	0.086360	M Se <	0.005200	M Zn	0.030125
M Al	0.014862	O Fe	0.002410	M Nb <	0.000570	O Si	0.024100	O Zr <	0.002600
M As <	0.003500	M Ga <	0.000570	M Nd	0.000923	M Sm	0.000461		
M Au <	0.001700	M Gd <	0.003500	M Ni <	0.005700	M Sn <	0.002300		
O B	0.002209	M Ge <	0.005200	M Os <	0.001200	M Sr <	0.004600		
O Ba <	0.002500	M Hf <	0.000570	n P <		M Ta <	0.000570		
O Be <	0.001400	M Hg <	0.000570	M Pb	0.005020	M Tb	0.001044		
M Bi <	0.003500	M Ho	0.009037	M Pd <	0.005100	M Te <	0.002300		
O Ca	0.009841	M In <	0.002300	M Pr <	0.002300	M Th <	0.000570		
M Cd <	0.000570	M Ir <	0.000570	M Pt <	0.000570	M Ti <	0.003500		
M Ce <	0.002300	O K	0.018677	M Rb <	0.000570	M Tl <	0.000570		
M Co <	0.000570	M La	0.000461	M Re <	0.000570	M Tm <	0.003500		
M Cr <	0.004000	O Li <	0.009300	M Rh <	0.008000	M U <	0.000570		
M Cs <	0.000570	M Lu	0.000582	M Ru <	0.000570	M V	0.001265		
M Cu	0.002610	O Mg	0.001486	n S <		M W <	0.002300		
M Dy	0.003815	M Mn	0.000582	M Sb	0.005422	s Y <			
M Er	0.003615	M Mo <	0.005700	M 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 Terms and Conditions of Sale, <https://www.inorganicventures.com/terms-and-conditions-sale>. The Terms and Conditions contain information on the use of materials traceable to PCRM™ certified reference materials. This Limited License agreement is especially pertinent for laboratories accredited under ISO:17034.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

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

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

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 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 chemically stable for years in 2-5% HNO₃ / LDPE container.

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

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

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

8.0 HAZARDOUS INFORMATION

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

9.0 HOMOGENEITY

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

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

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

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

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

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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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



Certificate Approved By:

Muzzammil Khan
Stock Laboratory Supervisor



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director





CERTIFIED WEIGHT REPORT:

MS961 R-1 6/11/24

Lot #

Part Number: 57028
Lot Number: 041124
Description: Nickel (NI)
Solvent: 24002546 Nitric Acid
Expiration Date: 041127
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 1000
NIST Test Number: 6UTB
Weight shown below was diluted to (mL): 249.85
5E-05 Balance Uncertainty
0.002 Flask Uncertainty
2% 5.0 (mL) Nitric Acid

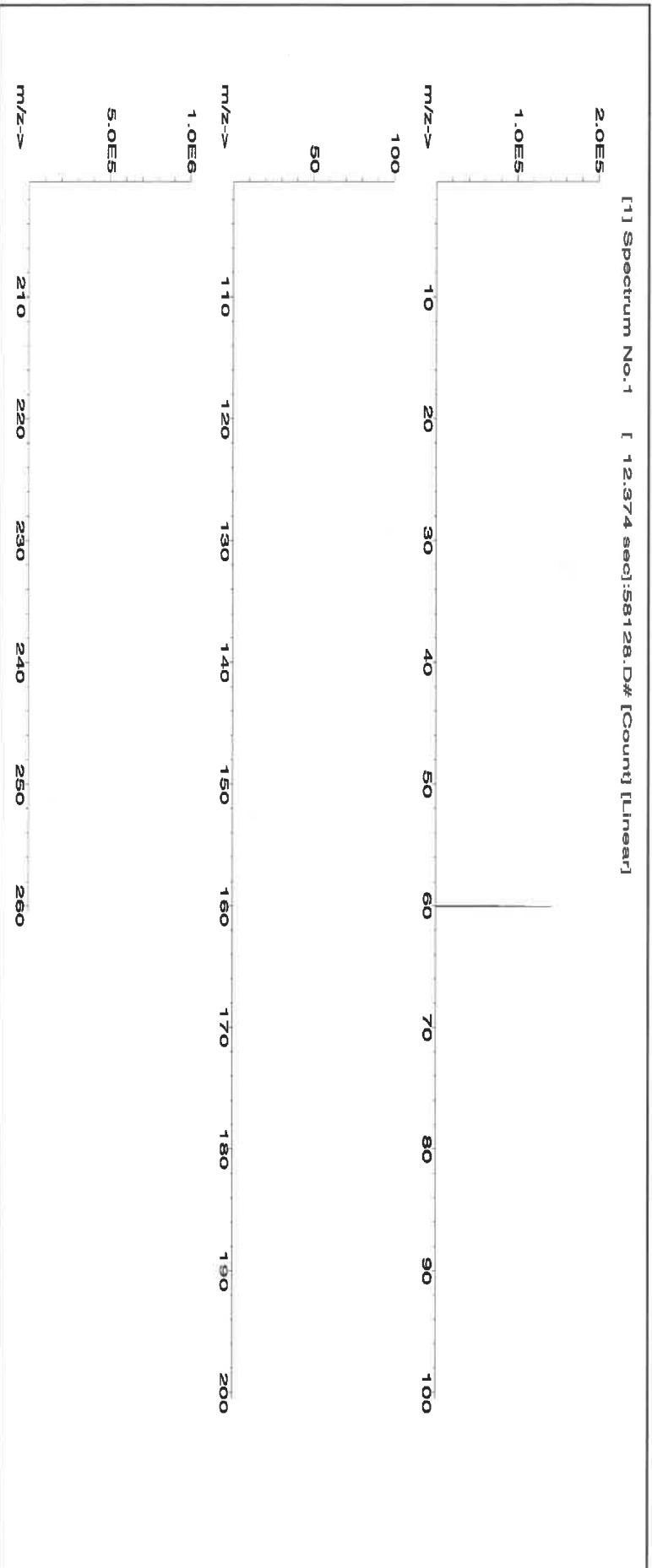
Formulated By:	Brian Geddes	041124
Reviewed By:	Pedro L. Rentas	041124

SDS Information

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

1. Nickel(II) nitrate hexahydrate (NI) IN033 NIM052023A1 1000 99.999 0.10 20.2 1.2369 1.2369 1000.0 2.0 13478-00-7 1 mg/m3 or-rat 1620 mg/kg 3136

[1] Spectrum No.1 [12.374 sec]:58128.D# [Count] [Linear]





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

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

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

(T) = Target analyte

Physical Characterization:

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

Certified by:

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



R: 06/14/2014



Lot # **Solvent:**

24002546

Nitric Acid

Selenium (Se)

2.0%

Expiration Date:

060627

(mL)

Formulated By:

Benson Chan

060624

Nominal Concentration ($\mu\text{g/mL}$):

1000

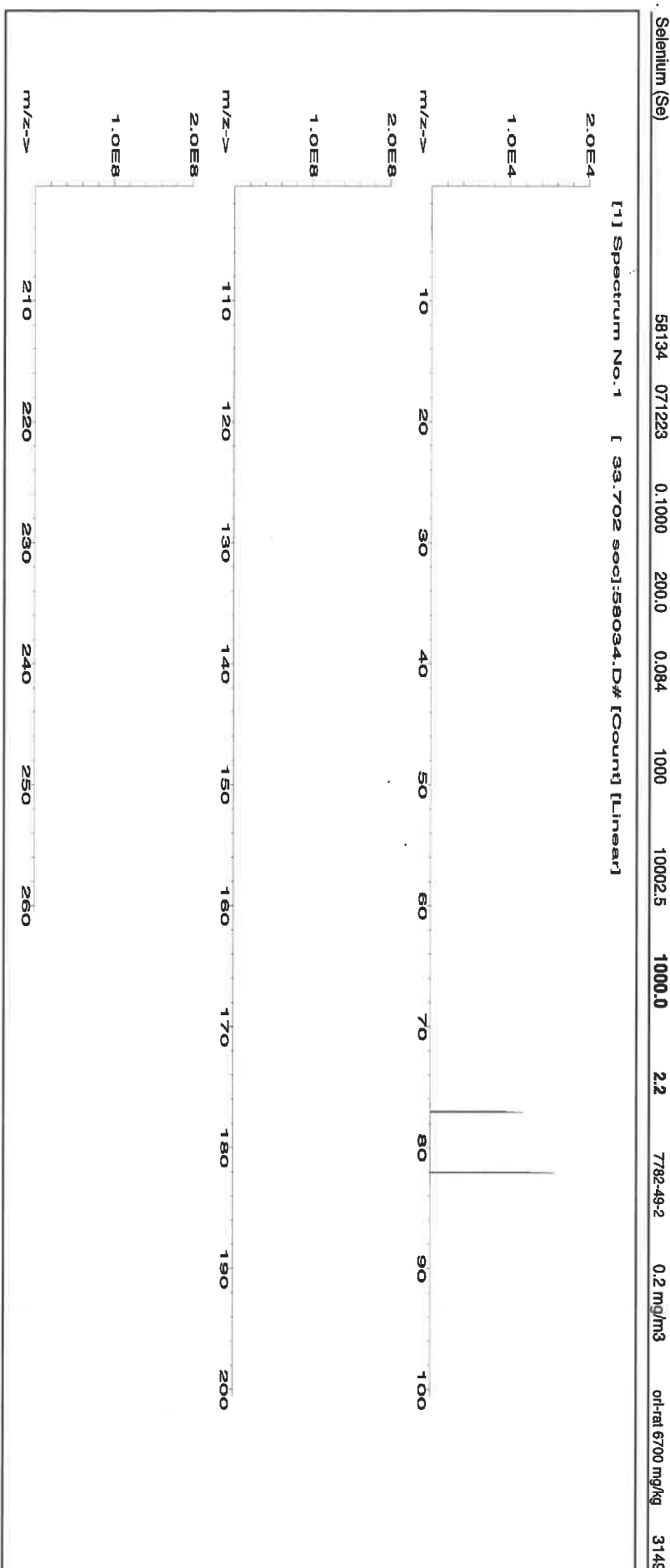
NIST Test Number: 6UTB

5E-05 Balance Uncertainty

Volume shown below was diluted to (mL): 2000.07

0.100 Flask Uncertainty

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





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

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

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

(T) = Target analyte

Physical Characterization:

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

Certified by:

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

M5976, M5977

R: 02/22/24

1.0 ACCREDITATION / REGISTRATION

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



2.0 PRODUCT DESCRIPTION

Product Code: Single Analyte Custom Grade Solution
Catalog Number: CGMO1
Lot Number: T2-MO720876
Matrix: H2O
tr. NH4OH
Value / Analyte(s): 1 000 µg/mL ea:
Molybdenum
Starting Material: Ammonium Molybdate
Starting Material Lot#: 2361
Starting Material Purity: 99.9893%

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Value: 998 ± 7 µg/mL
Density: 1.000 g/mL (measured at 20 ± 4 °C)
Assay Information:

Assay Method #1 **998 ± 4 µg/mL**
ICP Assay NIST SRM 3134 Lot Number: 130418

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

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

Characterization of CRM/RM by Two or More Methods

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

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

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

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

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

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

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

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

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

X_a = mean of Assay Method A with

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

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

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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

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	<	0.000590	M	Eu	<	0.000300	M	Na		0.000879	M	Se	<	0.008000	M	Zn		0.000598
M	Al		0.000563	M	Fe	<	0.006500	M	Nb	<	0.029000	i	Si	<		M	Zr	<	0.001800
M	As	<	0.002100	M	Ga	<	0.000300	i	Nd	<		M	Sm	<	0.000300				
M	Au	<	0.000300	M	Gd	<	0.000300	M	Ni	<	0.008000	M	Sn	<	0.008900				
M	B	<	0.003300	M	Ge	<	0.000300	M	Os	<	0.000590	M	Sr		0.000175				
M	Ba		0.001689	M	Hf	<	0.001800	i	P	<		M	Ta	<	0.004200				
M	Be	<	0.000890	M	Hg	<	0.003300	M	Pb	<	0.000300	M	Tb	<	0.000300				
M	Bi	<	0.000890	M	Ho	<	0.000300	M	Pd	<	0.001800	M	Te	<	0.021000				
O	Ca		0.006334	M	In	<	0.032000	M	Pr	<	0.013000	M	Th	<	0.000300				
O	Cd	<	0.026000	M	Ir	<	0.000300	M	Pt	<	0.000300	O	Tl	<	0.032000				
M	Ce	<	0.008300	M	K		0.130213	M	Rb		0.004575	M	Tl		0.001266				
M	Co		0.000598	M	La	<	0.000300	M	Re	<	0.000300	M	Tm	<	0.000300				
M	Cr		0.000527	O	Li		0.000059	M	Rh	<	0.000300	M	U	<	0.005300				
M	Cs		0.000527	M	Lu	<	0.000300	M	Ru	<	0.079000	M	V	<	0.000890				
M	Cu		0.002252	M	Mg		0.000563	i	S	<		M	W		0.087982				
M	Dy	<	0.000300	M	Mn	<	0.005900	M	Sb		0.001513	M	Y	<	0.000300				
M	Er	<	0.000300	s	Mo	<		M	Sc	<	0.001200	M	Yb	<	0.000300				

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

6.0 INTENDED USE

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

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

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

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

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

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 95.94 +6 6,7,8,9

[MoO4]-2(chemical form as received)

Chemical Compatibility -Mo is received in a NH4OH matrix giving the operator the option of using HCl or HF to stabilize acidic solutions. The [MoO4]-2 is soluble in concentrated HCl [MoOCl5]-2, dilute HF / HNO3 [MoOF5]-2 and basic media [MoO4]-2. Stable at ppm levels with some metals provided it is fluorinated. Do not mix with Alkaline or Rare Earths when HF is present. Stable with most inorganic anions provided it is in the [MoO4]-2 chemical form.

Stability - 2-100 ppb levels stable (alone or mixed with all other metals that are at comparable levels) as the [MoOF5]-2 for months in 1% HNO3 / LDPE container. 1-10,000 ppm single element solutions as the [MoO4]-2 chemically stable for years in 1% NH4OH in a LDPE container.

Mo Containing Samples (Preparation and Solution) -Metal (Soluble in HF / HNO3 or hot dilute HCl); Oxide (soluble in HF or NH4OH) ; Organic Matrices (Dry ash at 450EC in Pt0 and dissolve oxide with HF or HCl).

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

Technique/Line	Estimated D.L.	Order	Interferences (underlined indicates severe)
ICP-MS 95 amu	3 ppt	n/a	40Ar39K16O,79Br16O,190Os2+,190Pt2+
ICP-OES 202.030 nm	0.008 / 0.0002 µg/mL	1	Os, Hf
ICP-OES 203.844 nm	0.012 / 0.002 µg/mL	1	
ICP-OES 204.598 nm	0.012 / 0.001 µg/mL	1	Ir, Ta

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: 800.569.6799; 540.585.3030, Fax: 540.585.3012; info@inorganicventures.com

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

July 17, 2022

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

11.2 Lot Expiration Date

- July 17, 2027

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

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

11.3 Period of Validity

- Sealed TCT Bag Open Date: _____

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

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:

Uyen Truong
Supervisor, Product Documentation



Certificate Approved By:

Michael Booth
Director, Technical



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director



Certificate of Analysis

M5976, M5977

R: 02/22/24

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

1.0 ACCREDITATION / REGISTRATION

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



2.0 PRODUCT DESCRIPTION

Product Code: Single Analyte Custom Grade Solution
Catalog Number: CGMO1
Lot Number: T2-MO720876
Matrix: H2O
tr. NH4OH
Value / Analyte(s): 1 000 µg/mL ea:
Molybdenum
Starting Material: Ammonium Molybdate
Starting Material Lot#: 2361
Starting Material Purity: 99.9893%

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Value: 998 ± 7 µg/mL
Density: 1.000 g/mL (measured at 20 ± 4 °C)
Assay Information:

Assay Method #1 998 ± 4 µg/mL
ICP Assay NIST SRM 3134 Lot Number: 130418

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

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

Characterization of CRM/RM by Two or More Methods

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

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

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

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

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

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

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

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

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

X_a = mean of Assay Method A with

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

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

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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

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	<	0.000590	M	Eu	<	0.000300	M	Na		0.000879	M	Se	<	0.008000	M	Zn		0.000598
M	Al		0.000563	M	Fe	<	0.006500	M	Nb	<	0.029000	i	Si	<		M	Zr	<	0.001800
M	As	<	0.002100	M	Ga	<	0.000300	i	Nd	<		M	Sm	<	0.000300				
M	Au	<	0.000300	M	Gd	<	0.000300	M	Ni	<	0.008000	M	Sn	<	0.008900				
M	B	<	0.003300	M	Ge	<	0.000300	M	Os	<	0.000590	M	Sr		0.000175				
M	Ba		0.001689	M	Hf	<	0.001800	i	P	<		M	Ta	<	0.004200				
M	Be	<	0.000890	M	Hg	<	0.003300	M	Pb	<	0.000300	M	Tb	<	0.000300				
M	Bi	<	0.000890	M	Ho	<	0.000300	M	Pd	<	0.001800	M	Te	<	0.021000				
O	Ca		0.006334	M	In	<	0.032000	M	Pr	<	0.013000	M	Th	<	0.000300				
O	Cd	<	0.026000	M	Ir	<	0.000300	M	Pt	<	0.000300	O	Tl	<	0.032000				
M	Ce	<	0.008300	M	K		0.130213	M	Rb		0.004575	M	Tl		0.001266				
M	Co		0.000598	M	La	<	0.000300	M	Re	<	0.000300	M	Tm	<	0.000300				
M	Cr		0.000527	O	Li		0.000059	M	Rh	<	0.000300	M	U	<	0.005300				
M	Cs		0.000527	M	Lu	<	0.000300	M	Ru	<	0.079000	M	V	<	0.000890				
M	Cu		0.002252	M	Mg		0.000563	i	S	<		M	W		0.087982				
M	Dy	<	0.000300	M	Mn	<	0.005900	M	Sb		0.001513	M	Y	<	0.000300				
M	Er	<	0.000300	s	Mo	<		M	Sc	<	0.001200	M	Yb	<	0.000300				

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

6.0 INTENDED USE

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

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

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

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

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

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 95.94 +6 6,7,8,9

[MoO₄]-2(chemical form as received)

Chemical Compatibility -Mo is received in a NH₄OH matrix giving the operator the option of using HCl or HF to stabilize acidic solutions. The [MoO₄]-2 is soluble in concentrated HCl [MoOCl₅]-2, dilute HF / HNO₃ [MoOF₅]-2 and basic media [MoO₄]-2. Stable at ppm levels with some metals provided it is fluorinated. Do not mix with Alkaline or Rare Earths when HF is present. Stable with most inorganic anions provided it is in the [MoO₄]-2 chemical form.

Stability - 2-100 ppb levels stable (alone or mixed with all other metals that are at comparable levels) as the [MoOF₅]-2 for months in 1% HNO₃ / LDPE container. 1-10,000 ppm single element solutions as the [MoO₄]-2 chemically stable for years in 1% NH₄OH in a LDPE container.

Mo Containing Samples (Preparation and Solution) -Metal (Soluble in HF / HNO₃ or hot dilute HCl); Oxide (soluble in HF or NH₄OH) ; Organic Matrices (Dry ash at 450EC in Pt0 and dissolve oxide with HF or HCl).

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

Technique/Line	Estimated D.L.	Order	Interferences (underlined indicates severe)
ICP-MS 95 amu	3 ppt	n/a	40Ar39K16O,79Br16O,190Os2+,190Pt2+
ICP-OES 202.030 nm	0.008 / 0.0002 µg/mL	1	Os, Hf
ICP-OES 203.844 nm	0.012 / 0.002 µg/mL	1	
ICP-OES 204.598 nm	0.012 / 0.001 µg/mL	1	Ir, Ta

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: 800.569.6799; 540.585.3030, Fax: 540.585.3012; info@inorganicventures.com

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

July 17, 2022

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

11.2 Lot Expiration Date

- July 17, 2027

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

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

11.3 Period of Validity

- Sealed TCT Bag Open Date: _____

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

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:

Uyen Truong
Supervisor, Product Documentation



Certificate Approved By:

Michael Booth
Director, Technical



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director



Certificate of Analysis

MS978, MS979



Refine your results. Redefine your industry.

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F: 540-585-3012
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1.0 ACCREDITATION / REGISTRATION

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



2.0 PRODUCT DESCRIPTION

Product Code: Single Analyte Custom Grade Solution

Catalog Number: CGT1

Lot Number: T2-T1719972

Matrix: 2% (v/v) HNO₃

Value / Analyte(s): tr. HF

Starting Material: 1 000 µg/mL ea.

Starting Material: Titanium

Starting Material: Ti Metal

Starting Material Lot#: 2094

Starting Material Purity: 99.9975%

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Value: 1002 ± 5 µg/mL

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

Assay Method #1

1002 ± 4 µg/mL

ICP Assay NIST SRM 3162a Lot Number: 130925

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

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

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

$X_{CRM/RM} = (X_p / U_{CRM})$

X_p = mean of Assay Method A with

U_{CRM} = the standard uncertainty of characterization Method A

$U_{CRM} = (U_{CRM1}^2 / C_1^2 + U_{CRM2}^2 / C_2^2 + \dots + U_{CRMn}^2 / C_n^2)^{1/2}$

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

$U_{CRM} = (U_{CRM1}^2 / C_1^2 + U_{CRM2}^2 / C_2^2 + \dots + U_{CRMn}^2 / C_n^2)^{1/2}$

$U_{CRM} = (U_{CRM1}^2 / C_1^2 + U_{CRM2}^2 / C_2^2 + \dots + U_{CRMn}^2 / C_n^2)^{1/2}$

$U_{CRM} = (U_{CRM1}^2 / C_1^2 + U_{CRM2}^2 / C_2^2 + \dots + U_{CRMn}^2 / C_n^2)^{1/2}$

$U_{CRM} = (U_{CRM1}^2 / C_1^2 + U_{CRM2}^2 / C_2^2 + \dots + U_{CRMn}^2 / C_n^2)^{1/2}$

$U_{CRM} = (U_{CRM1}^2 / C_1^2 + U_{CRM2}^2 / C_2^2 + \dots + U_{CRMn}^2 / C_n^2)^{1/2}$

$U_{CRM} = (U_{CRM1}^2 / C_1^2 + U_{CRM2}^2 / C_2^2 + \dots + U_{CRMn}^2 / C_n^2)^{1/2}$

$U_{CRM} = (U_{CRM1}^2 / C_1^2 + U_{CRM2}^2 / C_2^2 + \dots + U_{CRMn}^2 / C_n^2)^{1/2}$

$U_{CRM} = (U_{CRM1}^2 / C_1^2 + U_{CRM2}^2 / C_2^2 + \dots + U_{CRMn}^2 / C_n^2)^{1/2}$

$U_{CRM} = (U_{CRM1}^2 / C_1^2 + U_{CRM2}^2 / C_2^2 + \dots + U_{CRMn}^2 / C_n^2)^{1/2}$

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$U_{CRM} = (U_{CRM1}^2 / C_1^2 + U_{CRM2}^2 / C_2^2 + \dots + U_{CRMn}^2 / C_n^2)^{1/2}$

4.0 TRACEABILITY TO NIST

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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

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

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

6.0 INTENDED USE

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

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

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

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

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

Atomic Weight; Valence: Soluble in concentrated HCl, HF, H₃PO₄, H₂SO₄ and HNO₃. Avoid neutral to basic media. Unstable at ppm levels with metals that would pull F- away (i.e. Do not mix with Alkaline or Rare Earths or high levels of transition elements unless they are fluorinated). Stable with most inorganic anions with a tendency to hydrolyze forming the hydrated oxide in all dilute acids except HF.

Stability: - 2-100 ppb levels stable (Alone or mixed with all other metals) as the Ti(F)-6-2 for months in 1% HNO₃ / LDPE container. - 1-10,000 ppm single element solutions as the Ti(F)-6-2 chemically stable for years in 2-5% HNO₃ / trace HF in an LDPE container.

Ti Containing Samples (Preparation and Solution) - Metal (Soluble in H₂O / HF caution - powder reacts violently): Oxide - high temperature history or rutile (Dissolved by heating in 1:1:1 H₂O / HF / H₂SO₄); K₂SiO₃ - no KF if silica not present); Organic Matrices (Dry ash at 450°C in P10 and dissolve by heating with 1:1:1 H₂O / HF / H₂SO₄ or fuse ash with pyrosulfate if oxide is as plastic pigment and likely in brookite crystaline form).

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

Technique/Line	Estimated D.L.	14 ppt
ICP-MS 48 amu	N/A	32S160, 32S14N,
ICP-OES 323.452 nm	0.0054 / 0.00092 µg/mL	14N17N2, 36Ar12C,
ICP-OES 334.941 nm	0.0038 / 0.00028 µg/mL	48Ca, [96X=2
ICP-OES 336.121 nm	0.0053 / 0.00034 µg/mL	14N17N2, 36Ar12C,
HF Note: This standard should not be prepared or stored in glass.		W, Mo, Co
		Nb, Ta, Cr, U
		Ce, Ar, Ni
		Ru]]
		(where X = Zr, Mo,

8.0

HAZARDOUS INFORMATION

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

9.0

HOMOGENEITY

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

10.0

QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

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

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

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

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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11.0

CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

June 17, 2022

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

11.2 Lot Expiration Date

- June 17, 2027

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

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

11.3 Period of Validity

- Sealed TCT Bag Open Date:

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

12.0

NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Thomas Kozlikowski
Manager, Quality Control

TD9784

Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director

Paul R. Gaines

Certificate of Analysis

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Christiansburg, VA 24073 USA
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M5985
R: 6/14/24

1.0 ACCREDITATION / REGISTRATION

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



2.0 PRODUCT DESCRIPTION

Product Code: Single Analyte Custom Grade Solution
Catalog Number: CGIN10
Lot Number: U2-IN729349
Matrix: 5% (v/v) HNO₃
Value / Analyte(s): 10 000 µg/mL ea:
Indium
Starting Material: Indium Metal
Starting Material Lot#: 2511
Starting Material Purity: 99.9995%

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Value: 10022 ± 30 µg/mL
Density: 1.044 g/mL (measured at 20 ± 4 °C)

Assay Information:

Assay Method #1	10021 ± 56 µg/mL ICP Assay NIST SRM 3124a Lot Number: 110516
Assay Method #2	10035 ± 25 µg/mL EDTA NIST SRM 928 Lot Number: 928
Assay Method #3	10001 ± 33 µg/mL Calculated NIST SRM Lot Number: See Sec. 4.2

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

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

Characterization of CRM/RM by Two or More Methods

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

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

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

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

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

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

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

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

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

X_a = mean of Assay Method A with

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

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

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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

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

M	Ag	<	0.000760	M	Eu	<	0.000760	O	Na	0.012771	M	Se	<	0.023000	M	Zn	<	0.006100
M	Al	0.003385	O	Fe	0.004462	M	Nb	<	0.000760	O	Si	0.024619	M	Zr	<	0.000760		
M	As	<	0.004600	M	Ga	<	0.000760	M	Nd	<	0.000760	M	Sm	<	0.000760			
M	Au	<	0.002300	M	Gd	<	0.000760	O	Ni	<	0.005100	M	Sn	<	0.000760			
O	B	0.003692	M	Ge	<	0.001600	M	Os	<	0.000760	O	Sr	<	0.000610				
M	Ba	<	0.001600	M	Hf	<	0.000760	n	P	<		M	Ta	<	0.000760			
O	Be	<	0.000130	M	Hg	<	0.003100	M	Pb	0.001400	M	Tb	<	0.000760				
M	Bi	<	0.000760	M	Ho	<	0.000760	M	Pd	<	0.001600	M	Te	<	0.000760			
O	Ca	0.004616	s	In	<			M	Pr	<	0.000760	M	Th	<	0.000760			
M	Cd	<	0.000760	M	Ir	<	0.000760	M	Pt	<	0.000760	O	Ti	<	0.001100			
M	Ce	<	0.000760	O	K	0.007078	M	Rb	<	0.000760	M	Tl	<	0.000760				
M	Co	<	0.000760	M	La	<	0.000760	M	Re	<	0.000760	M	Tm	<	0.000760			
O	Cr	<	0.001300	O	Li	<	0.000130	M	Rh	<	0.000760	M	U	<	0.000760			
M	Cs	<	0.000760	M	Lu	<	0.000760	M	Ru	<	0.000760	M	V	<	0.001600			
M	Cu	<	0.003800	O	Mg	0.000707	n	S	<		M	W	<	0.001600				
M	Dy	<	0.000760	O	Mn	0.000149	M	Sb	<	0.000760	M	Y	<	0.000760				
M	Er	<	0.000760	M	Mo	<	0.002300	M	Sc	<	0.000760	M	Yb	<	0.000760			

M - Checked by ICP-MS

O - Checked by ICP-OES

i - Spectral Interference

n - Not Checked For

s - Solution Standard Element

6.0 INTENDED USE

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

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

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

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

Atomic Weight; Valence; Coordination Number; Chemical Form In Solution - 114.82 +3 6 In(H₂O)₆+3

Chemical Compatibility -Soluble in HCl, HNO₃, and H₂SO₄. Avoid neutral and basic media. Stable with most metals and inorganic anions. The oxalate, sulfide, carbonate, hydroxide and phosphate are insoluble in water.

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

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

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

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

8.0 HAZARDOUS INFORMATION

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

9.0 HOMOGENEITY

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

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

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

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

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

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

February 21, 2023

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

11.2 Lot Expiration Date

- February 21, 2028

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

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

11.3 Period of Validity

- Sealed TCT Bag Open Date: _____

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

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Thomas Kozikowski
Manager, Quality Control



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director





Refine your results. Redefine your industry.

300 Technology Drive
Christiansburg, VA 24073 USA
inorganicventures.com

Certificate of Analysis

M6074
M6075
M6076
M6077

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

F: 540-585-3012

info@inorganicventures.com

EXP: 9/6/2029

1.0 ACCREDITATION / REGISTRATION

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



2.0 PRODUCT DESCRIPTION

Product Code: Multi Analyte Custom Grade Solution
Catalog Number: CHEM-CLP-4
Lot Number: V2-MEB746762
Matrix: 3% (v/v) HNO₃
3% (v/v) HF
Value / Analyte(s): 1 000 µg/mL ea:
Boron, Molybdenum,
Silicon, Tin,
Titanium

3.0 CERTIFIED VALUES AND UNCERTAINTIES

ANALYTE	CERTIFIED VALUE	ANALYTE	CERTIFIED VALUE
Boron, B	1 000 ± 5 µg/mL	Molybdenum, Mo	1 000 ± 5 µg/mL
Silicon, Si	1 000 ± 7 µg/mL	Tin, Sn	1 000 ± 5 µg/mL
Titanium, Ti	1 000 ± 6 µg/mL		

Density: 1.033 g/mL (measured at 20 ± 4 °C)

Assay Information:

ANALYTE	METHOD	NIST SRM#	SRM LOT#
B	ICP Assay	3107	190605
B	Calculated		See Sec. 4.2
Mo	ICP Assay	traceable to 3134	U2-MO739068
Si	ICP Assay	Traceable to 3150	S2-SI702546
Sn	ICP Assay	3161a	140917
Ti	ICP Assay	traceable to 3162a	T2-TI725816

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

Characterization of CRM/RM by Two or More Methods

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

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

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

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

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

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

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

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

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

X_a = mean of Assay Method A with

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

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

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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

N/A

6.0 INTENDED USE

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

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

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

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

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

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

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

8.0 HAZARDOUS INFORMATION

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

9.0 HOMOGENEITY

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

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

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

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

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

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

September 06, 2024

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

11.2 Lot Expiration Date

- **September 06, 2029**

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

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

11.3 Period of Validity

- Sealed TCT Bag Open Date: _____

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

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Joseph Burns
Custom VS Manager



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director



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

 **avantor™**



Review → 10/9/24
Met dig

Material No.: 9530-33
Batch No.: 22E1662006
Manufactured Date: 2022-04-11
Retest Date: 2027-04-10
Revision No.: 0

M6118

Certificate of Analysis

Test	Specification	Result
ACS – Assay (as HCl) (by acid-base titrn)	36.5 – 38.0 %	37.6 %
ACS – Color (APHA)	≤ 10	5
ACS – Residue after Ignition	≤ 3 ppm	< 1 ppm
ACS – Specific Gravity at 60°/60°F	1.185 – 1.192	1.190
ACS – Bromide (Br)	≤ 0.005 %	< 0.005 %
ACS – Extractable Organic Substances	≤ 5 ppm	< 1 ppm
ACS – Free Chlorine (as Cl ₂)	≤ 0.5 ppm	< 0.5 ppm
Phosphate (PO ₄)	≤ 0.05 ppm	< 0.03 ppm
Sulfate (SO ₄)	≤ 0.5 ppm	< 0.3 ppm
Sulfite (SO ₃)	≤ 0.8 ppm	0.3 ppm
Ammonium (NH ₄)	≤ 3 ppm	< 1 ppm
Trace Impurities – Arsenic (As)	≤ 0.010 ppm	< 0.003 ppm
Trace Impurities – Aluminum (Al)	≤ 10.0 ppb	< 0.2 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	37.0 ppb
Trace Impurities – Chromium (Cr)	≤ 1.0 ppb	< 0.4 ppb
Trace Impurities – Cobalt (Co)	≤ 1.0 ppb	< 0.3 ppb
Trace Impurities – Copper (Cu)	≤ 1.0 ppb	< 0.1 ppb
Trace Impurities – Gallium (Ga)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Germanium (Ge)	≤ 3.0 ppb	< 2.0 ppb
Trace Impurities – Gold (Au)	≤ 4.0 ppb	0.2 ppb
Heavy Metals (as Pb)	≤ 100 ppb	< 50 ppb
Trace Impurities – Iron (Fe)	≤ 15 ppb	1 ppb

>>> Continued on page 2 >>>

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



Material No.: 9530-33
Batch No.: 22E1662006

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	1.0 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	< 0.2 ppb
Trace Impurities – Potassium (K)	≤ 9.0 ppb	< 2.0 ppb
Trace Impurities – Selenium (Se), For Information Only		1.0 ppb
Trace Impurities – Silicon (Si)	≤ 100.0 ppb	< 0.4 ppb
Trace Impurities – Silver (Ag)	≤ 1.0 ppb	< 0.3 ppb
Trace Impurities – Sodium (Na)	≤ 100.0 ppb	1.9 ppb
Trace Impurities – Strontium (Sr)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Tantalum (Ta)	≤ 1.0 ppb	< 0.9 ppb
Trace Impurities – Thallium (Tl)	≤ 5.0 ppb	< 2.0 ppb
Trace Impurities – Tin (Sn)	≤ 5.0 ppb	< 0.8 ppb
Trace Impurities – Titanium (Ti)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Vanadium (V)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Zinc (Zn)	≤ 5.0 ppb	< 0.3 ppb
Trace Impurities – Zirconium (Zr)	≤ 1.0 ppb	< 0.1 ppb

>>> Continued on page 3 >>>

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

 **avantorsm**



Material No.: 9530-33
Batch No.: 22E1662006

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

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


Jamie Ethier
Vice President Global Quality

Nitric Acid 69%
CMOS

avantor™



R → 10/13/24
Metali g

Material No.: 9606-03
Batch No.: 2310662003
Manufactured Date: 2023-08-21
Retest Date: 2028-08-19
Revision No.: 0

M 6120

Certificate of Analysis

Test	Specification	Result
Assay (HNO ₃)	69.0 – 70.0 %	69.5 %
Appearance	Passes Test	Passes Test
Color (APHA)	≤ 10	10
Residue after Ignition	≤ 2 ppm	< 2 ppm
Chloride (Cl)	≤ 0.08 ppm	< 0.08 ppm
Phosphate (PO ₄)	≤ 0.10 ppm	< 0.10 ppm
Sulfate (SO ₄)	≤ 0.2 ppm	0.2 ppm
Trace Impurities – Aluminum (Al)	≤ 40.0 ppb	< 40.0 ppb
Arsenic and Antimony (as As)	≤ 5.0 ppb	< 5.0 ppb
Trace Impurities – Barium (Ba)	≤ 10.0 ppb	< 10.0 ppb
Trace Impurities – Beryllium (Be)	≤ 10.0 ppb	< 10.0 ppb
Trace Impurities – Bismuth (Bi)	≤ 20.0 ppb	< 20.0 ppb
Trace Impurities – Boron (B)	≤ 10.0 ppb	< 10.0 ppb
Trace Impurities – Cadmium (Cd)	≤ 50 ppb	< 50 ppb
Trace Impurities – Calcium (Ca)	≤ 50.0 ppb	< 50.0 ppb
Trace Impurities – Chromium (Cr)	≤ 30.0 ppb	30.0 ppb
Trace Impurities – Cobalt (Co)	≤ 10.0 ppb	< 10.0 ppb
Trace Impurities – Copper (Cu)	≤ 10.0 ppb	< 10.0 ppb
Trace Impurities – Gallium (Ga)	≤ 10.0 ppb	< 10.0 ppb
Trace Impurities – Germanium (Ge)	≤ 20 ppb	< 20 ppb
Trace Impurities – Gold (Au)	≤ 20 ppb	< 20 ppb
Heavy Metals (as Pb)	≤ 100 ppb	< 100 ppb
Trace Impurities – Iron (Fe)	≤ 40.0 ppb	< 40.0 ppb
Trace Impurities – Lead (Pb)	≤ 20.0 ppb	< 20.0 ppb
Trace Impurities – Lithium (Li)	≤ 10.0 ppb	< 10.0 ppb
Trace Impurities – Magnesium (Mg)	≤ 20 ppb	< 20 ppb
Trace Impurities – Manganese (Mn)	≤ 10.0 ppb	< 10.0 ppb
Trace Impurities – Nickel (Ni)	≤ 20.0 ppb	< 20.0 ppb

>>> Continued on page 2 >>>

Nitric Acid 69%
CMOS

 **avantorsTM**



Material No.: 9606-03
Batch No.: 2310662003

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

>>> Continued on page 3 >>>

Nitric Acid 69%
CMOS

 **avantorsTM**

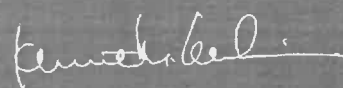


Material No.: 9606-03
Batch No.: 2310662003

Test	Specification	Result
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For Microelectronic Use

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



Ken Koehnlein
Sr. Manager, Quality Assurance

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

avantor™



R → 16/13/24
Met dig

M 6121

Material No.: 9530-33
Batch No.: 0000275677
Manufactured Date: 2020/12/16
Retest Date: 2025/12/15
Revision No: 1

Certificate of Analysis

Test	Specification	Result
ACS – Assay (as HCl) (by acid-base titrn)	36.5 – 38.0 %	37.6
ACS – Color (APHA)	<= 10	5
ACS – Residue after Ignition	<= 3 ppm	1
ACS – Specific Gravity at 60°/60°F	1.185 – 1.192	1.190
ACS – Bromide (Br)	<= 0.005 %	< 0.005
ACS – Extractable Organic Substances	<= 5 ppm	1
ACS – Free Chlorine (as Cl ₂)	<= 0.5 ppm	< 0.5
Phosphate (PO ₄)	<= 0.05 ppm	< 0.03
Sulfate (SO ₄)	<= 0.5 ppm	< 0.3
Sulfite (SO ₃)	<= 0.8 ppm	0.3
Ammonium (NH ₄)	<= 3 ppm	< 1
Trace Impurities – Arsenic (As)	<= 0.010 ppm	< 0.003
Trace Impurities – Aluminum (Al)	<= 10.0 ppb	< 0.2
Arsenic and Antimony (as As)	<= 5 ppb	< 3
Trace Impurities – Barium (Ba)	<= 1.0 ppb	< 0.2
Trace Impurities – Beryllium (Be)	<= 1.0 ppb	< 0.2
Trace Impurities – Bismuth (Bi)	<= 10.0 ppb	< 1.0
Trace Impurities – Boron (B)	<= 20.0 ppb	< 5.0
Trace Impurities – Cadmium (Cd)	<= 1.0 ppb	< 0.3
Trace Impurities – Calcium (Ca)	<= 50.0 ppb	29.7
Trace Impurities – Chromium (Cr)	<= 1.0 ppb	< 0.4
Trace Impurities – Cobalt (Co)	<= 1.0 ppb	< 0.3
Trace Impurities – Copper (Cu)	<= 1.0 ppb	< 0.1
Trace Impurities – Gallium (Ga)	<= 1.0 ppb	< 0.2

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

Avantor Performance Materials, LLC

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

Material No.: 9530-33
Batch No.: 0000275677

Test	Specification	Result
Trace Impurities – Germanium (Ge)	<= 3.0 ppb	< 2.0
Trace Impurities – Gold (Au)	<= 4.0 ppb	< 0.2
Heavy Metals (as Pb)	<= 100 ppb	< 50
Trace Impurities – Iron (Fe)	<= 15.0 ppb	< 1
Trace Impurities – Lead (Pb)	<= 1.0 ppb	< 0.5
Trace Impurities – Lithium (Li)	<= 1.0 ppb	0.2
Trace Impurities – Magnesium (Mg)	<= 10.0 ppb	0.4
Trace Impurities – Manganese (Mn)	<= 1.0 ppb	< 0.4
Trace Impurities – Mercury (Hg)	<= 0.5 ppb	0.1
Trace Impurities – Molybdenum (Mo)	<= 10.0 ppb	< 5.0
Trace Impurities – Nickel (Ni)	<= 4.0 ppb	< 0.3
Trace Impurities – Niobium (Nb)	<= 1.0 ppb	< 0.2
Trace Impurities – Potassium (K)	<= 9.0 ppb	< 2.0
Trace Impurities – Selenium (Se), For Information Only	ppb	1.0
Trace Impurities – Silicon (Si)	<= 100.0 ppb	< 10.0
Trace Impurities – Silver (Ag)	<= 1.0 ppb	< 0.3
Trace Impurities – Sodium (Na)	<= 100.0 ppb	< 5.0
Trace Impurities – Strontium (Sr)	<= 1.0 ppb	< 0.2
Trace Impurities – Tantalum (Ta)	<= 1.0 ppb	< 0.9
Trace Impurities – Thallium (Tl)	<= 5.0 ppb	< 2.0
Trace Impurities – Tin (Sn)	<= 5.0 ppb	< 0.8
Trace Impurities – Titanium (Ti)	<= 1.0 ppb	0.2
Trace Impurities – Vanadium (V)	<= 1.0 ppb	< 0.2
Trace Impurities – Zinc (Zn)	<= 5.0 ppb	0.3
Trace Impurities – Zirconium (Zr)	<= 1.0 ppb	< 0.1

For Laboratory, Research or Manufacturing Use

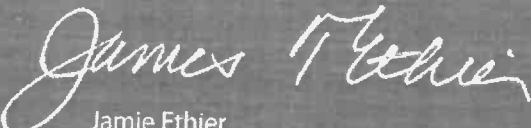
Product Information (not specifications):

Appearance (clear, fuming liquid)

Meets ACS Specifications

Country of Origin: US

Packaging Site: Phillipsburg Mfg Ctr & DC


Jamie Ethier

Vice President Global Quality

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

Avantor Performance Materials, LLC

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

Nitric Acid 69%
CMOS



R → 11/12/24

M6126

Material No.: 9606-03
Batch No.: 24D1062002
Manufactured Date: 2024-03-26
Retest Date: 2029-03-25
Revision No.: 0

Certificate of Analysis

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

>>> Continued on page 2 >>>

Nitric Acid 69%
CMOS

 **avantor**TM



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

Test	Specification	Result
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For Microelectronic Use

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



Jamie Croak
Director Quality Operations, Bioscience Production



CERTIFIED WEIGHT REPORT:

Part Number: 58112
Lot # 112124
Description: Magnesium (Mg)
Solvent: Nitric Acid

Expiration Date: 11/21/27
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 10000
NIST Test Number: 6LUB

Weight shown below was diluted to (mL): 2000.07
5E-05 Balance Uncertainty
0.100 Flask Uncertainty

<i>Giovanni Esposito</i>	
Formulated By:	Giovanni Esposito
Reviewed By:	Pedro L. Rentas
	112124

Compound

Lot	Nominal	Purity	Uncertainty	Assay	Target	Actual	Actual	Expanded	SDS Information	NIST
Number	Conc. (µg/mL)	(%)	Purity (%)	(%)	Weight (g)	Weight (g)	Conc. (µg/mL)	± (µg/mL)	(Solvent Safety Info. On Attached pg.)	SRM

1. Magnesium nitrate hexahydrate (Mg) IN030 MG000023A1 10000 99.999 0.10 8.51 234.9183 234.9459 10001.2 20.0 13446-18-9 NA off-rat 5440 mg/kg 3131a

[1] Spectrum No. 1 [19.823 sec]:58112.D# [Count] [Linear]





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

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

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

(T) = Target analyte

Physical Characterization:

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

Certified by:

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



CERTIFIED WEIGHT REPORT:

Part Number:
Lot Number:
Description:

58025
101124
Manganese (Mn)

R-71113128

Lot #
Solvent: 24002546 Nitric Acid

Expiration Date:

101127

2% 80.0 (mL) Nitric Acid

Recommended Storage:

Ambient (20 °C)

Nominal Concentration (µg/mL):

1000

NIST Test Number:

6UTB

Weight shown below was diluted to (mL):

4000.2

0.10 Flask Uncertainty

SE-05 Balance Uncertainty

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

Compound

RM#	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty Purity (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
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1. Manganese(II) nitrate hydrate (Mn) IN031 MNM02020A1 1000 99.999 0.10 20.8 19.2322 19.2344 1000.1 2.0 15710-66-4 5 mg/m3 or-rel >300mg/kg 3132

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

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



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

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

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

(T) = Target analyte

Physical Characterization:

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

Certified by:

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



CERTIFIED WEIGHT REPORT:

Part Number: 58111
Lot Number: 072424
Description: Sodium (Na)

Lot # R-1113125
Solvent: 24002546 Nitric Acid

Expiration Date: 072427
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 10000
NIST Test Number: 6UTB

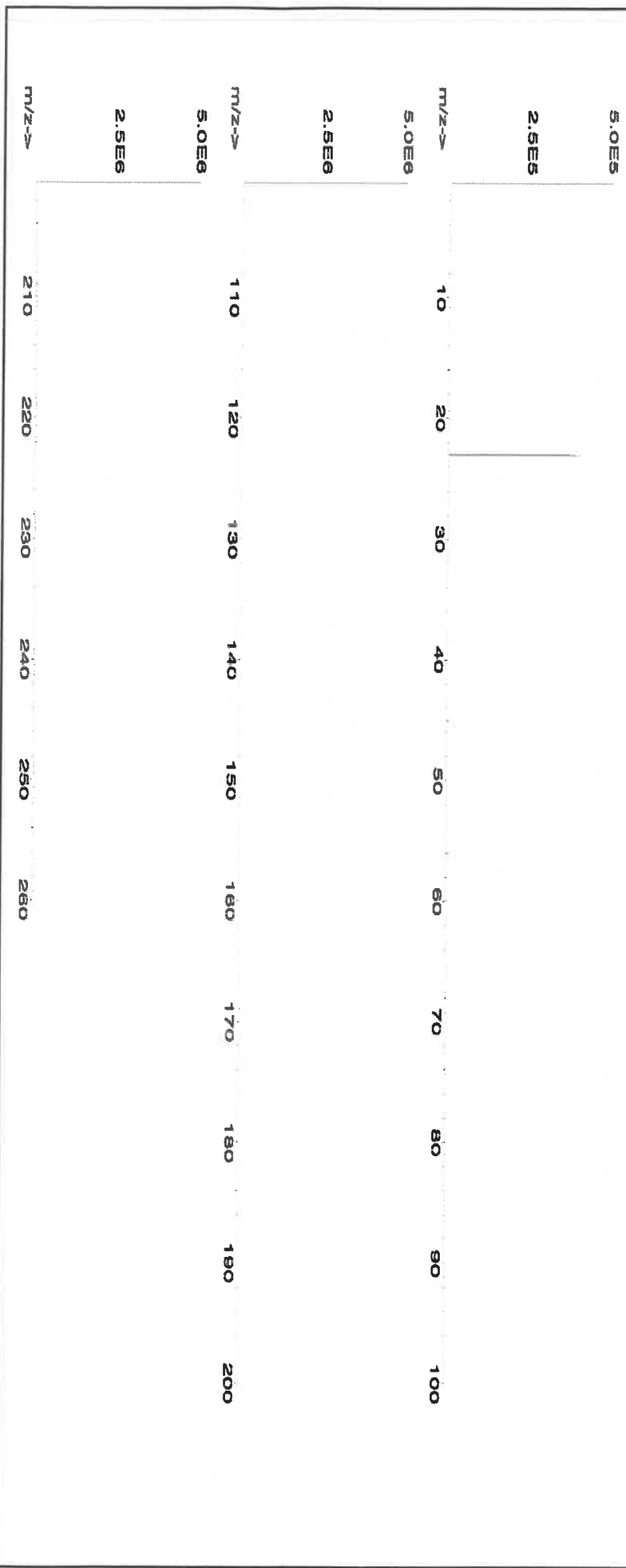
Weight shown below was diluted to (mL): 4000.2
5E-05 Balance Uncertainty
0.10 Flask Uncertainty

Formulated By:	Benson Chan	072424
Reviewed By:	Pedro L. Renteria	072424

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

1. Sodium nitrate (Na) IN036 NAV01201511 10000 99.999 0.10 26.9 148.7096 ##### 10000.0 20.0 7631-99-4 5 mg/m3 orl-rat 3430 mg/kg 3152a

[1] Spectrum No. 1 [8.935 sec]:58111.D# [Count] [Linear]





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

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

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

(T) = Target analyte

Physical Characterization:

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

Certified by:

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



CERTIFIED WEIGHT REPORT:

Part Number: 58111
Lot Number: 122223
Description: Sodium (Na)

Solvent: 24002546 Nitric Acid

Lot #

Expiration Date: 122226
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 10000
NIST Test Number: 6UTB

2% 60.0 (mL) Nitric Acid

Weight shown below was diluted to (mL): 3000.4 0.06 Flask Uncertainty

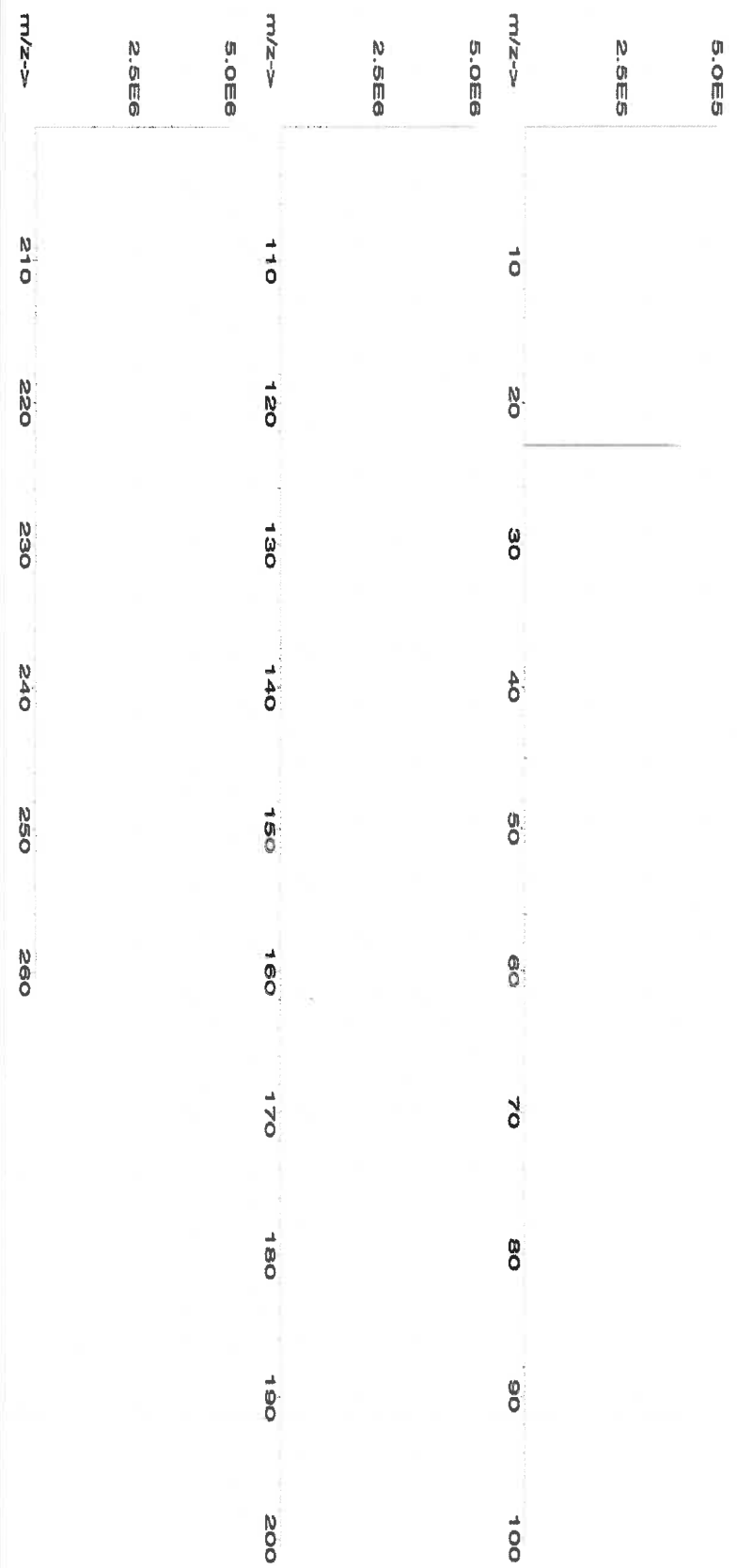
<i>Aleah O Brady</i>	
Formulated By:	Aleah O Brady
	122223
<i>Pedro L Rentas</i>	
Reviewed By:	Pedro L Rentas
	122223

SDS Information

Compound	Lot	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty Purity (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
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1. Sodium nitrate (Na) IN036 NAV01201511 10000 99.999 0.10 26.9 111.5406 111.5479 10000.7 20.0 7631-99-4 5 mg/m3 or-trat 3430 mg/kg 3152a

[1] Spectrum No.1 [8.935 sec]:58111.D# [Count] [Linear]





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

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

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

(T) = Target analyte

Physical Characterization:

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

Certified by:

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



R: 01/03/24 M5802 M5803

CERTIFIED WEIGHT REPORT:

Part Number:
Lot Number:
Description:

57051
120523
Antimony (Sb)

Lot #
24002546

Solvent:
Nitric Acid

2.0%

60.0
(mL)

Nitric Acid

Expiration Date:
120526

Recommended Storage:
Ambient (20 °C)

Nominal Concentration (µg/mL):
1000

NIST Test Number:
6U7B

Volume shown below was diluted to (mL):
3000.41

5E-05 Balance Uncertainty
0.058 Flask Uncertainty

Formulated By:	Lawrence Barry	120523
Reviewed By:	Pedro L. Renteria	120523

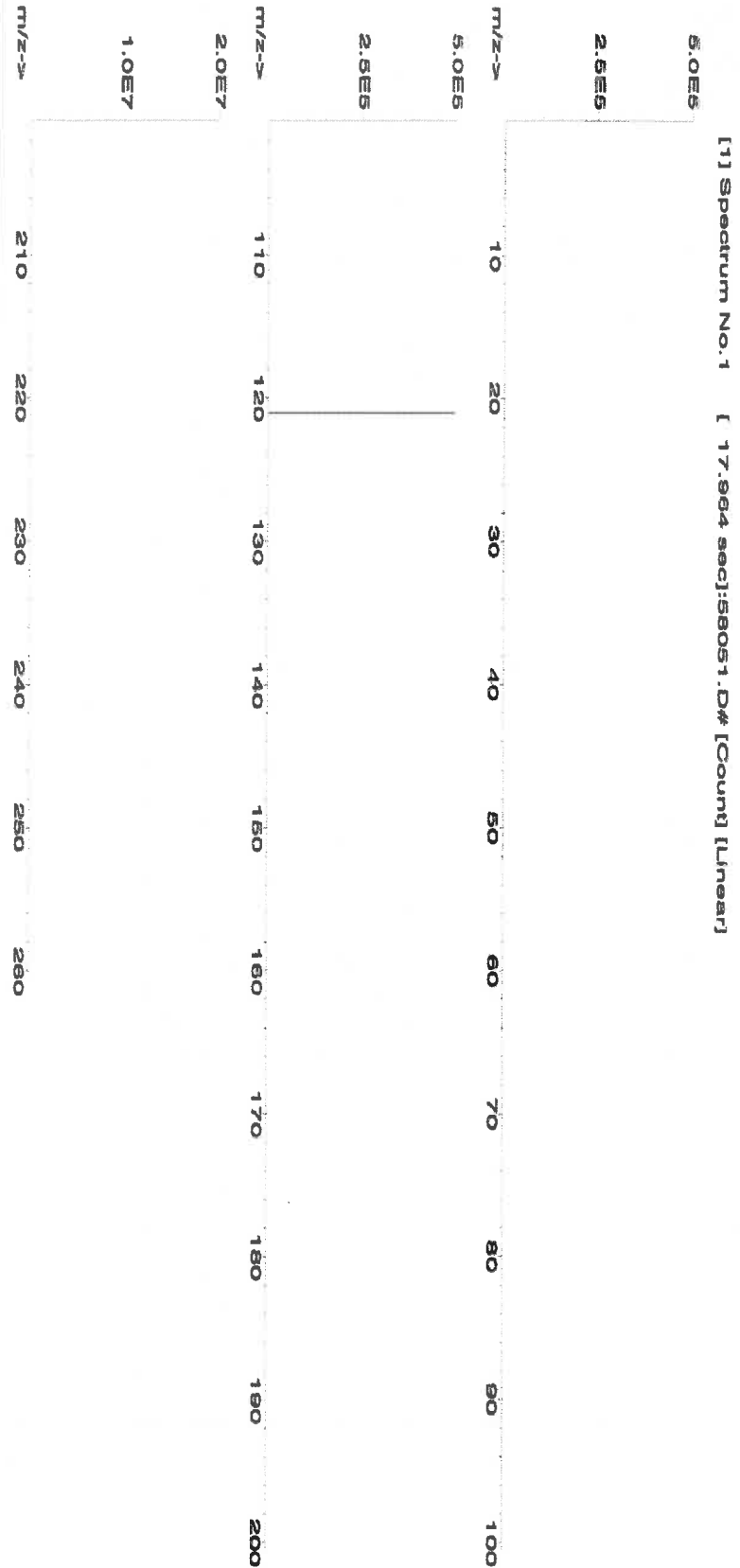
Compound

Part Number	Lot Number	Dilution Factor	Initial Vol. (mL)	Uncertainty Pipette (mL)	Nominal Conc. (µg/mL)	Initial Conc. (µg/mL)	Final Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
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1. Antimony (Sb) 58151 100923 0.1000 300.0 0.084 1000 10001.4 1000.0 2.1 7440-36-0 0.5 mg/m3 or-rel 7000 mg/kg 3102a

SDS Information

(Solvent Safety Info. On Attached pg.)





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

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

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

(T) = Target analyte

Physical Characterization:

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

Certified by:

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



M6030



CERTIFIED WEIGHT REPORT:

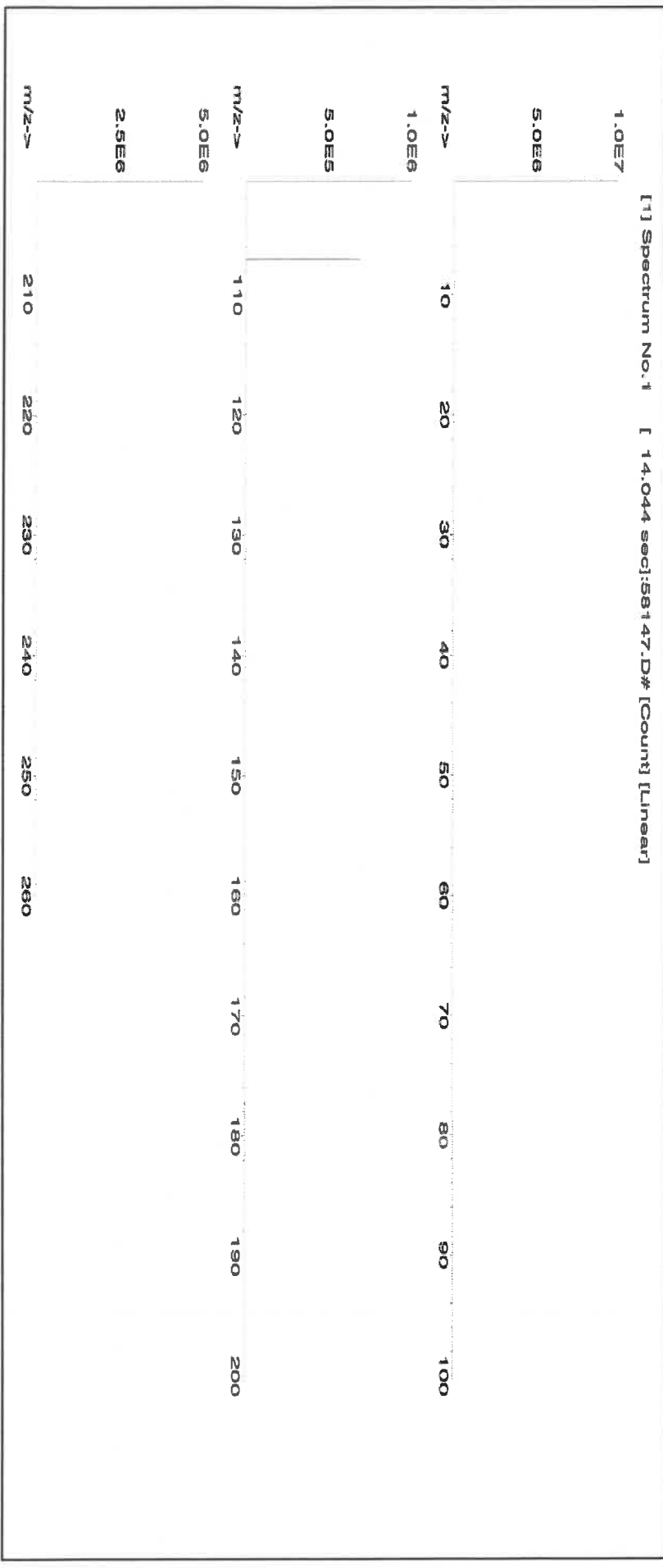
Part Number: **57047**
Lot Number: **122823**
Description: **Silver (Ag)**
Solvent: 24002546 Nitric Acid

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

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

SDS Information									
Compound	RM#	Lot Number	Nominal Conc. (µg/mL)	Purity (%)	Uncertainty Purity (%)	Assay (%)	Target Weight (g)	Actual Weight (g)	Actual Conc. (µg/mL)
1. Silver nitrate (Ag)	IN035	J0612AGAI	1000.0	99.9996	0.10	63.7	6.27992	6.27998	1000.0

1. Silver nitrate (Ag) IN035 J0612AGAI 1000.0 99.9996 0.10 63.7 6.27992 6.27998 1000.0 2.0 7761-88-8 10 µg/mL NA 3151





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

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

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

(T)= Target analyte

Physical Characterization:

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

Certified by:

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

R: 8/5/24

M6019

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: Single Analyte Custom Grade Solution
Catalog Number: CGSR1
Lot Number: U2-SR730227
Matrix: 0.1% (v/v) HNO₃
Value / Analyte(s): 1 000 µg/mL ea:
Strontium
Starting Material: SrCO₃
Starting Material Lot#: M2-2192
Starting Material Purity: 99.9993%

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Value: 1001 ± 3 µg/mL
Density: 1.000 g/mL (measured at 20 ± 4 °C)

Assay Information:

Assay Method #1	998 ± 4 µg/mL ICP Assay NIST SRM Traceable to 3153a Lot Number: K2-SR650985
Assay Method #2	1001 ± 3 µg/mL EDTA NIST SRM 928 Lot Number: 928
Assay Method #3	1001 ± 2 µg/mL Calculated NIST SRM Lot Number: See Sec. 4.2

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

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

Characterization of CRM/RM by Two or More Methods

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

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

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

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

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

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

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

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

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

X_a = mean of Assay Method A with

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

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

k = coverage factor = 2

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

u_{bb} = bottle to bottle homogeneity standard uncertainty

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

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

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

4.1 Thermometer Calibration

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

4.2 Balance Calibration

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

4.3 Glassware Calibration

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

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

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

M	Ag	<	0.001980	M	Eu	<	0.000495	O	Na	0.000200	M	Se	<	0.013862	O	Zn	0.000143	
O	Al	0.000370	O	Fe	0.000410	M	Nb	<	0.000495	i	Si	<			M	Zr	<	0.000495
M	As	<	0.000495	M	Ga	<	0.000495	M	Nd	<	0.000495	M	Sm	<	0.000495			
M	Au	<	0.000989	M	Gd	<	0.000495	O	Ni	<	0.007631	M	Sn	<	0.000990			
M	B	<	0.039606	M	Ge	<	0.000495	M	Os	<	0.000494	s	Sr	<				
M	Ba	0.006486	M	Hf	<	0.000495	i	P	<			M	Ta	<	0.000495			
M	Be	<	0.000990	M	Hg	<	0.000989	M	Pb	<	0.002970	M	Tb	<	0.000495			
M	Bi	<	0.000495	M	Ho	<	0.000495	M	Pd	<	0.003957	M	Te	<	0.027724			
O	Ca	0.004255	M	In	<	0.000495	M	Pr	<	0.000495	M	Th	<	0.000990				
M	Cd	0.001339	M	Ir	<	0.000494	M	Pt	<	0.002970	M	Ti	<	0.005940				
M	Ce	<	0.004950	O	K	<	0.008184	M	Rb	<	0.002970	M	Tl	<	0.000495			
M	Co	<	0.000495	M	La	<	0.000495	M	Re	<	0.000495	M	Tm	<	0.000495			
O	Cr	<	0.003207	O	Li	<	0.000884	O	Rh	<	0.012829	M	U	<	0.001485			
M	Cs	<	0.000990	M	Lu	<	0.002970	M	Ru	<	0.000989	M	V	<	0.001980			
M	Cu	0.000099	O	Mg	0.000064	i	S	<				M	W	<	0.003960			
M	Dy	<	0.000495	O	Mn	0.000066	M	Sb	<	0.014852	O	Y	<	0.000995				
M	Er	<	0.000495	M	Mo	<	0.001980	M	Sc	<	0.001980	M	Yb	<	0.000495			

M - Checked by ICP-MS

O - Checked by ICP-OES

i - Spectral Interference

n - Not Checked For

s - Solution Standard Element

6.0 INTENDED USE

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

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

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

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

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

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

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

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

Sr Containing Samples (Preparation and Solution) -Metal (Best dissolved in diluted HNO₃); Ores (Carbonate fusion in PtO followed by HCl dissolution); Organic Matrices (Dry ash and dissolution in dilute HCl).

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

Technique/Line	Estimated D.L.	Order	Interferences (underlined indicates severe)
ICP-MS 88 amu	1200 ppt	N/A	72Ge16O, 176Yb+2, 176Lu+2 , 176Hf+2
ICP-OES 407.771 nm	0.0004 / 0.00006 µg/mL	1	U, Ce
ICP-OES 421.552 nm	0.0008 / 0.00004 µg/mL	1	Rb
ICP-OES 460.733 nm	0.07 / 0.003 µg/mL	1	Ce

8.0 HAZARDOUS INFORMATION

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

9.0 HOMOGENEITY

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

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

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

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

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

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

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

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

March 03, 2023

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

11.2 Lot Expiration Date

- March 03, 2028

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

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

11.3 Period of Validity

- Sealed TCT Bag Open Date: _____

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

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Approved By:

Thomas Kozikowski
Manager, Quality Control



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director





CERTIFIED WEIGHT REPORT:

R: 03/16/23 MS473 MS474 MS475 MS476

Lot #

Part Number:

Lot Number:

Description:

Solvent: 20510011 Nitric Acid

2% 20.0 (mL) Nitric Acid

Formulated By: Lawrence Barry 082922

Reviewed By: Pedro L. Rientas 082922

Expiration Date:

Recommended Storage:

Nominal Concentration (µg/mL):

NIST Test Number:

Weight shown below was diluted to (mL):

082925

Ambient (20 °C)

10000

6UTB

5E-05 Balance Uncertainty

0.058 Flask Uncertainty

1000.12

0.058

Flask Uncertainty

Balance Uncertainty

Flask Uncertainty

Balance Uncertainty

Flask Uncertainty

Balance Uncertainty

Compound

RM#

Lot

Number

Nominal

Purity (%)

Uncertainty (%)

Assay (%)

Target

Weight (g)

Actual

Weight (g)

Actual

Conc. (µg/mL)

Expanded

Uncertainty

(Solvent Safety Info. On Attached pg.)

CAS#

OSHA PEL (TWA)

LD50

SRM

10017

SF2022018A1

10000

99.997

0.10

41.2

24.2756

24.2758

10000.1

20.0

10042-76-9

NA

or-rat >2000mg/kg

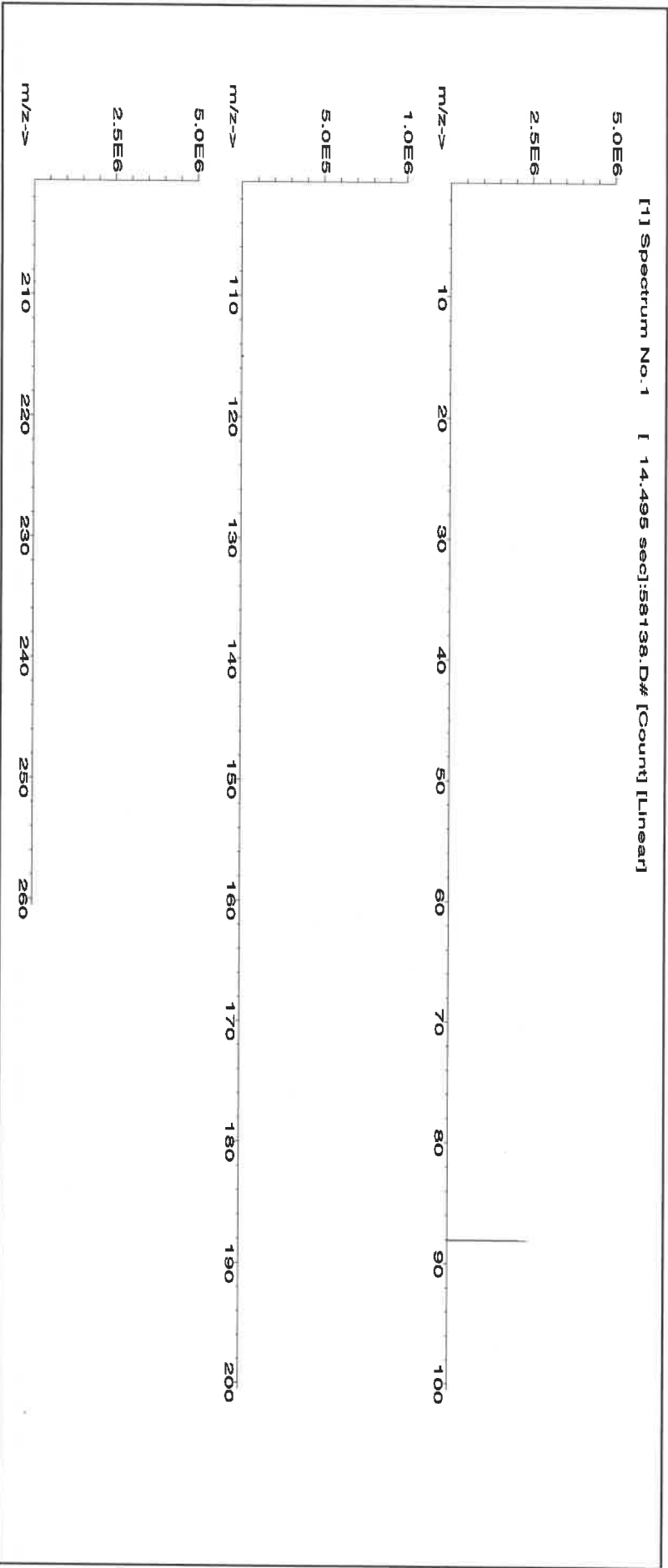
3153a

or-rat >2000mg/kg

3153a

1. Strontium nitrate (Sr)

[1] Spectrum No. 1 [14.495 sec]: 58138.D# [Count] [Linear]





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

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

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

(T) = Target analyte

Physical Characterization:

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

Certified by:

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



CERTIFIED WEIGHT REPORT:

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

Lot #

Solvent: 24002546 Nitric Acid

2% 40.0 Nitric Acid (mL)

Expiration Date:

062727

Recommended Storage: Ambient (20 °C)

Nominal Concentration (µg/mL):

1000

NIST Test Number:

6UTB

Weight shown below was diluted to (mL): 2000.1

5E-05 Balance Uncertainty
0.10 Flask Uncertainty

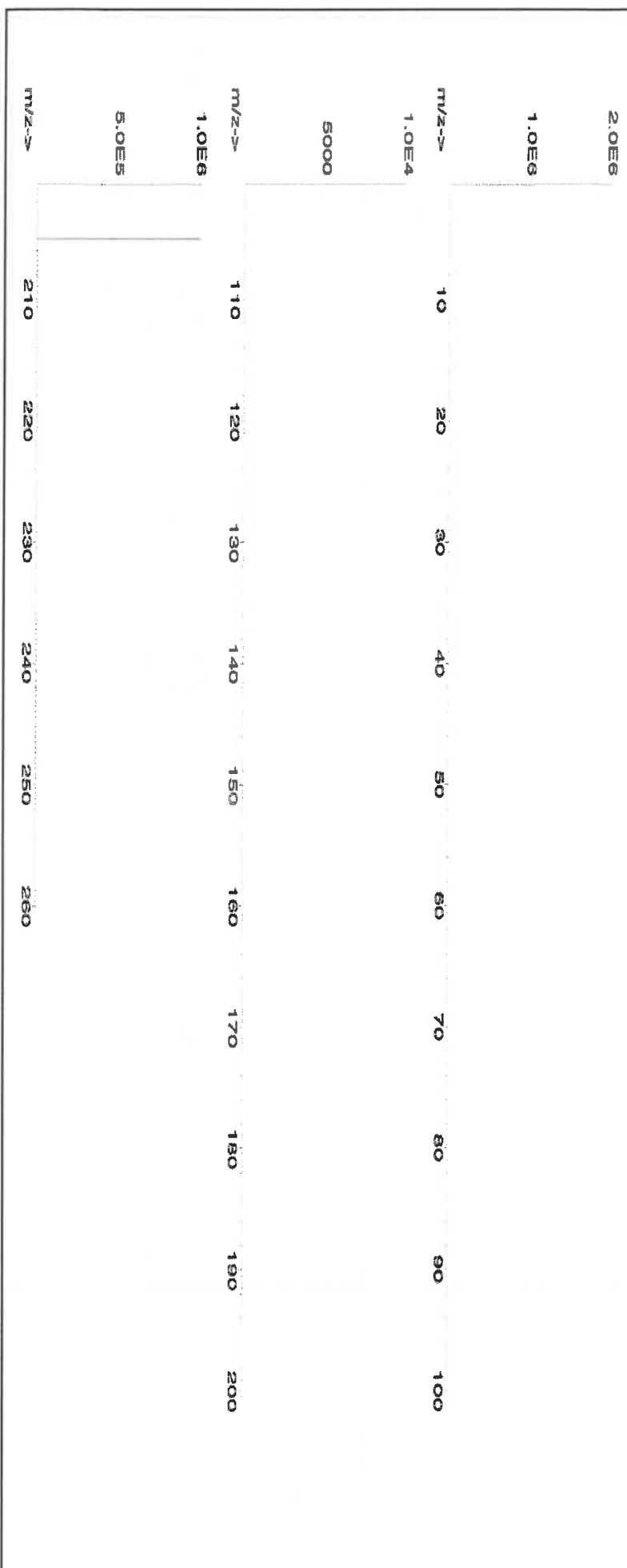
<i>Aleah O'Brady</i>	
Formulated By:	Aleah O'Brady
	062724
Reviewed By:	<i>Pedro L. Rendas</i>
	Pedro L. Rendas
	062724

SDS Information

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

1. Thallium nitrate (TI) IN037 BCCF4399 1000 99.999 0.10 77.0 2.5975 2.5977 1000.1 2.0 10102-45-1 0.1 mg/m3 orl-mus 15mg/kg 3158

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





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

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

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

(T) = Target analyte

Physical Characterization:

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

Certified by:

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



Certified Reference Material CRM

M6021



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

CERTIFIED WEIGHT REPORT:

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

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

Aleah O'Brady	
Formulated By:	Aleah O'Brady
	062424
Reviewed By:	Pedro L. Rantas
	062424

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

Volume shown below was diluted to (mL): **2000.3**
5E-05 Balance Uncertainty
0.06 Flask Uncertainty

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

Compound		Part Number	Lot Number	Dilution Factor	Initial Vol. (mL)	Uncertainty (mL)	Nominal Conc. (µg/mL)	Initial Conc. (µg/mL)	Final Conc. (µg/mL)	Expanded Uncertainty +/- (µg/mL)	CAS#	OSHA PEL (TWA)	LD50	NIST SRM
1. Ammonium metavanadate (V)		58123	021224	0.1000	200.0	0.084	1000	10000.3	1000.0	2.2	7803-55-6	0.05 mg/m3	or-at 58.1mg/kg	3165

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

2.OE6		10	20	30	40	50	60	70	80	90	100
1.OE6		10	20	30	40	50	60	70	80	90	100
2.OE7		10	20	30	40	50	60	70	80	90	100
1.OE7		10	20	30	40	50	60	70	80	90	100
5.OE6		110	120	130	140	150	160	170	180	190	200
2.5E6		210	220	230	240	250	260				

CORCO CHEMICAL CORPORATION

Manufacturers of ACS Reagents and Semiconductor Grade Chemicals

Office and Plant
299 Cedar Lane
Fairless Hills, PA 19030

Phone: 215-295-5006
Fax: 215-295-0781

Acetic Acid, Glacial, ACS Reagent Grade

SPECIFICATION

MAXIMUM LIMITS

Appearance	Colorless and free from suspended matter or sediment
Assay	99.7 min.
Color (APHA)	10
Dilution Test	Passes Test
Residue after evaporation	0.001%
Acetic Anhydride	0.01%
Chloride (Cl)	1 ppm
Sulfate (SO ₄)	1 ppm
Heavy Metals (as Pb)	0.5 ppm
Iron (Fe)	0.2 ppm
Sub. Red. Dichromate	Passes Test
Sub. Red. Permanganate	Passes Test
Titrateable Base	0.0004meq/g

W3038
38
08/11/21

06/20/2023



Certificate of Analysis



Sodium Hydroxide (Pellets)

Material: 0583
Grade: ACS GRADE
Batch Number: 23B1556310

Chemical Formula: NaOH
Molecular Weight: 40
CAS #: 1310-73-2
Appearance:

Manufacture Date: 12/14/2022
Expiration Date: 12/31/2025

Storage: Room Temperature

Pellets

TEST	SPECIFICATION	ANALYSIS	DISPOSITION
Calcium	<= 0.005 %	<0.005 %	PASS
Chloride	<= 0.005 %	0.002 %	PASS
Heavy Metals	<= 0.002 %	<0.002 %	PASS
Iron	<= 0.001 %	<0.001 %	PASS
Magnesium	<= 0.002 %	<0.002 %	PASS
Mercury	<= 0.1 ppm	<0.1 ppm	PASS
Nickel	<= 0.001 %	<0.001 %	PASS
Nitrogen Compounds	<= 0.001 %	<0.001 %	PASS
Phosphate	<= 0.001 %	<0.001 %	PASS
Potassium	<= 0.02 %	<0.02 %	PASS
Purity	>= 97.0 %	99.2 %	PASS
Sodium Carbonate	<= 1.0 %	0.5 %	PASS
Sulfate	<= 0.003 %	<0.003 %	PASS

Internal ID #: 710

Signature

We certify that this batch conforms to the specifications listed.

This document has been electronically produced and is valid without a signature.

Leona Edwardson, Quality Control Sr. Manager - Solon
VWR Chemicals, LLC.
28600 Fountain Parkway, Solon OH 44139 USA

Additional Information

Analysis may have been rounded to significant digits in specification limits.

Product meets analytical specifications of the grades listed.



Sodium Hydroxide (Pellets)

Material: 0583
Grade: ACS GRADE
Batch Number: 23B1556310

Chemical Formula: NaOH
Molecular Weight: 40
CAS #: 1310-73-2
Appearance:

Manufacture Date: 12/14/2022
Expiration Date: 12/31/2025

Storage: Room Temperature

Pellets

Spec Set: 0583ACS

Internal ID #: 710

Signature

We certify that this batch conforms to the specifications listed.

This document has been electronically produced and is valid without a signature.

Leona Edwardson, Quality Control Sr. Manager - Solon
VWR Chemicals, LLC.
28600 Fountain Parkway, Solon OH 44139 USA

Additional Information

Analysis may have been rounded to significant digits in specification limits.

Product meets analytical specifications of the grades listed.

M200.7-Trace Elements-22

SOP ID : ~~M3050B-Digestion-20~~, MSFAM01.1-Trace Metals-2

SDG No : ME2947,MBHH97

Matrix : WATER

Pipette ID: ICP A

Balance ID : N/A

Filter paper ID : N/A

pH Strip ID : M6069

Hood ID : #3

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

Start Digest Date: 01/27/2025 Time : 12:05 Temp : 96 °C

End Digest Date: 01/27/2025 Time : 14:10 Temp : 96 °C

Digestion tube ID: M5595

Block thermometer ID: MET-DIG. #1

Dig Technician Signature: *SKD.*

Supervisor Signature: *[Signature]*

Temp : 1. 96°C 2. N/A

Standard Name	MLS USED	STD REF. # FROM LOG
LCSS	1.00	MP84063
Spike Sol 6	1.00	MP84070
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

Chemical Used	ML/SAMPLE USED	Lot Number
1:1 HNO3	1.00	MP84041
1:1 HCL	0.50	MP83499
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

Extraction Conformance/Non-Conformance Comments:

HOT BLOCK #1 CELL #55 : 96 C

Date / Time	Prepped Sample Relinquished By/Location	Received By/Location
01/27/25 15:10	<i>SKD. met doctio?</i>	<i>[Signature] (met doctio)</i>
	Preparation Group	Analysis Group

Lab Sample ID	Client Sample ID	pH	Initial Vol (ml)	Final Vol (ml)	Color Before	Color After	Clarity Before	Clarity After	Comment	Prep Pos
PB166236TB	LEB236	<2	50	50	Colorless	Colorless	Clear	Clear	N/A	1
PB166272BL	PBW272	<2	50	50	Colorless	Colorless	Clear	Clear	N/A	2
PB166272BS	LCS272	<2	50	50	Colorless	Colorless	Clear	Clear	MP84063	3
Q1164-01	ME2946	<2	50	50	Colorless	Colorless	Clear	Clear	N/A	4
Q1164-02	ME2947	<2	50	50	Colorless	Colorless	Clear	Clear	N/A	5
Q1164-03	ME2947D	<2	50	50	Colorless	Colorless	Clear	Clear	N/A	6
Q1164-04	ME2947S	<2	50	50	Colorless	Colorless	Clear	Clear	MP84070	7
Q1182-01	MBHH96	<2	50	50	Colorless	Colorless	Clear	Clear	N/A	8
Q1182-02	MBHH97	<2	50	50	Colorless	Colorless	Clear	Clear	N/A	9
Q1182-03	MBHH98	<2	50	50	Colorless	Colorless	Clear	Clear	N/A	10
Q1182-04	MBHH99	<2	50	50	Colorless	Colorless	Clear	Clear	N/A	11
Q1182-05	MBHH99D	<2	50	50	Colorless	Colorless	Clear	Clear	N/A	12
Q1182-06	MBHH99S	<2	50	50	Colorless	Colorless	Clear	Clear	MP84070	13

Instrument ID: P4

Daily Analysis Runlog For Sequence/QC Batch ID # LB134460

Review By	Kareem Khairalla	Review On	1/29/2025 10:02:19 AM
Supervise By	Sarabjit Jaswal	Supervise On	1/30/2025 7:27:43 AM

STD. NAME	STD REF.#
ICAL Standard	MP84204,MP84212,MP84210,MP84209,MP84208,MP84207,MP84206
ICV Standard	MP84213
CCV Standard	MP84216
ICSA Standard	MP84214,MP84215
CRI Standard	
LCS Standard	MP84063
Chk Standard	MP84218,MP84219

Sr#	SampleId	ClientID	QcType	Date	Comment	Operator	Status
1	S0	S0	CAL1	01/28/25 17:57		Kareem	OK
2	S1	S01	CAL2	01/28/25 18:01		Kareem	OK
3	S2	S02	CAL3	01/28/25 18:05		Kareem	OK
4	S3	S03	CAL4	01/28/25 18:09		Kareem	OK
5	S4	S04	CAL5	01/28/25 18:14		Kareem	OK
6	S5	S05	CAL6	01/28/25 18:18		Kareem	OK
7	S6	S06	CAL7	01/28/25 18:22		Kareem	OK
8	ICV004	ICV004	ICV	01/28/25 19:08	Inst. paused for calibration review	Kareem	OK
9	ICB004	ICB004	ICB	01/28/25 19:12		Kareem	OK
10	ICSA004	ICSA004	ICSA	01/28/25 19:29	Inst. paused for review	Kareem	OK
11	ICSAB004	ICSAB004	ICSAB	01/28/25 19:33		Kareem	OK
12	CCV025	CCV025	CCV	01/28/25 19:37		Kareem	OK
13	CCB025	CCB025	CCB	01/28/25 19:41		Kareem	OK
14	Q1136-02	YE8F7	SAM	01/28/25 19:45		Kareem	OK
15	Q1136-03	YE8F7D	DUP	01/28/25 19:49		Kareem	OK
16	Q1136-02L	YE8F7L	SD	01/28/25 19:53		Kareem	OK
17	Q1136-04	YE8F7S	MS	01/28/25 19:57		Kareem	OK
18	Q1151-01	MC0AZ0	SAM	01/28/25 20:01	Cr,Co,Ni high	Kareem	Dilution

Instrument ID: P4

Daily Analysis Runlog For Sequence/QC Batch ID # LB134460

Review By	Kareem Khairalla	Review On	1/29/2025 10:02:19 AM
Supervise By	Sarabjit Jaswal	Supervise On	1/30/2025 7:27:43 AM
STD. NAME	STD REF.#		
ICAL Standard	MP84204,MP84212,MP84210,MP84209,MP84208,MP84207,MP84206		
ICV Standard	MP84213		
CCV Standard	MP84216		
ICSA Standard	MP84214,MP84215		
CRI Standard			
LCS Standard	MP84063		
Chk Standard	MP84218,MP84219		

19	Q1151-01DL	MC0AZ0	SAM	01/28/25 20:05	10x for Cr,Co,Ni, Still Cr,Co,Ni high	Kareem	Dilution
20	Q1151-02DL	MC0AZ1	SAM	01/28/25 20:10	2x for Co,Ni high, Still Co,Ni high	Kareem	Dilution
21	Q1151-03DL	MC0AZ2	SAM	01/28/25 20:13	2x for Co,Ni	Kareem	Confirms
22	Q1151-05DL	MC0AZ4	SAM	01/28/25 20:17	2x for Co	Kareem	Confirms
23	Q1151-08A	MC0AZ7A	PS	01/28/25 20:21	PS for As,Be,Cu,Mn,Se,Zn(0.0152 ML MP84220,0.035 ML MP84252,0.0048 ML M5715,0.0076 ML M6128,0.007 ML MP84254,0.01 ML M5819)	Kareem	OK
24	Q1163-01DL	ME2946	SAM	01/28/25 20:25	5x for Fe	Kareem	Confirms
25	Q1163-02DL	ME2947	SAM	01/28/25 20:29	2x for Ca	Kareem	Confirms
26	Q1163-03DL	ME2947D	DUP	01/28/25 20:33	2x for Ca	Kareem	Confirms
27	Q1163-02LDL	ME2947L	SD	01/28/25 20:37	10x for Ca	Kareem	Confirms
28	Q1163-04DL	ME2947S	MS	01/28/25 20:41	not required	Kareem	Not Ok
29	PB166236TB	LEB236	MB	01/28/25 20:45		Kareem	OK
30	Q1164-01	ME2946	SAM	01/28/25 20:50		Kareem	OK
31	Q1164-02	ME2947	SAM	01/28/25 20:54		Kareem	OK
32	Q1164-03	ME2947D	DUP	01/28/25 20:58		Kareem	OK
33	Q1164-02L	ME2947L	SD	01/28/25 21:02		Kareem	OK
34	CCV026	CCV026	CCV	01/28/25 21:11		Kareem	OK

Instrument ID: P4

Daily Analysis Runlog For Sequence/QC Batch ID # LB134460

Review By	Kareem Khairalla	Review On	1/29/2025 10:02:19 AM
Supervise By	Sarabjit Jaswal	Supervise On	1/30/2025 7:27:43 AM
STD. NAME	STD REF.#		
ICAL Standard	MP84204,MP84212,MP84210,MP84209,MP84208,MP84207,MP84206		
ICV Standard	MP84213		
CCV Standard	MP84216		
ICSA Standard	MP84214,MP84215		
CRI Standard			
LCS Standard	MP84063		
Chk Standard	MP84218,MP84219		

35	CCB026	CCB026	CCB	01/28/25 21:15		Kareem	OK
36	Q1164-04	ME2947S	MS	01/28/25 21:19		Kareem	OK
37	Q1182-01	MBHH96	SAM	01/28/25 21:24		Kareem	OK
38	Q1182-02	MBHH97	SAM	01/28/25 21:28		Kareem	OK
39	Q1182-03	MBHH98	SAM	01/28/25 21:32		Kareem	OK
40	Q1182-04	MBHH99	SAM	01/28/25 21:36		Kareem	OK
41	Q1182-05	MBHH99D	DUP	01/28/25 21:40		Kareem	OK
42	Q1182-04L	MBHH99L	SD	01/28/25 21:44		Kareem	OK
43	Q1182-06	MBHH99S	MS	01/28/25 21:49		Kareem	OK
44	PB166272BL	PBW272	MB	01/28/25 21:53		Kareem	OK
45	PB166272BS	LCS272	LCS	01/28/25 21:57		Kareem	OK
46	PB166267TB	LEB267	MB	01/28/25 22:01		Kareem	OK
47	Q1160-01	YE8C9	SAM	01/28/25 22:05		Kareem	OK
48	Q1160-02	YE8C9D	DUP	01/28/25 22:09		Kareem	OK
49	Q1160-01L	YE8C9L	SD	01/28/25 22:13		Kareem	OK
50	Q1160-03	YE8C9S	MS	01/28/25 22:17		Kareem	OK
51	Q1160-04	YE8D0	SAM	01/28/25 22:21		Kareem	OK
52	Q1160-05	YE8D3	SAM	01/28/25 22:25		Kareem	OK
53	PB166267BL	PBW267	MB	01/28/25 22:29		Kareem	OK
54	PB166267BS	LCS267	LCS	01/28/25 22:33		Kareem	OK

Instrument ID: P4

Daily Analysis Runlog For Sequence/QC Batch ID # LB134460

Review By	Kareem Khairalla	Review On	1/29/2025 10:02:19 AM
Supervise By	Sarabjit Jaswal	Supervise On	1/30/2025 7:27:43 AM

STD. NAME	STD REF.#
ICAL Standard	MP84204,MP84212,MP84210,MP84209,MP84208,MP84207,MP84206
ICV Standard	MP84213
CCV Standard	MP84216
ICSA Standard	MP84214,MP84215
CRI Standard	
LCS Standard	MP84063
Chk Standard	MP84218,MP84219

55	CCV027	CCV027	CCV	01/28/25 22:42		Kareem	OK
56	CCB027	CCB027	CCB	01/28/25 22:46		Kareem	OK

SOP ID : M1311-TCLP-15
SDG No : ME2947, MBHH97,
Weigh By : JP
Balance ID : WC SC-7
pH Meter ID : WC PH METER-1
Extraction By : JP
Filter By : JP
Pipette ID : WC
Tumbler ID : T-1
TCLP Filter ID : 115525

Start Prep Date : 01/24/2025 **Time :** 15:30
End Prep Date : 01/25/2025 **Time :** 09:10
Combination Ratio : 20
ZHE Cleaning Batch : N/A
Initial Room Temperature: 23 °C
Final Room Temperature: 22 °C
TCLP Technician Signature : 
Supervisor By : 

Standardized Name	MLS USED	STD REF. # FROM LOG
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

Chemical Used	ML/SAMPLE U	Lot Number
TCLP-FLUID-1	N/A	WP110801
HCL-TCLP,1N	N/A	WP110803
HNO3-TCLP,1N	N/A	WP110804
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
120ml Plastic bottle	N/A	405130101
1:1 HNO3	N/A	MP84041

Extraction Conformance/Non-Conformance Comments:

Matrix spikes are added after filtration and before preservation. TUMBLER T-1 checked, 30 rpm. Particle size reduction is not required.

Date / Time	Prepped Sample Relinquished By/Location	Received By/Location
01/27/25 10:00	 TCLP Room	 my dig
	Preparation Group	Analysis Group 

Sample ID	ClientID	TCLP Vessel ID	Sample Wt (g)	Volume Extraction Fluid #1 (mL)	Multi phasic	Phase Miscible	Phases Combined	Final Leachate PH	Metals Leachate Adj. PH	Prep Pos
PB166236TB	LEB236	07	N/A	2000	N/A	N/A	N/A	4.93	1.03	T-1
Q1164-01	ME2946	01	100.02	2000	N/A	N/A	N/A	7.60	1.49	T-1
Q1164-02	ME2947	02	100.03	2000	N/A	N/A	N/A	6.80	1.30	T-1
Q1164-03	ME2947D	02	100.03	2000	N/A	N/A	N/A	6.80	1.30	T-1
Q1164-04	ME2947S	02	100.03	2000	N/A	N/A	N/A	6.80	1.30	T-1
Q1182-01	MBHH96	03	100.02	2000	N/A	N/A	N/A	5.20	1.59	T-1
Q1182-02	MBHH97	04	100.01	2000	N/A	N/A	N/A	5.13	1.41	T-1
Q1182-03	MBHH98	05	100.02	2000	N/A	N/A	N/A	5.21	1.33	T-1
Q1182-04	MBHH99	06	100.01	2000	N/A	N/A	N/A	5.30	1.37	T-1
Q1182-05	MBHH99D	06	100.01	2000	N/A	N/A	N/A	5.30	1.37	T-1
Q1182-06	MBHH99S	06	100.01	2000	N/A	N/A	N/A	5.30	1.37	T-1

SampleID	ClientID	Sample Weight (g)	Filter Weight (g)	Filtrate (mL)	Filter + Solid (After 100°C)	% solids	% Dry Solids
PB166236TB	LEB236	N/A	N/A	N/A	N/A	N/A	N/A
Q1164-01	ME2946	N/A	N/A	N/A	N/A	100	N/A
Q1164-02	ME2947	N/A	N/A	N/A	N/A	100	N/A
Q1164-03	ME2947D	N/A	N/A	N/A	N/A	100	N/A
Q1164-04	ME2947S	N/A	N/A	N/A	N/A	100	N/A
Q1182-01	MBHH96	N/A	N/A	N/A	N/A	100	N/A
Q1182-02	MBHH97	N/A	N/A	N/A	N/A	100	N/A
Q1182-03	MBHH98	N/A	N/A	N/A	N/A	100	N/A
Q1182-04	MBHH99	N/A	N/A	N/A	N/A	100	N/A
Q1182-05	MBHH99D	N/A	N/A	N/A	N/A	100	N/A
Q1182-06	MBHH99S	N/A	N/A	N/A	N/A	100	N/A

Hot Block ID : WC S-1 /WC S-2

Thermometer ID : FLASHPOINT

SampleID	ClientID	Sample Weight (g)	Volume DI Water (mL)	PH after 5 min stir	PH after 10 min stir	Extraction Fluid 1 or 2	pH Extraction Fluid
PB166236TB	LEB236	N/A	N/A	N/A	N/A	#1	4.93
Q1164-01	ME2946	5.03	96.5	8.60	3.39	#1	4.93
Q1164-02	ME2947	5.02	96.5	8.85	4.11	#1	4.93
Q1164-03	ME2947D	5.02	96.5	8.85	4.11	#1	4.93
Q1164-04	ME2947S	5.02	96.5	8.85	4.11	#1	4.93
Q1182-01	MBHH96	5.01	96.5	8.10	3.37	#1	4.93
Q1182-02	MBHH97	5.03	96.5	8.45	3.57	#1	4.93
Q1182-03	MBHH98	5.04	96.5	8.10	3.29	#1	4.93
Q1182-04	MBHH99	5.05	96.5	8.16	3.33	#1	4.93
Q1182-05	MBHH99D	5.05	96.5	8.16	3.33	#1	4.93
Q1182-06	MBHH99S	5.05	96.5	8.16	3.33	#1	4.93