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Analyse Service GmbH

RFA Ringversuch AMIS, Südafrika - Magnesite AMIS0650

Veranstalter des Ringversuchs:	AMIS - African Mineral Standard - Südafrika
Ringversuchsmaterial:	AMIS0650, Magnesite MOXHQ, South Africa
RV geschlossen:	2019 - 12
Literatur:	Proficiency Testing Final Report (Laborcode CRB = ST)

Hauptelemente [MA%]

	CRB	RV	1sRV
SiO_2	3,160	3,250	0,260
Al_2O_3	0,250	0,240	0,040
Fe_2O_3	0,276	0,266	0,023
TiO_2	0,018	0,017	0,004
P_2O5	0,014	0,011	0,002
CaO	1,560	1,540	0,100
MgO	51,650	51,610	1,420
MgO	86,080	86,010	2,370
K_2O	0,034	0,038	0,010
Na_2O	0,090	0,220	0,110
Cr_2O_3	0,020	0,025	0,010
LOI	8,435	9,050	0,850

Legende

CRB: Ergebnisse CRB – **RV:** Ergebnisse Ringversuch -- **1s-RV:** Standardabweichung Ringversuch
Z-Score: Differenz des Messwertes vom Mittelwert des Ringversuchs -- ***** Wert nicht zertifiziert

Proficiency Testing Final Report

Report to participating laboratories on the results from

AMIS0650
Proficiency Testing

Magnesite MOXHQ, South Africa

Name: Melesha Mungaroo
Function: PT Scheme Coordinator
Email address: melesha@amis.co.za
Phone Number: 011 923 0800

Date: 12 November 2019
Signature:

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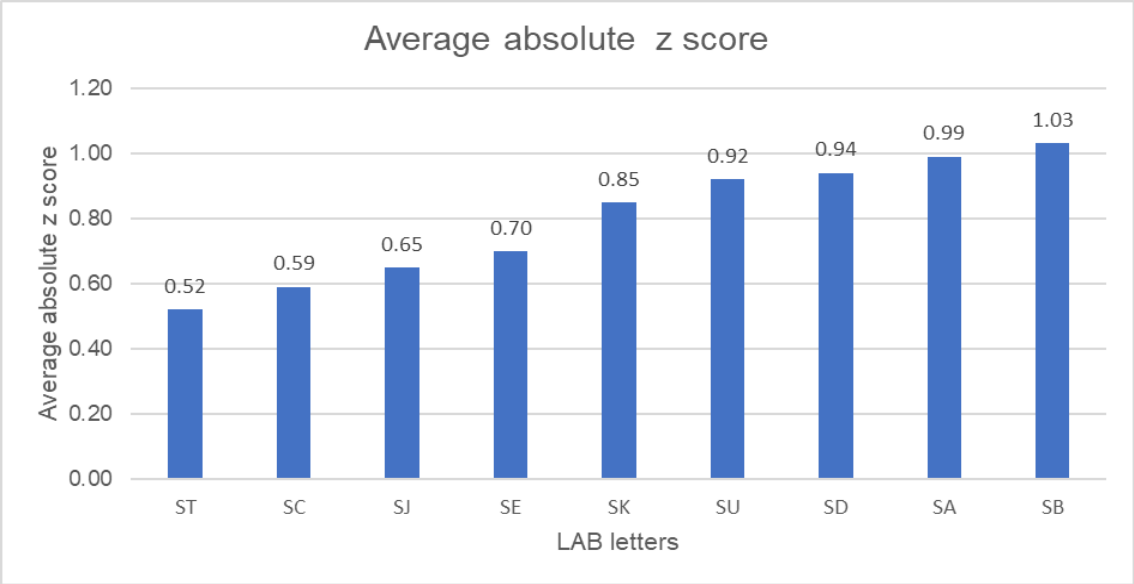
1.Confidentiality

This report is strictly confidential. Individual laboratories are not identified in this report. Individual laboratories will be given their own identifying codes for the different tables and graphs, but not the codes for other laboratories.

2.Absolute average z scores



Based on the average of the absolute value of the z-scores

It is recommended by AMIS that should a laboratory's absolute average z-score be greater than 2, an internal investigation of possible root causes should be carried out by the laboratory.
The values highlighted in red on the data are considered outliers.

Labs that participated-NOT the same order as Lab Letter
ALS Geochemistry Arabia
Argetest Mineral Processing, R&D and Analysis Services
Bureau Veritas Minerals Ultra Trace Pty Ltd
CRB Analyse Service GmbH
Dorfner Anzaplan (Analysenzentrum undAnlagenplanungsgesellschaft mbH)
Geoangol
Intertek Perth
Samancor Western Chrome Mine
SGS Geosol Laboratories Ltda (Brazil)
SGS Vancouver (Canada)

3.Explanation of statistical analysis

Fifteen laboratories were each sent 8 samples of material taken scientifically from throughout the batch.
Results from nine of the laboratories were received in time for the Certificate.
Results from ten of the laboratories were received in time for the PT Report

Laboratories are indicated by letters SA through to SL and SU through to SV and are not listed in alphabetical order.

3.1 The data tables contain raw assay data from those labs plus:

3.1.1 The lab mean,
3.1.2 The lab standard deviation,
3.1.3 The lab RSD (the laboratory standard deviation divided by the lab mean, expressed as a percentage),
3.1.4 The z-scores of the individual analyses (the individual value minus the mean of the whole data divided by the SD of the whole data),
3.1.5 A laboratory ranking based on the average of the absolute values for the z-score of the AMIS0650 data,
3.1.6 Statistics for the un-iterated data set (mean, standard deviation and RSD),
3.1.7 Statistics for the iterated data (mean, RSD percent, number of results, SD, 2SD, 3SD, Std mean±2SD and Std mean±3SD)-This data can be used in conjunction with the graph
3.1.8 Simple statistics of the lab statistics (mean, standard deviation and RSD),
3.1.9 Measurement of uncertainty

3.2 Some results were removed for the calculation of the mean and standard deviation presented on the graph.
The general rules for exclusion were:

- If the z score >±2, the result is an outlier and it is removed.
- If 50% or less of the results from one laboratory have z scores >±2, those results are removed
- If 50% or more of the results from one laboratory have z scores >±2, the entire laboratory's results are removed.

3.3 Statistics on these tables are those for the whole data set. They differ from the "recommended concentrations" and two "between laboratory standard deviations" on the certificate independently calculated by the certifying geochemist. Some outlying results were excluded for the calculation of those values.

3.4 An independent geochemist Allan Fraser, was retained to provide recommended concentrations and limits at two standard deviations. These represent the values that a "good lab" should report, within acceptable limits of analytical accuracy. Allan Fraser was provided with the electronic versions of all assay reports and a spreadsheet containing the compiled data prepared by Ms Mohlakwana Mahubane (Deputy PT Scheme Coordinator)

Disclaimer: While every precaution has been taken to ensure the accuracy of this data AMIS, will not be held responsible for any errors. Laboratory managers are requested to carefully vet this report and to draw the author's attention to any mistakes or omissions that may be present. Kindly note that all results are reported as received. Lab data is represented as 2 decimal places for graphical representation only. Excel files can be made available upon request if a lab wishes to do their internal stats evaluations.

4. Subcontracted activities

The following activities were subcontracted:

4.1 Preparation of Certified Reference Material
4.2 QC analysis to determine ranges for individual elements
4.3 Transportation of samples with courier companies

5. Method of preparation, Homogeneity and Stability assessment

The particle size distribution for this material was shown to have a nominal top size of 54µm (95% passing 54µm). The procedure of preparation in brief is as follows: the material was crushed, dry-milled and air-classified to <54µm. It was then blended in a bi-conical mixer, systematically divided and sealed into 1kg Laboratory Packs. Explorer Packs are then subdivided from the Laboratory Packs as required. Final packaged units were then selected on a random basis and submitted for analysis to an independent laboratory accredited with the ISO17025 standard of general requirements for the competence of testing and calibration laboratories. The results obtained from this laboratory are then evaluated statistically by AMIS for homogeneity. The stability of the material will be subject to continuous testing for the duration of the inventory. Should product stability become an issue, all customers will be notified and notification to that effect will be placed on the www.amis.co.za website.

6. Assigned value

The assigned values for the PT report are expressed as the mean calculated from the software as follows:

6.1 Calculated from all the raw data including outliers
6.2 Calculated after removal of outliers using z-scores (Refer to 3.1.4)

7. Standard Deviation For Proficiency Assessment

The Standard Deviation is a representation of the population standard deviation and provides the estimate of the repeatability of the data and it is calculated as follows:

7.1 The Standard deviation is calculated from the software
7.2 Standard Deviation from individual laboratories is calculated and represented as LAB_SD for that lab
7.3 The Standard Deviation For Proficiency Assessment is then calculated as a weighted mean standard deviation
7.4 The standard deviations are converted to variances by squaring the standard deviations and added by taking the root sum of squares and the number of labs into consideration

8. Metrological traceability and measurement of uncertainty

The values quoted herein are based on the consensus values derived from statistical analysis of the data from an inter-laboratory measurement program. Traceability to SI units is via the standards used by the individual laboratories the majority of which are accredited to the ISO17025 general requirements for the competence of testing and calibration laboratories and who have maintained measurement traceability during the analytical process.

The samples used in this PT process have been selected in such a way as to represent the entire batch of material and were taken from the final packaged units; therefore all possible sources of uncertainty (sample uncertainty and measurement uncertainty) are included in the final combined standard uncertainty determination. The uncertainty measurement takes into consideration the between lab and the within lab variances.

9.Design and implementation of the PT Scheme

9.1 At the beginning of each year, the Technical Personnel and Managing Director plan what possible Proficiency Testing Schemes will be sent to laboratories.
9.2 The samples are sent to an external laboratory to determine the range of the elements of interest and homogeneity.
9.3 An analysis request letter is compiled and sent to participating laboratories.
9.4 Samples are dispatched and results are returned within the given time frame by participating laboratories electronically.
9.5 Results are loaded onto the software.
9.6 A PT report is compiled and sent to participating laboratories.

10.Concentration ranges

Oxide/Element	Unit	Range	
Al	ppm	375	400
Al_2O_3	%	0.01	1
Ba	ppm	8.0	12
Bi	ppm	0.001	1.5
C	%	0.1	2.0
Ca	%	0.1	2.0
CaO	%	0.1	2.0
Cd	ppm	0.001	1.5
Co	ppm	0.1	2.0
Cr	ppm	44	57
Cs	ppm	0.001	1.0
Cu	ppm	10	16
Fe	%	0.01	1.0
Fe_2O_3	%	0.01	1
Ga	ppm	0.01	1.5
Hf	ppm	0.01	1.5
K	ppm	290	350
K_2O	%	0.001	1
Li	ppm	11	16
LOI	%	7.0	11
Mg*	%	49	53
MgO*	%	83	87
Mn	ppm	16	22
Mo	ppm	0.01	2.0

Oxide/Element	Unit	Range	
Na	%	0.01	1.0
Na_2O	%	0.01	1.0
Nb	ppm	0.01	1.5
Ni	ppm	7.0	9.0
P_2O_5	%	0.0001	0.01
Pb	ppm	10	16
Rb	ppm	0.1	2.0
S	%	0.001	0.1
Sb	ppm	0.1	2.0
SG	No Unit	2.0	4.0
SiO_2	%	1.0	4.0
Sn	ppm	0.001	1.0
Sr	ppm	140	180
Ta	ppm	0.01	1.0
Th	ppm	0.001	0.1
Ti	ppm	50	65
TiO_2	%	0.001	0.1
U	ppm	0.01	1.5
V	ppm	4.0	6.0
W	ppm	0.01	1.5
Y	ppm	0.01	1.5
Zn	ppm	10	16
Zr	ppm	1.0	3.0

11. Abbreviations

Symbol	Meaning
Ag	Silver
Al	Aluminum
Ar	Argon
As	Arsenic
Au	Gold
Ba	Barium
Be	Beryllium
Bi	Bismuth
Br	Bromine
C	Carbon
Ca	Calcium
Cd	Cadmium
Ce	Cerium
Cl	Chlorine
Co	Cobalt
Cr	Chromium
Cs	Cesium
Cu	Copper
Dy	Dysprosium
Er	Erbium
Es	Einsteinium
Eu	Europium
F	Fluorine
Fe	Iron
Ga	Gallium
Gd	Gadolinium
Ge	Germanium
Hf	Hafnium
Hg	Mercury
Ho	Holmium
In	Indium
Ir	Iridium
K	Potassium
La	Lanthanum
Li	Lithium
Lu	Lutetium
Mg	Magnesium
Mn	Manganese
Mo	Molybdenum
Na	Sodium
Nb	Niobium
Nd	Neodymium
Ni	Nickel
Os	Osmium
P	Phosphorus
Pb	Lead

Symbol	Meaning
Pd	Palladium
Pm	Promethium
Pr	Praseodymium
Pt	Platinum
Rb	Rubidium
Re	Rhenium
Rh	Rhodium
Ru	Ruthenium
S	Sulfur
Sb	Antimony
Sc	Scandium
Se	Selenium
Si	Silicon
Sm	Samarium
Sn	Tin
Sr	Strontium
Ta	Tantalum
Tb	Terbium
Tc	Technetium
Te	Tellurium
Th	Thorium
Ti	Titanium
Tl	Thallium
Tm	Thulium
U	Uranium
V	Vanadium
W	Tungsten
Y	Yttrium
Yb	Ytterbium
Zn	Zinc
Zr	Zirconium
Al_2O_3	Aluminium Oxide
BaO	Barium Oxide
CaO	Calcium Oxide
Cr_2O_3	Chrome (III) Oxide
Fe_2O_3	Iron (III) Oxide
K_2O	Potassium Oxide
Na_2O	Sodium Oxide
P_2O_5	Phosphorus (V) Oxide
MgO	Magnesium Oxide
MnO	Manganese Oxide
SiO_2	Silicon Dioxide
SO_3	Sulphur Trioxide
TiO_2	Titanium Dioxide
V_2O_5	Vanadium Pentoxide
U_3O_8	Triuranium octoxide

Symbol	Meaning
Gen Method	Method of analysis
NiS	Nickel Sulphide
n	Number of results
4A_MICP	4 acid digest
GOI	Gain on Ignition
LOI	Loss on Ignition
FUS	Fusion
Pb Collection	Lead Collection
SG	Specific Gravity
RSD	Relative Standard Deviation
SAL	Sulphuric Acid Leach
CL	Cyanide Leach
4A_ICPES	4 acid digest finished with ICPOES
Ext	Extraction with HCl
LOI TGA	LOI with TGA finish
LOI XRF	LOI with XRF finish
LOI Gravimetric	LOI with gravimetric finish

11.Trace Elements

Element	Gen Method	n	Mean	SD	RSD %	Unit
Ag	4A_MICP	15	0.058	0.015	25	ppm
Ba	FUS	7	39.86	3.18	8	ppm
BaO	XRF	6	0.010	<0.0001	<0.0001	%
Be	4A_MICP	17	0.15	0.041	28	ppm
Ca	4A_ICPES	8	10797.00	294.25	3	ppm
Cr	FUS	6	172.83	6.08	4	ppm
Cs	4A_MICP	3	0.10	<0.0001	<0.0001	ppm
Dy	4A_MICP	8	0.094	0.018	19	ppm
Er	4A_MICP	4	0.050	<0.0001	<0.0001	ppm
Fe	FUS	8	1992.50	85.48	4	ppm
Hf	4A_MICP	11	0.28	0.34	125	ppm
K	FUS	8	1153.75	147.93	13	ppm
LOI	LOI gravimetric	8	12.29	1.00	8	%
LOI	LOI TGA	8	12.70	1.15	9	%
LOI	LOI XRF	8	12.92	1.08	8	%
Lu	4A_MICP	4	0.013	0.0050	40	ppm
MgO	Ext	8	83.58	0.19	0.2	%
MgO	FUS	8	83.94	0.42	0.5	%
Mn	FUS	8	30.13	1.96	7	ppm
MnO	XRF	10	0.0059	0.0022	37	%
Nd	4A_MICP	8	0.62	0.026	4	ppm
P	4A_MICP	16	46.88	4.79	10	ppm
Pr	4A_MICP	8	0.16	0.000000002	0.000001	ppm
Sc	4A_MICP	8	0.85	0.22	25	ppm
Sm	4A_MICP	8	0.13	0.026	20	ppm
Sn	4A_MICP	8	0.38	0.25	67	ppm
SO_3	XRF	16	0.044	0.0082	19	%
Sr	FUS	8	208.50	3.02	1	ppm
SrO	XRF	16	0.021	0.0015	7	%
Ta	4A_MICP	23	1.73	2.54	147	ppm
Te	4A_MICP	15	0.16	0.10	63	ppm
Th	4A_MICP	20	0.39	0.74	192	ppm
Ti	FUS	8	102.38	2.56	3	ppm
Tl	4A_MICP	1	0.070	<0.0001	<0.0001	ppm
V	FUS	8	16.75	1.39	8	ppm
V_2O_5	XRF	1	0.010	<0.0001	<0.0001	%
Yb	4A_MICP	8	0.11	0.018	17	ppm
Zr	FUS	6	25.17	1.83	7	ppm

Please Note**
The data on the above Trace Tables are <24 results.
They are for informational purposes only and are not represented on the PT report.

12. Element statistics (Include comments)

12.1. Al 4A_MICP

Lab_ID	Z_Score	Data
SA	1.82	5000.00
SA	1.82	5000.00
SA	1.82	5000.00
SA	1.88	5100.00
SA	1.88	5100.00
SA	1.94	5200.00
SA	1.99	5300.00
SA	2.05	5400.00
SB	-1.01	100.00
SB	-1.01	100.00
SB	-1.01	100.00
SB	-1.01	100.00
SB	-1.01	100.00
SB	-0.95	200.00
SB	-0.95	200.00
SB	-0.95	200.00
SC	-0.43	1100.00
SC	-0.37	1200.00
SC	-0.37	1200.00
SC	-0.37	1200.00
SC	-0.31	1300.00
SC	-0.31	1300.00
SC	-0.31	1300.00
SC	-0.31	1300.00

Lab_ID	Z_Score	Data
SD	-0.31	1300.00
SD	-0.31	1300.00
SD	-0.31	1300.00
SD	-0.31	1300.00
SD	-0.31	1300.00
SD	-0.31	1300.00
SD	-0.26	1400.00
SD	-0.20	1500.00
SJ	-0.31	1300.00
SJ	-0.31	1300.00
SJ	-0.31	1300.00
SJ	-0.31	1300.00
SJ	-0.26	1400.00
SJ	-0.26	1400.00
SJ	-0.26	1400.00
SJ	-0.20	1500.00

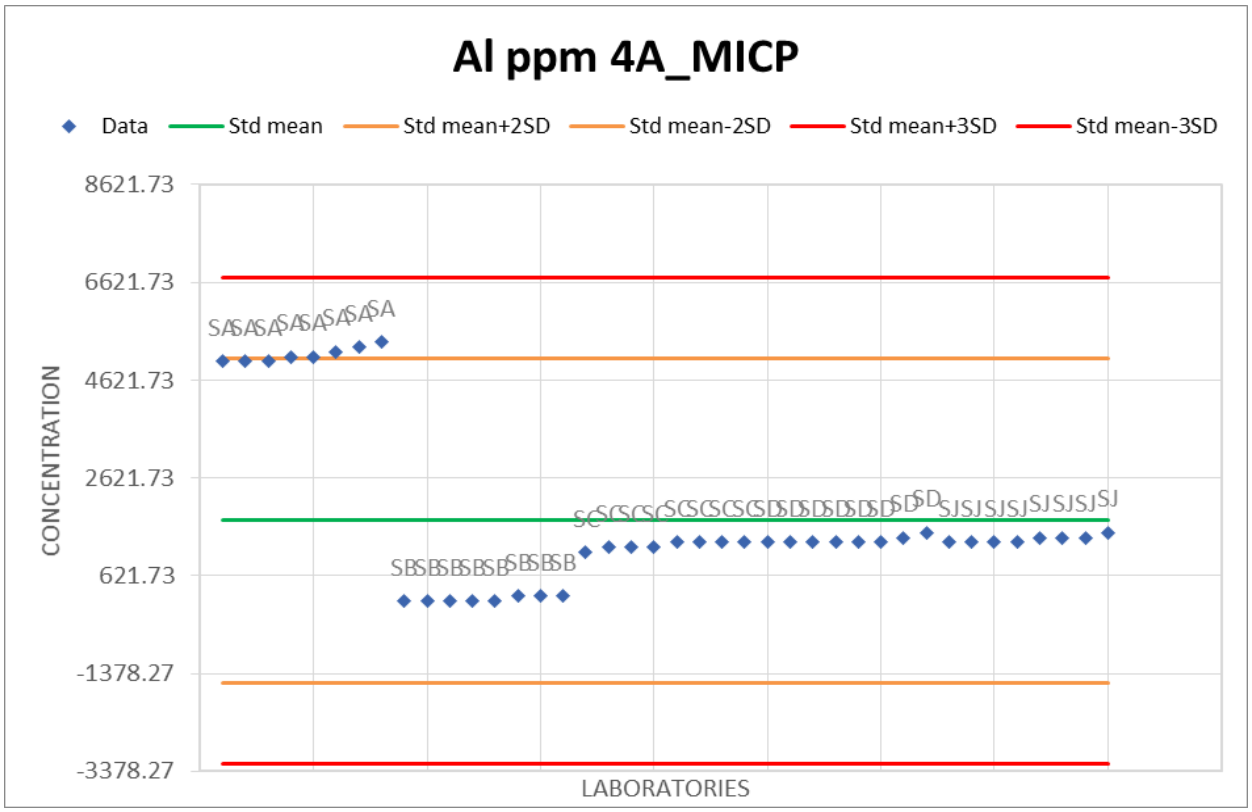
Results with outliers

Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Al	4A_MICP	40	1842.50	1733.66	94	ppm

Between Laboratory Statistics

Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Al	4A_MICP	SA	8	5137.500	150.594	0.029	2.931
Al	4A_MICP	SB	8	137.500	51.755	0.376	37.640
Al	4A_MICP	SC	8	1237.500	74.402	0.060	6.012
Al	4A_MICP	SD	8	1337.500	74.402	0.056	5.563
Al	4A_MICP	SJ	8	1362.500	74.402	0.055	5.461
			Average	1842.500	91.613	0.115	11.521

12.1. Al 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Al	4A_MICP	39	1751.28	1656.23	95	ppm

Std mean	1751.282
SD	1656.228
2SD	3312.456
3SD	4968.683
Std mean+2SD	5063.738
Std mean-2SD	-1561.173
Std mean+3SD	6719.965
Std mean-3SD	-3217.401

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Al	4A_MICP	1019.869	5199857.089	2280.320	79.521	ppm

Comment: 1 result out of 40 was rejected as an outlier using z score.

12.2. Al_2O_3 XRF

Lab_ID	Z_Score	Data
SA	0.48	0.26
SA	0.48	0.26
SA	0.48	0.26
SA	0.48	0.26
SA	0.75	0.27
SA	1.01	0.28
SA	1.01	0.28
SA	1.28	0.29
SB	-2.46	0.15
SB	-2.46	0.15
SB	-2.19	0.16
SB	-2.19	0.16
SB	-2.19	0.16
SB	-2.19	0.16
SB	-2.19	0.16
SB	-2.19	0.16
SC	-1.12	0.20
SC	-0.86	0.21
SC	-0.59	0.22
SC	-0.32	0.23
SC	-0.05	0.24
SC	-0.05	0.24
SC	-0.05	0.24
SC	0.21	0.25

Lab_ID	Z_Score	Data
SD	-0.05	0.24
SD	0.21	0.25
SD	0.21	0.25
SD	0.21	0.25
SD	0.21	0.25
SD	0.21	0.25
SD	0.48	0.26
SD	0.75	0.27
SE	-0.86	0.21
SE	-0.59	0.22
SE	-0.32	0.23
SE	-0.32	0.23
SE	-0.05	0.24
SE	-0.05	0.24
SE	-0.05	0.24
SE	0.21	0.25
SJ	-0.24	0.23
SJ	-0.24	0.23
SJ	-0.24	0.23
SJ	-0.19	0.24
SJ	0.03	0.24
SJ	0.11	0.25
SJ	0.21	0.25
SJ	1.04	0.28

Lab_ID	Z_Score	Data
SK	-0.05	0.24
SK	0.21	0.25
SK	0.48	0.26
SK	0.75	0.27
SK	0.75	0.27
SK	1.28	0.29
SK	1.81	0.31
SK	2.08	0.32
ST	-0.05	0.24
ST	-0.05	0.24
ST	-0.05	0.24
ST	-0.05	0.24
ST	-0.05	0.24
ST	-0.05	0.24
ST	-0.05	0.24
ST	2.08	0.32
SU	0.48	0.26
SU	0.51	0.26
SU	0.56	0.26
SU	0.61	0.27
SU	0.67	0.27
SU	0.69	0.27
SU	0.75	0.27
SU	1.01	0.28

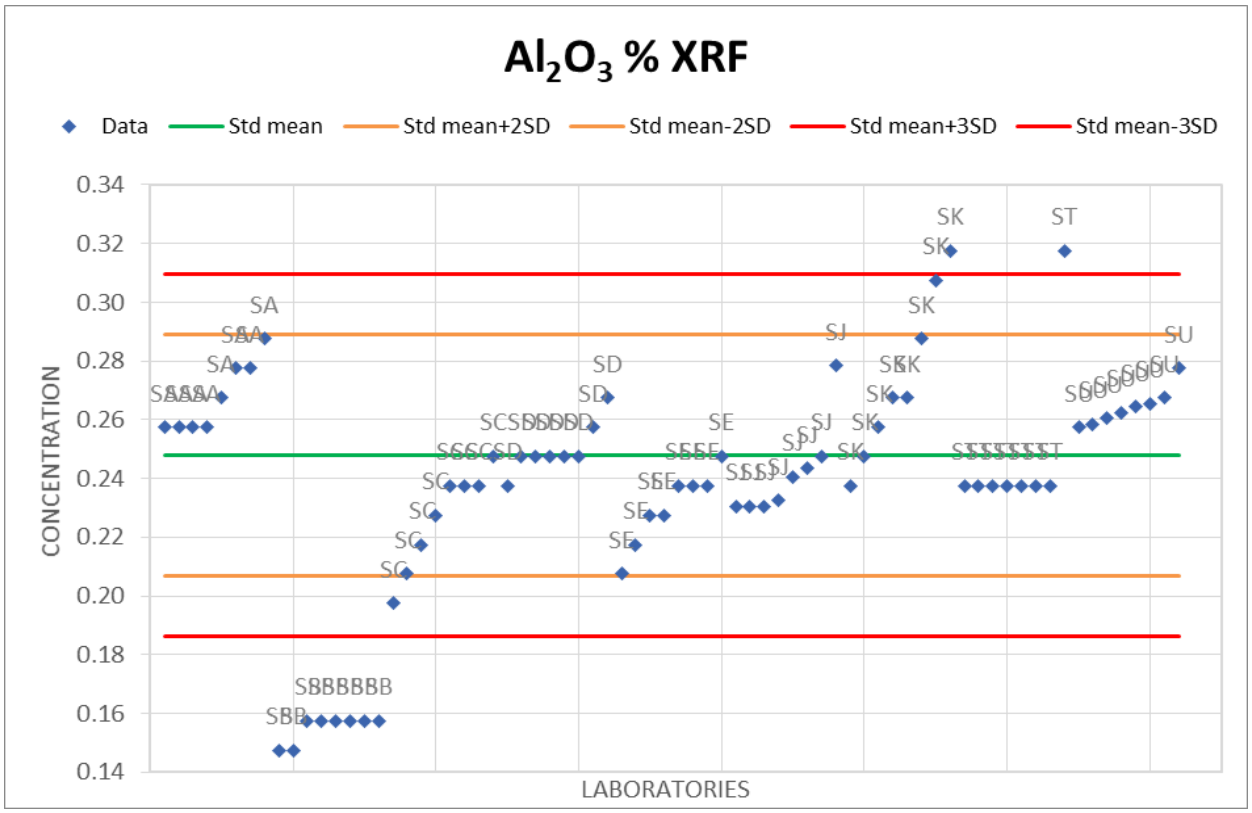
Results with outliers

Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Al_2O_3	XRF	72	0.24	0.04	15	%

Between Laboratory Statistics

Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Al_2O_3	XRF	SA	8	0.270	0.012	0.044	4.427
Al_2O_3	XRF	SB	8	0.158	0.005	0.029	2.939
Al_2O_3	XRF	SC	8	0.229	0.017	0.075	7.549
Al_2O_3	XRF	SD	8	0.253	0.009	0.035	3.511
Al_2O_3	XRF	SE	8	0.233	0.013	0.055	5.513
Al_2O_3	XRF	SJ	8	0.244	0.016	0.067	6.662
Al_2O_3	XRF	SK	8	0.276	0.028	0.102	10.227
Al_2O_3	XRF	ST	8	0.250	0.028	0.113	11.314
Al_2O_3	XRF	SU	8	0.267	0.006	0.024	2.386
			Average	0.242	0.017	0.061	6.059

12.2. Al_2O_3 XRF (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Al_2O_3	XRF	62	0.25	0.02	8	%

Std mean	0.250
SD	0.020
2SD	0.041
3SD	0.061
Std mean+2SD	0.291
Std mean-2SD	0.209
Std mean+3SD	0.312
Std mean-3SD	0.189

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Al_2O_3	XRF	0.007	0.0003	0.018	0.015	%

Comment: 10 results out of 72 were rejected as outliers using z score.

12.3. Ba 4A_MICP

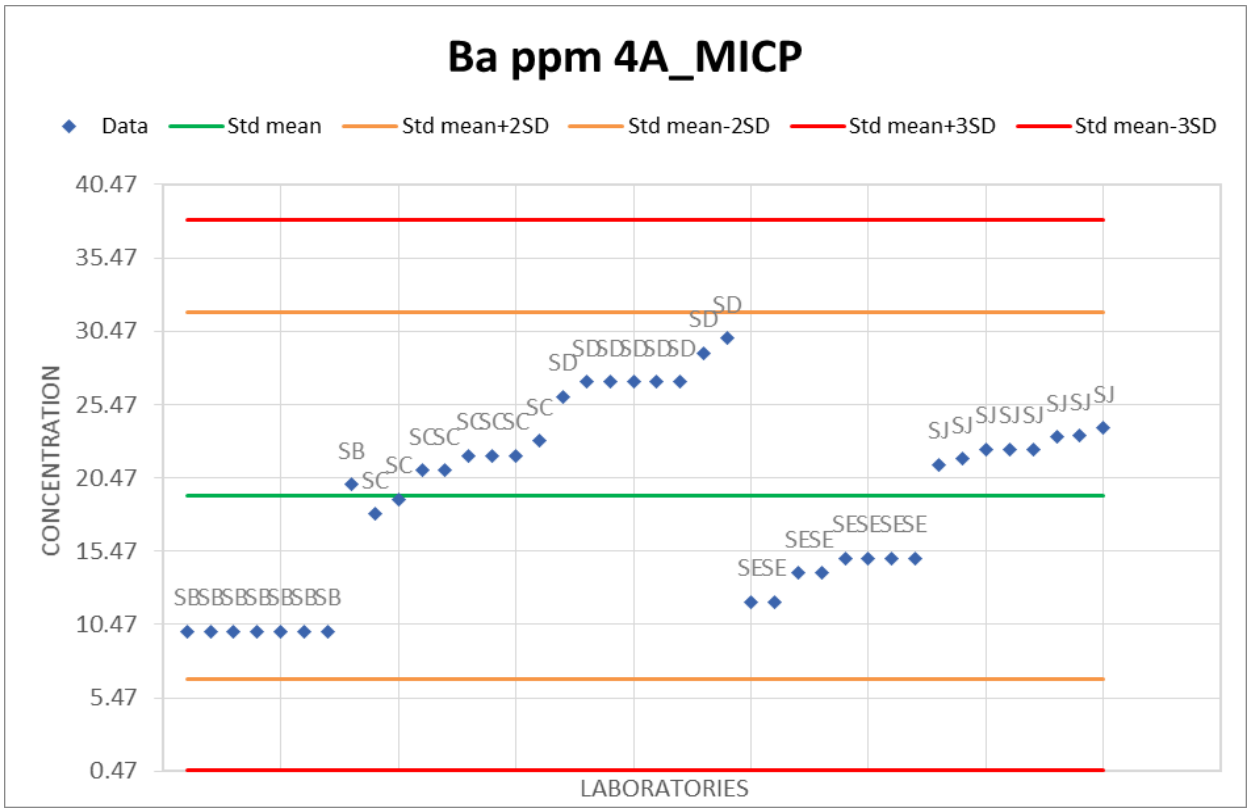
Lab_ID	Z_Score	Data
SB	-1.48	10.00
SB	-1.48	10.00
SB	-1.48	10.00
SB	-1.48	10.00
SB	-1.48	10.00
SB	-1.48	10.00
SB	-1.48	10.00
SB	0.12	20.00
SC	-0.20	18.00
SC	-0.04	19.00
SC	0.28	21.00
SC	0.28	21.00
SC	0.44	22.00
SC	0.44	22.00
SC	0.44	22.00
SC	0.60	23.00
SD	1.07	26.00
SD	1.23	27.00
SD	1.23	27.00
SD	1.23	27.00
SD	1.23	27.00
SD	1.23	27.00
SD	1.55	29.00
SD	1.71	30.00

Lab_ID	Z_Score	Data
SE	-1.16	12.00
SE	-1.16	12.00
SE	-0.84	14.00
SE	-0.84	14.00
SE	-0.68	15.00
SE	-0.68	15.00
SE	-0.68	15.00
SE	-0.68	15.00
SJ	0.34	21.37
SJ	0.40	21.76
SJ	0.50	22.42
SJ	0.51	22.44
SJ	0.51	22.44
SJ	0.64	23.27
SJ	0.65	23.35
SJ	0.73	23.85

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Ba	4A_MICP	40	19.27	6.26	32	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Ba	4A_MICP	SB	8	11.250	3.536	0.314	31.427
Ba	4A_MICP	SC	8	21.000	1.690	0.080	8.049
Ba	4A_MICP	SD	8	27.500	1.309	0.048	4.761
Ba	4A_MICP	SE	8	14.000	1.309	0.094	9.352
Ba	4A_MICP	SJ	8	22.613	0.835	0.037	3.690
			Average	19.273	1.974	0.115	11.456

12.3. Ba 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Ba	4A_MICP	40	19.27	6.26	32	ppm

Std mean	19.273
SD	6.260
2SD	12.520
3SD	18.780
Std mean+2SD	31.792
Std mean-2SD	6.753
Std mean+3SD	38.052
Std mean-3SD	0.493

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Ba	4A_MICP	3.723	68.817	8.296	1.974	ppm

Comment: No results were rejected as outliers using z score.

12.4. Bi 4A_MICP

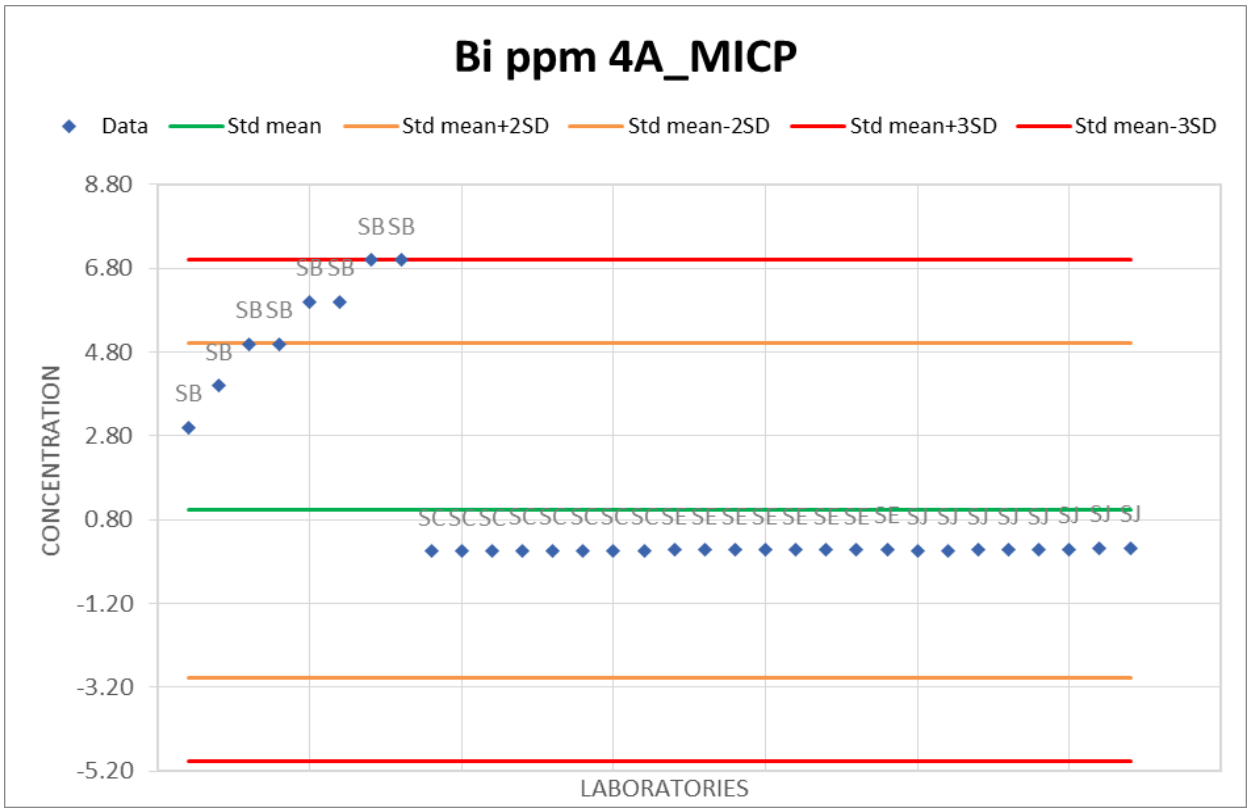
Lab_ID	Z_Score	Data
SB	0.66	3.00
SB	1.07	4.00
SB	1.48	5.00
SB	1.48	5.00
SB	1.90	6.00
SB	1.90	6.00
SB	2.31	7.00
SB	2.31	7.00
SC	-0.56	0.050
SC	-0.56	0.050
SC	-0.56	0.050
SC	-0.55	0.060
SC	-0.55	0.060
SC	-0.55	0.060
SC	-0.55	0.060
SC	-0.55	0.070
SE	-0.55	0.080
SE	-0.55	0.080
SE	-0.54	0.090
SE	-0.54	0.090
SE	-0.54	0.090
SE	-0.54	0.090
SE	-0.54	0.090
SE	-0.54	0.10

Lab_ID	Z_Score	Data
SJ	-0.55	0.070
SJ	-0.55	0.070
SJ	-0.55	0.080
SJ	-0.55	0.080
SJ	-0.54	0.090
SJ	-0.54	0.10
SJ	-0.53	0.13
SJ	-0.53	0.13

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Bi	4A_MICP	32	1.40	2.42	173	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Bi	4A_MICP	SB	8	5.375	1.408	0.262	26.193
Bi	4A_MICP	SC	8	0.058	0.007	0.123	12.298
Bi	4A_MICP	SE	8	0.089	0.006	0.072	7.221
Bi	4A_MICP	SJ	8	0.094	0.024	0.261	26.089
			Average	1.404	0.704	0.180	17.950

12.4. Bi 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Bi	4A_MICP	30	1.03	1.99	193	ppm

Std mean	1.031
SD	1.994
2SD	3.988
3SD	5.982
Std mean+2SD	5.019
Std mean-2SD	-2.957
Std mean+3SD	7.012
Std mean-3SD	-4.951

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Bi	4A_MICP	1.501	8.972	2.995	0.513	ppm

Comment: 2 results out of 32 were rejected as outliers using z score.

12.5. C Combustion LECO

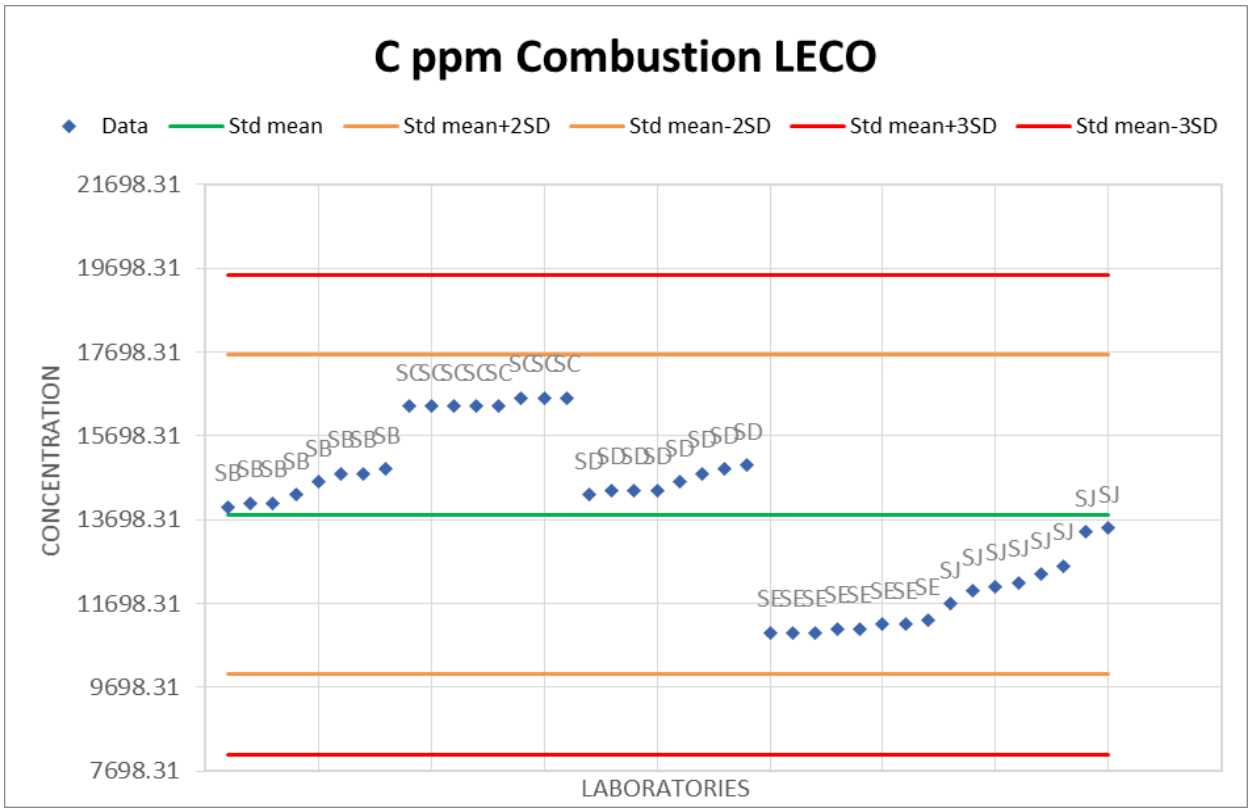
Lab_ID	Z_Score	Data
SB	0.09	14000.00
SB	0.14	14100.00
SB	0.14	14100.00
SB	0.25	14300.00
SB	0.41	14600.00
SB	0.51	14800.00
SB	0.51	14800.00
SB	0.56	14900.00
SC	1.35	16400.00
SC	1.35	16400.00
SC	1.35	16400.00
SC	1.35	16400.00
SC	1.35	16400.00
SC	1.46	16600.00
SC	1.46	16600.00
SC	1.46	16600.00
SD	0.25	14300.00
SD	0.30	14400.00
SD	0.30	14400.00
SD	0.30	14400.00
SD	0.41	14600.00
SD	0.51	14800.00
SD	0.56	14900.00
SD	0.62	15000.00

Lab_ID	Z_Score	Data
SE	-1.48	11000.00
SE	-1.48	11000.00
SE	-1.48	11000.00
SE	-1.43	11100.00
SE	-1.43	11100.00
SE	-1.38	11200.00
SE	-1.38	11200.00
SE	-1.32	11300.00
SJ	-1.11	11700.00
SJ	-0.96	12000.00
SJ	-0.90	12100.00
SJ	-0.85	12200.00
SJ	-0.75	12400.00
SJ	-0.64	12600.00
SJ	-0.22	13400.00
SJ	-0.17	13500.00

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
C	Combustion/LECO	40	13825.00	1907.17	14	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
C	Combustion/LECO	SB	8	14450.000	366.450	0.025	2.536
C	Combustion/LECO	SC	8	16475.000	103.510	0.006	0.628
C	Combustion/LECO	SD	8	14600.000	267.261	0.018	1.831
C	Combustion/LECO	SE	8	11112.500	112.599	0.010	1.013
C	Combustion/LECO	SJ	8	12487.500	651.235	0.052	5.215
			Average	13825.000	361.446	0.022	2.245

12.5. C Combustion LECO (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
C	Combustion/LECO	40	13825.00	1907.17	14	ppm

Std mean	13825.000
SD	1907.173
2SD	3814.345
3SD	5721.518
Std mean+2SD	17639.345
Std mean-2SD	10010.655
Std mean+3SD	19546.518
Std mean-3SD	8103.482

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
C	Combustion/LECO	1170.840	6837996.429	2614.956	361.446	ppm

Comment: No results were rejected as outliers using z score.

12.6. Ca 4A_MICP

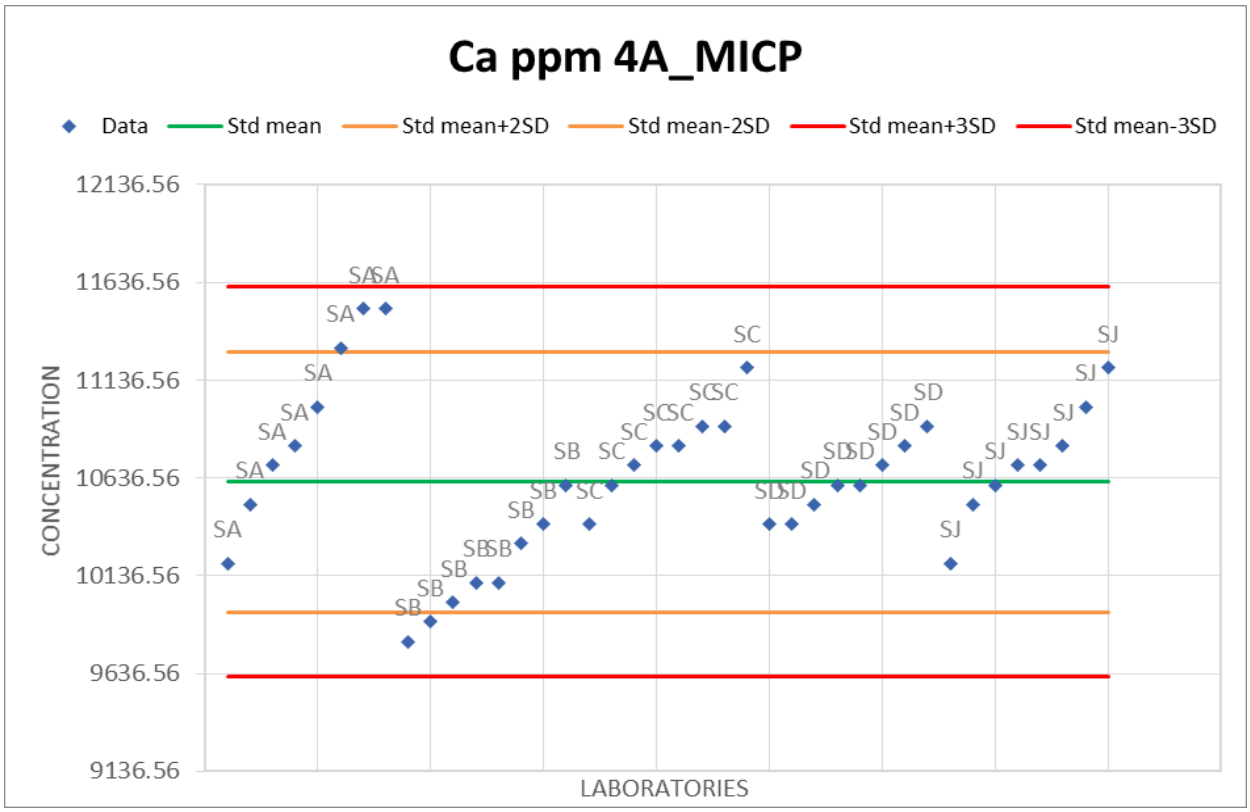
Lab_ID	Z_Score	Data
SA	-1.10	10200.00
SA	-0.35	10500.00
SA	0.15	10700.00
SA	0.40	10800.00
SA	0.90	11000.00
SA	1.66	11300.00
SA	2.16	11500.00
SA	2.16	11500.00
SB	-2.11	9800.00
SB	-1.86	9900.00
SB	-1.61	10000.00
SB	-1.35	10100.00
SB	-1.35	10100.00
SB	-0.85	10300.00
SB	-0.60	10400.00
SB	-0.10	10600.00
SC	-0.60	10400.00
SC	-0.10	10600.00
SC	0.15	10700.00
SC	0.40	10800.00
SC	0.40	10800.00
SC	0.65	10900.00
SC	0.65	10900.00
SC	1.40	11200.00

Lab_ID	Z_Score	Data
SD	-0.60	10400.00
SD	-0.60	10400.00
SD	-0.35	10500.00
SD	-0.10	10600.00
SD	-0.10	10600.00
SD	0.15	10700.00
SD	0.40	10800.00
SD	0.65	10900.00
SJ	-1.10	10200.00
SJ	-0.35	10500.00
SJ	-0.10	10600.00
SJ	0.15	10700.00
SJ	0.15	10700.00
SJ	0.40	10800.00
SJ	0.90	11000.00
SJ	1.40	11200.00

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Ca	4A_MICP	40	10640.00	398.59	4	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Ca	4A_MICP	SA	8	10937.500	474.906	0.043	4.342
Ca	4A_MICP	SB	8	10150.000	267.261	0.026	2.633
Ca	4A_MICP	SC	8	10787.500	235.660	0.022	2.185
Ca	4A_MICP	SD	8	10612.500	180.772	0.017	1.703
Ca	4A_MICP	SJ	8	10712.500	304.432	0.028	2.842
			Average	10640.000	309.146	0.027	2.741

12.6. Ca 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Ca	4A_MICP	37	10616.22	332.93	3	ppm

Std mean	10616.216
SD	332.928
2SD	665.855
3SD	998.783
Std mean+2SD	11282.072
Std mean-2SD	9950.361
Std mean+3SD	11614.999
Std mean-3SD	9617.433

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Ca	4A_MICP	123.826	66693.201	258.250	271.641	ppm

Comment: 3 results out of 40 were rejected as outliers using z score.

12.7. CaO XRF

Lab_ID	Z_Score	Data
SA	-1.12	1.43
SA	-0.92	1.45
SA	-0.81	1.46
SA	-0.71	1.47
SA	-0.71	1.47
SA	-0.71	1.47
SA	-0.71	1.47
SA	-0.41	1.50
SB	-0.71	1.47
SB	-0.61	1.48
SB	-0.61	1.48
SB	-0.61	1.48
SB	-0.51	1.49
SB	-0.41	1.50
SB	-0.41	1.50
SB	-0.41	1.50
SC	-0.11	1.53
SC	0.00	1.54
SC	0.00	1.54
SC	0.00	1.54
SC	0.00	1.54
SC	0.00	1.54
SC	0.10	1.55
SC	0.10	1.55

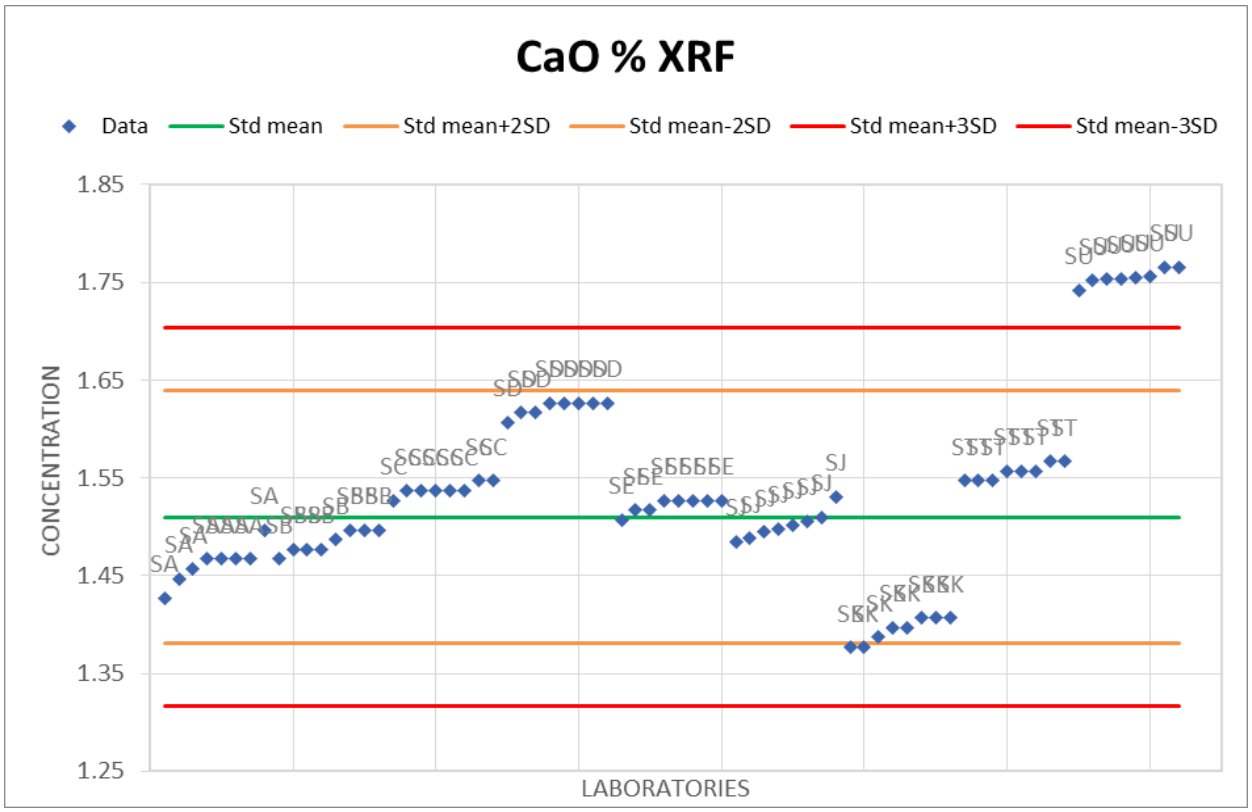
Lab_ID	Z_Score	Data
SD	0.71	1.61
SD	0.81	1.62
SD	0.81	1.62
SD	0.91	1.63
SD	0.91	1.63
SD	0.91	1.63
SD	0.91	1.63
SD	0.91	1.63
SE	-0.31	1.51
SE	-0.21	1.52
SE	-0.21	1.52
SE	-0.11	1.53
SE	-0.11	1.53
SE	-0.11	1.53
SE	-0.11	1.53
SE	-0.11	1.53
SJ	-0.53	1.49
SJ	-0.50	1.49
SJ	-0.43	1.50
SJ	-0.40	1.50
SJ	-0.36	1.51
SJ	-0.32	1.51
SJ	-0.28	1.51
SJ	-0.06	1.53

Lab_ID	Z_Score	Data
SK	-1.62	1.38
SK	-1.62	1.38
SK	-1.52	1.39
SK	-1.42	1.40
SK	-1.42	1.40
SK	-1.32	1.41
SK	-1.32	1.41
SK	-1.32	1.41
ST	0.10	1.55
ST	0.10	1.55
ST	0.10	1.55
ST	0.20	1.56
ST	0.20	1.56
ST	0.20	1.56
ST	0.30	1.57
ST	0.30	1.57
SU	2.07	1.75
SU	2.17	1.76
SU	2.18	1.76
SU	2.19	1.76
SU	2.20	1.76
SU	2.21	1.76
SU	2.32	1.77
SU	2.32	1.77

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
CaO	XRF	72	1.54	0.10	6	%

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
CaO	XRF	SA	8	1.465	0.020	0.014	1.365
CaO	XRF	SB	8	1.488	0.012	0.008	0.783
CaO	XRF	SC	8	1.541	0.006	0.004	0.416
CaO	XRF	SD	8	1.625	0.008	0.005	0.465
CaO	XRF	SE	8	1.525	0.008	0.005	0.496
CaO	XRF	SJ	8	1.505	0.014	0.010	0.963
CaO	XRF	SK	8	1.398	0.013	0.009	0.917
CaO	XRF	ST	8	1.559	0.008	0.005	0.535
CaO	XRF	SU	8	1.759	0.008	0.004	0.443
			Average	1.540	0.012	0.007	0.709

12.7. CaO XRF (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
CaO	XRF	64	1.51	0.06	4	%

Std mean	1.513
SD	0.065
2SD	0.129
3SD	0.194
Std mean+2SD	1.642
Std mean-2SD	1.384
Std mean+3SD	1.707
Std mean-3SD	1.319

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
CaO	XRF	0.024	0.005	0.067	0.012	%

Comment: 8 results out of 72 were rejected as outliers using z score.

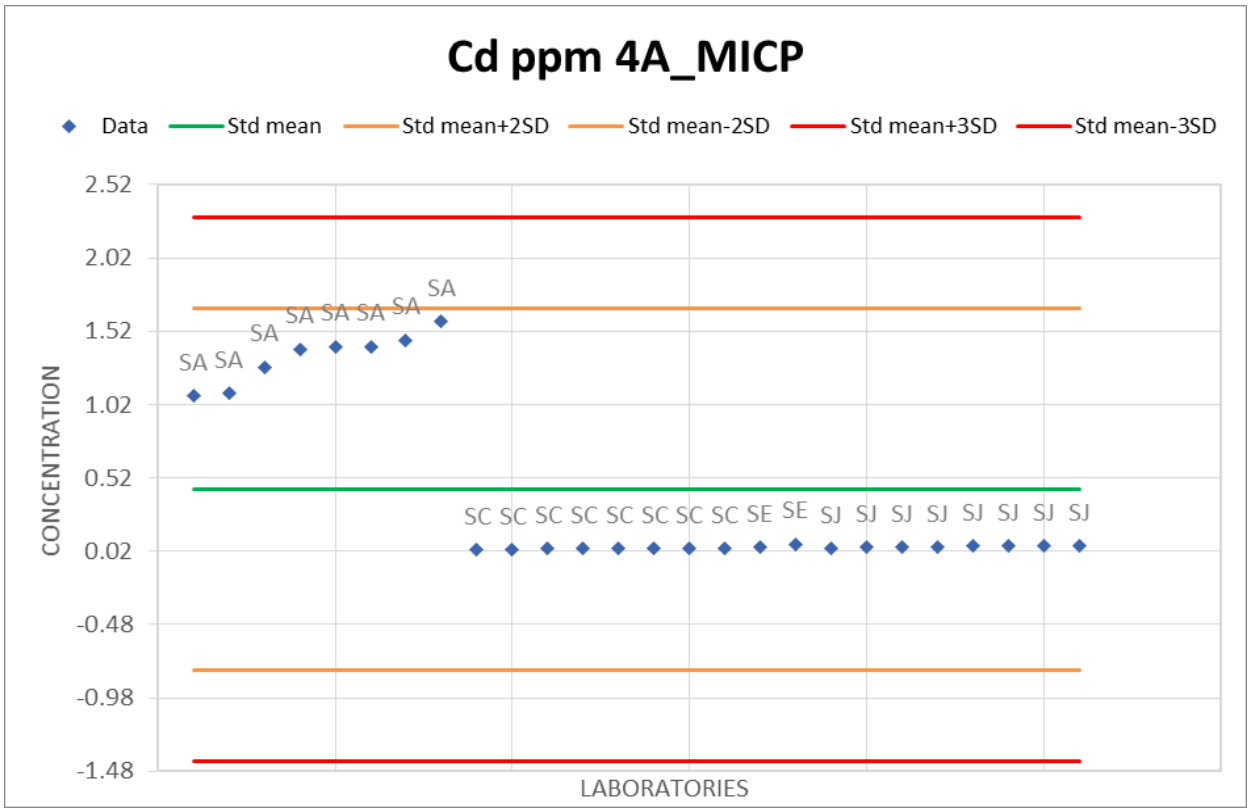
12.8. Cd 4A_MICP

Lab_ID	Z_Score	Data
SA	1.03	1.08
SA	1.06	1.10
SA	1.35	1.28
SA	1.54	1.40
SA	1.58	1.42
SA	1.58	1.42
SA	1.64	1.46
SA	1.85	1.59
SC	-0.67	0.030
SC	-0.67	0.030
SC	-0.66	0.040
SC	-0.66	0.040
SC	-0.66	0.040
SC	-0.66	0.040
SC	-0.66	0.040
SC	-0.66	0.040
SE	-0.64	0.050
SE	-0.61	0.070
SJ	-0.66	0.040
SJ	-0.64	0.050
SJ	-0.64	0.050
SJ	-0.64	0.050
SJ	-0.63	0.060
SJ	-0.63	0.060

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Cd	4A_MICP	26	0.45	0.62	138	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Cd	4A_MICP	SA	8	1.344	0.178	0.133	13.252
Cd	4A_MICP	SC	8	0.038	0.005	0.123	12.344
Cd	4A_MICP	SE	2	0.060	0.014	0.236	23.570
Cd	4A_MICP	SJ	8	0.054	0.007	0.138	13.842
			Average	0.374	0.099	0.158	15.752

12.8. Cd 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Cd	4A_MICP	26	0.45	0.62	138	ppm

Std mean	0.446
SD	0.618
2SD	1.235
3SD	1.853
Std mean+2SD	1.681
Std mean-2SD	-0.789
Std mean+3SD	2.299
Std mean-3SD	-1.406

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Cd	4A_MICP	0.440	0.773	0.879	0.101	ppm

Comment: No results were rejected as outliers using z score.

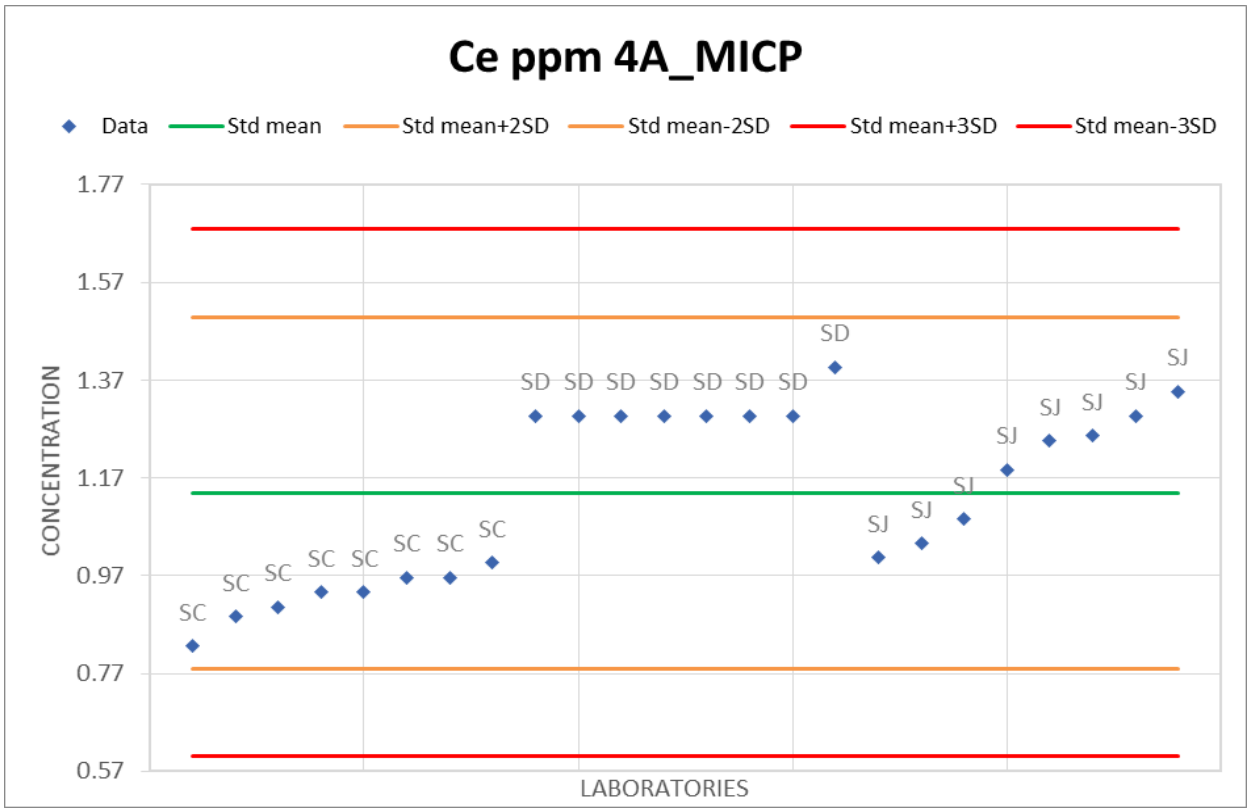
12.9. Ce 4A_MICP

Lab_ID	Z_Score	Data
SC	-1.74	0.83
SC	-1.41	0.89
SC	-1.30	0.91
SC	-1.13	0.94
SC	-1.13	0.94
SC	-0.96	0.97
SC	-0.96	0.97
SC	-0.80	1.00
SD	0.87	1.30
SD	0.87	1.30
SD	0.87	1.30
SD	0.87	1.30
SD	0.87	1.30
SD	0.87	1.30
SD	0.87	1.30
SD	1.43	1.40
SJ	-0.74	1.01
SJ	-0.57	1.04
SJ	-0.30	1.09
SJ	0.26	1.19
SJ	0.59	1.25
SJ	0.65	1.26
SJ	0.87	1.30
SJ	1.15	1.35

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Ce	4A_MICP	24	1.14	0.18	16	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Ce	4A_MICP	SC	8	0.931	0.054	0.058	5.781
Ce	4A_MICP	SD	8	1.313	0.035	0.027	2.694
Ce	4A_MICP	SJ	8	1.186	0.126	0.106	10.615
			Average	1.143	0.082	0.064	6.363

12.9. Ce 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Ce	4A_MICP	24	1.14	0.18	16	ppm

Std mean	1.143
SD	0.180
2SD	0.360
3SD	0.539
Std mean+2SD	1.503
Std mean-2SD	0.784
Std mean+3SD	1.683
Std mean-3SD	0.604

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Ce	4A_MICP	0.182	0.098	0.314	0.082	ppm

Comment: No results were rejected as outliers using z score.

12.10. Co 4A_MICP

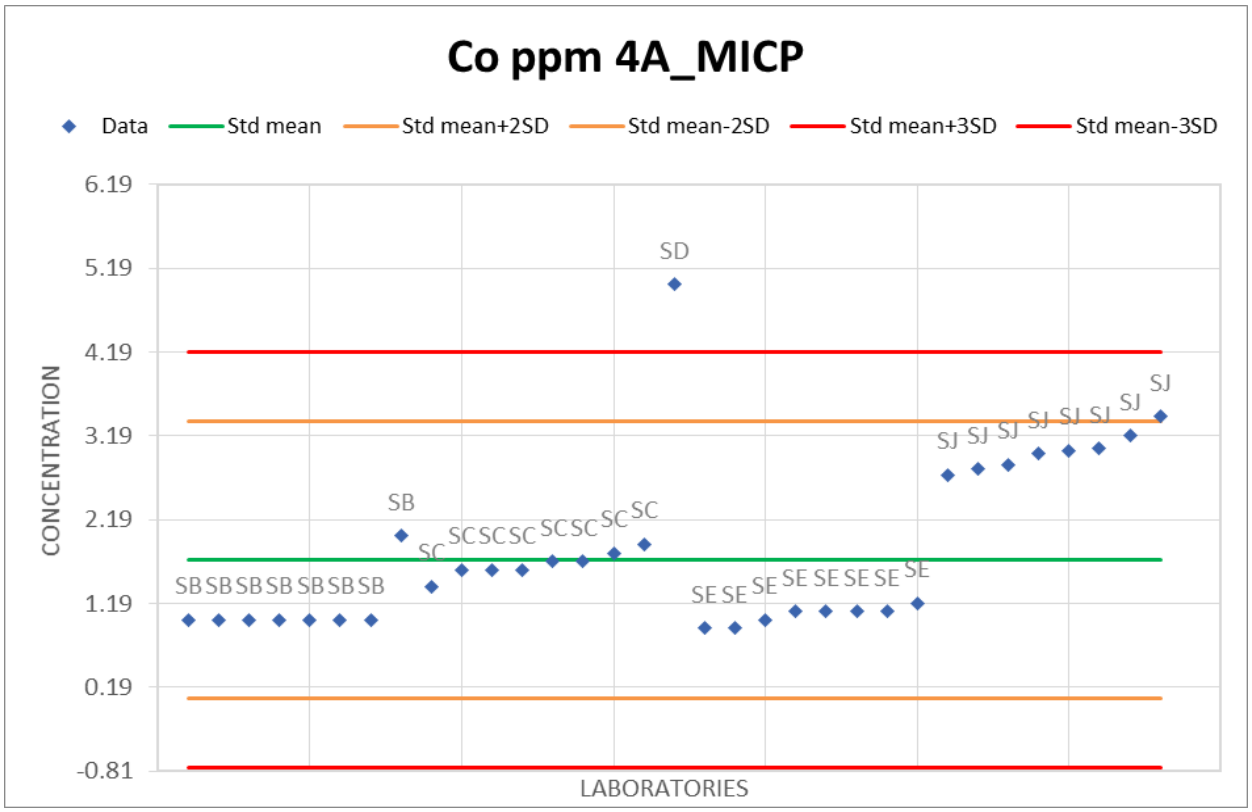
Lab_ID	Z_Score	Data
SB	-0.82	1.00
SB	-0.82	1.00
SB	-0.82	1.00
SB	-0.82	1.00
SB	-0.82	1.00
SB	-0.82	1.00
SB	-0.82	1.00
SB	0.19	2.00
SC	-0.41	1.40
SC	-0.21	1.60
SC	-0.21	1.60
SC	-0.21	1.60
SC	-0.11	1.70
SC	-0.11	1.70
SC	-0.01	1.80
SC	0.09	1.90
SD	3.21	5.00
SE	-0.92	0.90
SE	-0.92	0.90
SE	-0.82	1.00
SE	-0.71	1.10
SE	-0.71	1.10
SE	-0.71	1.10
SE	-0.71	1.10

Lab_ID	Z_Score	Data
SJ	0.92	2.73
SJ	0.99	2.80
SJ	1.05	2.85
SJ	1.18	2.98
SJ	1.22	3.02
SJ	1.24	3.04
SJ	1.40	3.20
SJ	1.63	3.43

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Co	4A_MICP	33	1.81	0.99	55	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Co	4A_MICP	SB	8	1.125	0.354	0.314	31.427
Co	4A_MICP	SC	8	1.663	0.151	0.091	9.058
Co	4A_MICP	SD	1	5.000	<0.0001	<0.0001	<0.0001
Co	4A_MICP	SE	8	1.050	0.107	0.102	10.181
Co	4A_MICP	SJ	8	3.006	0.228	0.076	7.569
			Average	2.369	0.226	0.146	14.559

12.10. Co 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Co	4A_MICP	32	1.71	0.83	48	ppm

Std mean	1.711
SD	0.826
2SD	1.652
3SD	2.478
Std mean+2SD	3.363
Std mean-2SD	0.059
Std mean+3SD	4.189
Std mean-3SD	-0.768

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Co	4A_MICP	0.639	1.627	1.276	0.230	ppm

Comment: 1 result out of 33 was rejected as an outlier using z score.

12.11. Cr 4A_MICP

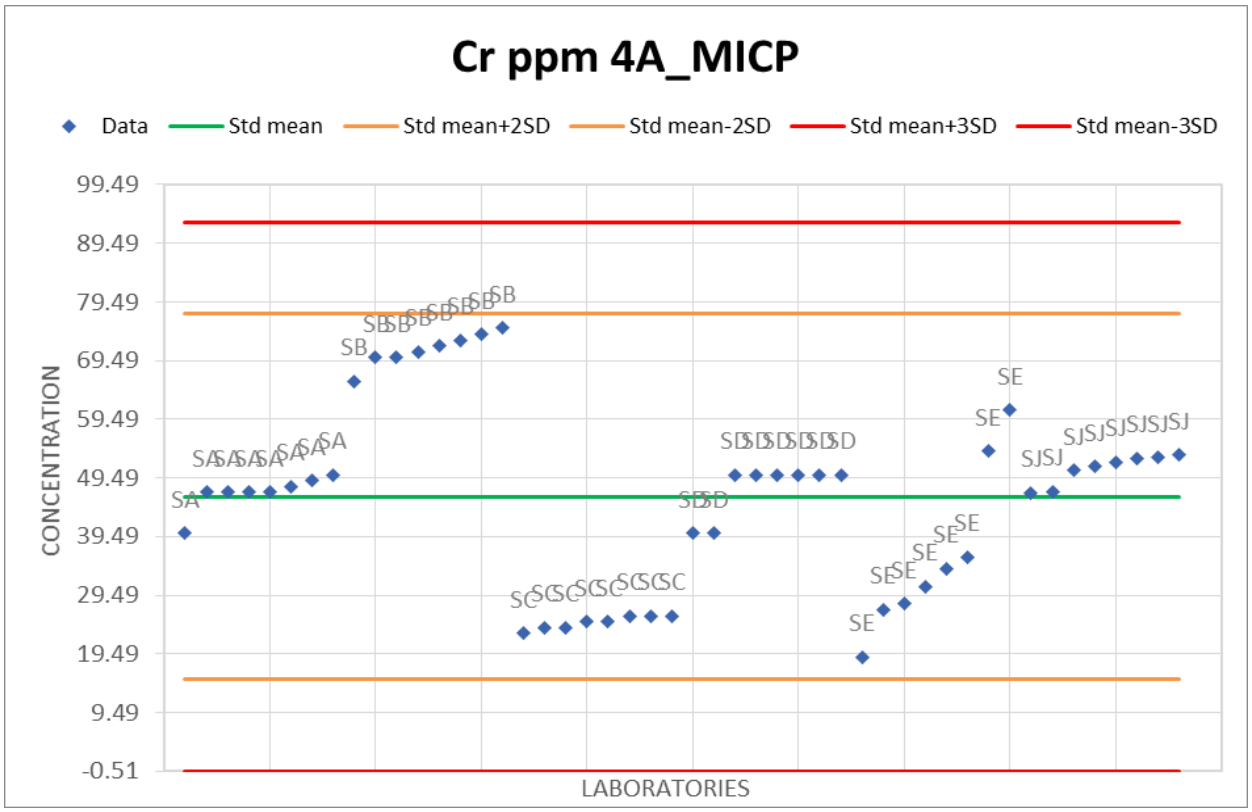
Lab_ID	Z_Score	Data
SA	-0.40	40.00
SA	0.04	47.00
SA	0.04	47.00
SA	0.04	47.00
SA	0.04	47.00
SA	0.11	48.00
SA	0.17	49.00
SA	0.24	50.00
SB	1.26	66.00
SB	1.52	70.00
SB	1.52	70.00
SB	1.58	71.00
SB	1.65	72.00
SB	1.71	73.00
SB	1.78	74.00
SB	1.84	75.00
SC	-1.49	23.00
SC	-1.43	24.00
SC	-1.43	24.00
SC	-1.37	25.00
SC	-1.37	25.00
SC	-1.30	26.00
SC	-1.30	26.00
SC	-1.30	26.00

Lab_ID	Z_Score	Data
SD	-0.40	40.00
SD	-0.40	40.00
SD	0.24	50.00
SD	0.24	50.00
SD	0.24	50.00
SD	0.24	50.00
SD	0.24	50.00
SD	0.24	50.00
SE	-1.75	19.00
SE	-1.24	27.00
SE	-1.17	28.00
SE	-0.98	31.00
SE	-0.79	34.00
SE	-0.66	36.00
SE	0.49	54.00
SE	0.94	61.00
SJ	0.04	46.90
SJ	0.05	47.13
SJ	0.29	50.81
SJ	0.33	51.41
SJ	0.38	52.16
SJ	0.42	52.86
SJ	0.42	52.90
SJ	0.46	53.42

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Cr	4A_MICP	48	46.30	15.60	34	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Cr	4A_MICP	SA	8	46.875	2.997	0.064	6.394
Cr	4A_MICP	SB	8	71.375	2.825	0.040	3.958
Cr	4A_MICP	SC	8	24.875	1.126	0.045	4.527
Cr	4A_MICP	SD	8	47.500	4.629	0.097	9.745
Cr	4A_MICP	SE	8	36.250	14.200	0.392	39.173
Cr	4A_MICP	SJ	8	50.949	2.570	0.050	5.045
			Average	46.304	6.428	0.115	11.474

12.11. Cr 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Cr	4A_MICP	48	46.30	15.60	34	ppm

Std mean	46.304
SD	15.596
2SD	31.193
3SD	46.789
Std mean+2SD	77.497
Std mean-2SD	15.111
Std mean+3SD	93.093
Std mean-3SD	-0.485

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Cr	4A_MICP	7.320	316.359	17.786	6.428	ppm

Comment: No results were rejected as outliers using z score.

12.12. Cr_2O_3 XRF

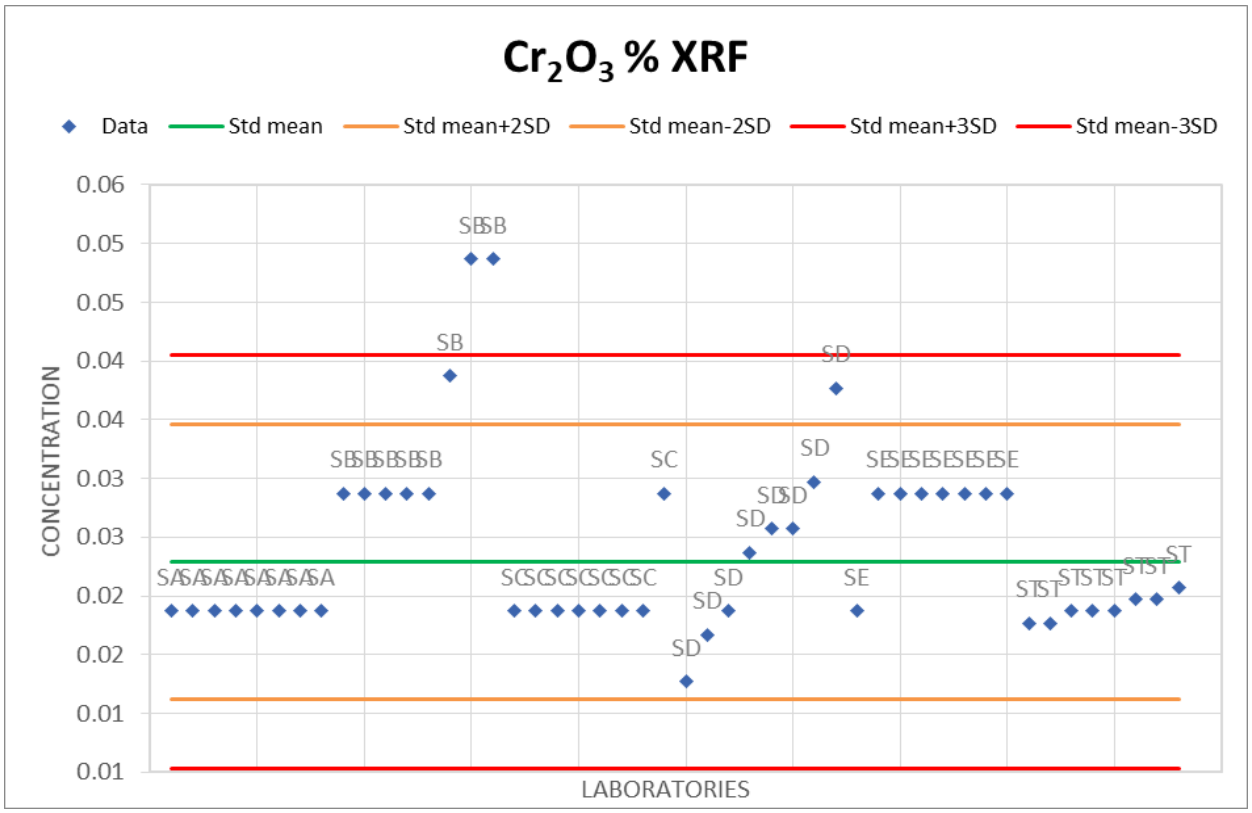
Lab_ID	Z_Score	Data
SA	-0.68	0.020
SA	-0.68	0.020
SA	-0.68	0.020
SA	-0.68	0.020
SA	-0.68	0.020
SA	-0.68	0.020
SA	-0.68	0.020
SA	-0.68	0.020
SB	0.61	0.030
SB	0.61	0.030
SB	0.61	0.030
SB	0.61	0.030
SB	0.61	0.030
SB	1.90	0.040
SB	3.19	0.050
SB	3.19	0.050
SC	-0.68	0.020
SC	-0.68	0.020
SC	-0.68	0.020
SC	-0.68	0.020
SC	-0.68	0.020
SC	-0.68	0.020
SC	-0.68	0.020
SC	0.61	0.030

Lab_ID	Z_Score	Data
SD	-1.46	0.014
SD	-0.94	0.018
SD	-0.68	0.020
SD	-0.03	0.025
SD	0.22	0.027
SD	0.22	0.027
SD	0.74	0.031
SD	1.77	0.039
SE	-0.68	0.020
SE	0.61	0.030
SE	0.61	0.030
SE	0.61	0.030
SE	0.61	0.030
SE	0.61	0.030
SE	0.61	0.030
SE	0.61	0.030
ST	-0.81	0.019
ST	-0.81	0.019
ST	-0.68	0.020
ST	-0.68	0.020
ST	-0.68	0.020
ST	-0.55	0.021
ST	-0.55	0.021
ST	-0.42	0.022

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Cr_2O_3	XRF	48	0.03	0.01	31	%

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Cr_2O_3	XRF	SA	8	0.020	0.000	0.000	0.001
Cr_2O_3	XRF	SB	8	0.036	0.009	0.253	25.272
Cr_2O_3	XRF	SC	8	0.021	0.004	0.166	16.638
Cr_2O_3	XRF	SD	8	0.025	0.008	0.314	31.371
Cr_2O_3	XRF	SE	8	0.029	0.004	0.123	12.298
Cr_2O_3	XRF	ST	8	0.020	0.001	0.051	5.112
			Average	0.025	0.005	0.151	15.115

12.12. Cr_2O_3 XRF (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Cr_2O_3	XRF	46	0.024	0.01	24	%

Std mean	0.024
SD	0.006
2SD	0.012
3SD	0.018
Std mean+2SD	0.036
Std mean-2SD	0.012
Std mean+3SD	0.042
Std mean-3SD	0.007

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Cr_2O_3	XRF	0.002	0.00003	0.005	0.004	%

Comment: 2 results out of 48 were rejected as outliers using z score.

12.13. Cu 4A_MICP

Lab_ID	Z_Score	Data
SA	0.16	15.70
SA	0.23	15.90
SA	0.23	15.90
SA	0.26	16.00
SA	0.57	16.90
SA	0.64	17.10
SA	0.78	17.50
SA	0.85	17.70
SB	-0.43	14.00
SB	-0.43	14.00
SB	-0.08	15.00
SB	-0.08	15.00
SB	-0.08	15.00
SB	-0.08	15.00
SB	-0.08	15.00
SB	0.26	16.00
SC	-2.08	9.20
SC	-2.08	9.20
SC	-1.70	10.30
SC	-1.66	10.40
SC	-1.63	10.50
SC	-1.53	10.80
SC	-1.46	11.00
SC	-1.29	11.50

Lab_ID	Z_Score	Data
SD	-0.08	15.00
SD	-0.08	15.00
SD	1.64	20.00
SD	1.64	20.00
SD	1.64	20.00
SD	1.64	20.00
SD	1.64	20.00
SD	1.64	20.00
SE	-0.77	13.00
SE	-0.77	13.00
SE	-0.43	14.00
SE	-0.43	14.00
SE	-0.43	14.00
SE	-0.43	14.00
SE	-0.08	15.00
SE	-0.08	15.00
SJ	0.10	15.54
SJ	0.30	16.12
SJ	0.35	16.25
SJ	0.37	16.32
SJ	0.60	16.99
SJ	0.74	17.38
SJ	0.85	17.71
SJ	1.09	18.41

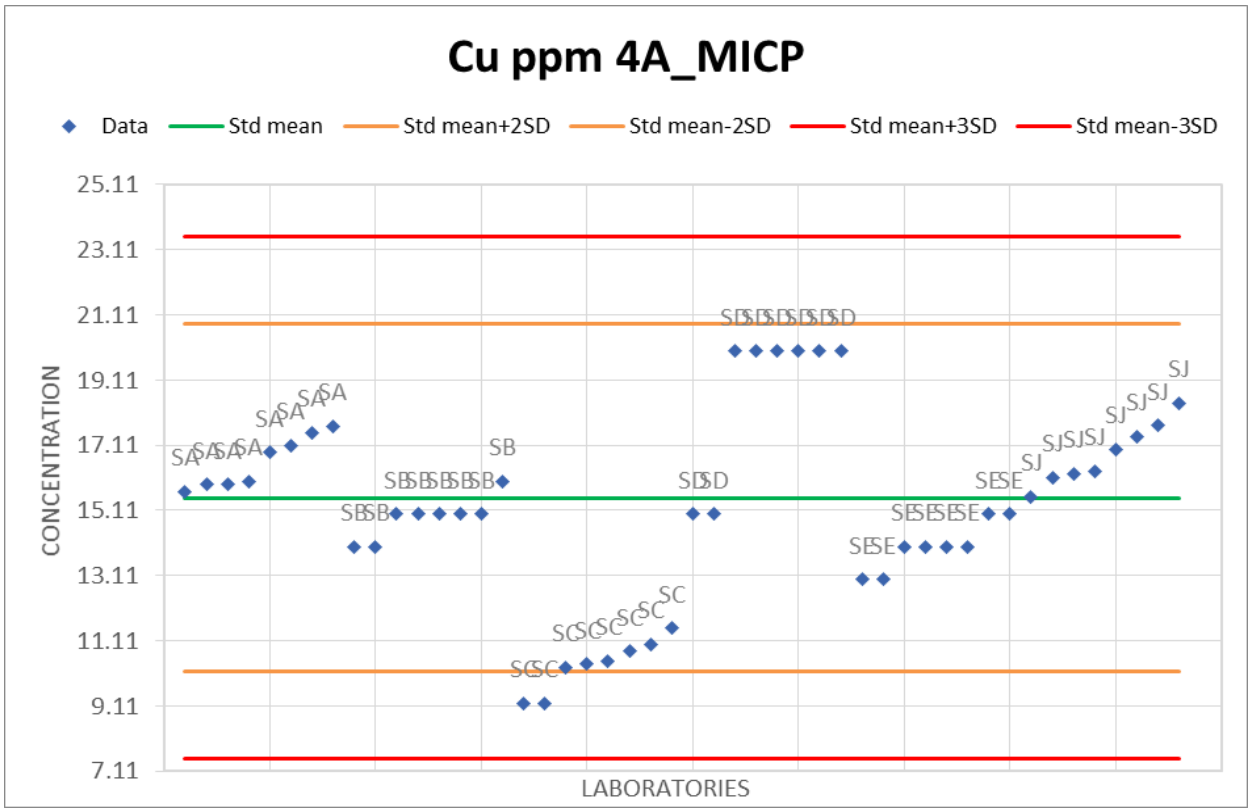
Results with outliers

Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Cu	4A_MICP	48	15.24	2.91	19	ppm

Between Laboratory Statistics

Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Cu	4A_MICP	SA	8	16.588	0.803	0.048	4.838
Cu	4A_MICP	SB	8	14.875	0.641	0.043	4.308
Cu	4A_MICP	SC	8	10.363	0.812	0.078	7.839
Cu	4A_MICP	SD	8	18.750	2.315	0.123	12.344
Cu	4A_MICP	SE	8	14.000	0.756	0.054	5.399
Cu	4A_MICP	SJ	8	16.840	0.953	0.057	5.662
			Average	15.236	1.194	0.067	6.732

12.13. Cu 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Cu	4A_MICP	46	15.50	2.67	17	ppm

Std mean	15.498
SD	2.671
2SD	5.342
3SD	8.014
Std mean+2SD	20.841
Std mean-2SD	10.156
Std mean+3SD	23.512
Std mean-3SD	7.485

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Cu	4A_MICP	1.209	8.593	2.931	1.186	ppm

Comment: 2 results out of 48 were rejected as outliers using z score.

12.14. Fe 4A_MICP

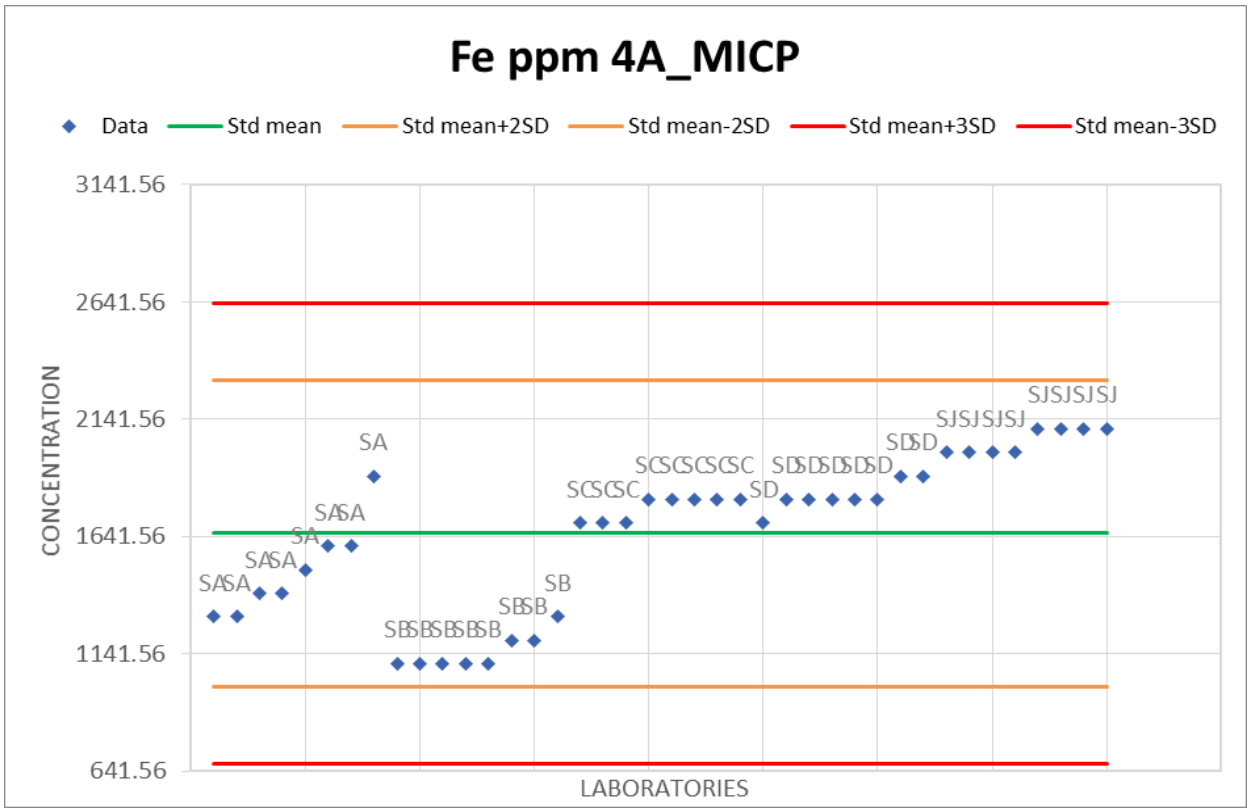
Lab_ID	Z_Score	Data
SA	-1.09	1300.00
SA	-1.09	1300.00
SA	-0.78	1400.00
SA	-0.78	1400.00
SA	-0.47	1500.00
SA	-0.17	1600.00
SA	-0.17	1600.00
SA	0.75	1900.00
SB	-1.70	1100.00
SB	-1.70	1100.00
SB	-1.70	1100.00
SB	-1.70	1100.00
SB	-1.70	1100.00
SB	-1.39	1200.00
SB	-1.39	1200.00
SB	-1.09	1300.00
SC	0.14	1700.00
SC	0.14	1700.00
SC	0.14	1700.00
SC	0.44	1800.00
SC	0.44	1800.00
SC	0.44	1800.00
SC	0.44	1800.00
SC	0.44	1800.00

Lab_ID	Z_Score	Data
SD	0.14	1700.00
SD	0.44	1800.00
SD	0.44	1800.00
SD	0.44	1800.00
SD	0.44	1800.00
SD	0.44	1800.00
SD	0.75	1900.00
SD	0.75	1900.00
SJ	1.06	2000.00
SJ	1.06	2000.00
SJ	1.06	2000.00
SJ	1.06	2000.00
SJ	1.36	2100.00
SJ	1.36	2100.00
SJ	1.36	2100.00
SJ	1.36	2100.00

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Fe	4A_MICP	40	1655.00	326.56	20	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Fe	4A_MICP	SA	8	1500.000	200.000	0.133	13.333
Fe	4A_MICP	SB	8	1150.000	75.593	0.066	6.573
Fe	4A_MICP	SC	8	1762.500	51.755	0.029	2.936
Fe	4A_MICP	SD	8	1812.500	64.087	0.035	3.536
Fe	4A_MICP	SJ	8	2050.000	53.452	0.026	2.607
			Average	1655.000	105.221	0.058	5.797

12.14. Fe 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Fe	4A_MICP	40	1655.00	326.56	20	ppm

Std mean	1655.000
SD	326.559
2SD	653.119
3SD	979.678
Std mean+2SD	2308.119
Std mean-2SD	1001.881
Std mean+3SD	2634.678
Std mean-3SD	675.322

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Fe	4A_MICP	193.775	186360.714	431.695	105.221	ppm

Comment: No results were rejected as outliers using z score.

12.15. Fe_2O_3 XRF

Lab_ID	Z_Score	Data
SA	-2.30	0.21
SA	-1.89	0.22
SA	-1.89	0.22
SA	-1.89	0.22
SA	-1.48	0.23
SA	-1.48	0.23
SA	-1.48	0.23
SA	-1.48	0.23
SB	-0.25	0.26
SB	0.17	0.27
SB	0.17	0.27
SB	0.17	0.27
SB	0.17	0.27
SB	0.58	0.28
SB	0.58	0.28
SB	1.40	0.30
SC	-0.25	0.26
SC	0.17	0.27
SC	0.17	0.27
SC	0.17	0.27
SC	0.17	0.27
SC	0.17	0.27
SC	0.17	0.27
SC	0.17	0.27

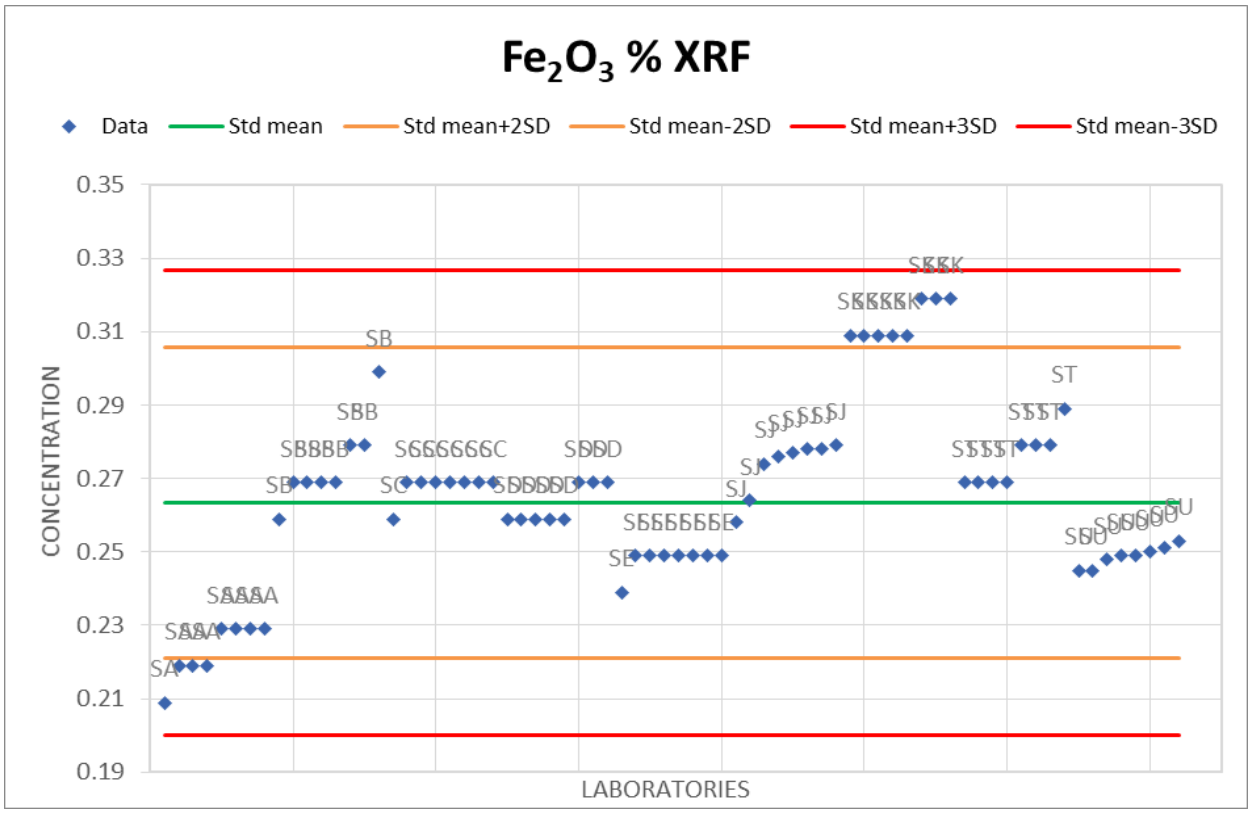
Lab_ID	Z_Score	Data
SD	-0.25	0.26
SD	-0.25	0.26
SD	-0.25	0.26
SD	-0.25	0.26
SD	-0.25	0.26
SD	0.17	0.27
SD	0.17	0.27
SD	0.17	0.27
SE	-1.07	0.24
SE	-0.66	0.25
SE	-0.66	0.25
SE	-0.66	0.25
SE	-0.66	0.25
SE	-0.66	0.25
SE	-0.66	0.25
SE	-0.66	0.25
SJ	-0.29	0.26
SJ	-0.04	0.27
SJ	0.37	0.28
SJ	0.45	0.28
SJ	0.50	0.28
SJ	0.54	0.28
SJ	0.54	0.28
SJ	0.58	0.28

Lab_ID	Z_Score	Data
SK	1.81	0.31
SK	1.81	0.31
SK	1.81	0.31
SK	1.81	0.31
SK	1.81	0.31
SK	2.22	0.32
SK	2.22	0.32
SK	2.22	0.32
ST	0.17	0.27
ST	0.17	0.27
ST	0.17	0.27
ST	0.17	0.27
ST	0.58	0.28
ST	0.58	0.28
ST	0.58	0.28
ST	0.99	0.29
SU	-0.82	0.25
SU	-0.82	0.25
SU	-0.70	0.25
SU	-0.66	0.25
SU	-0.66	0.25
SU	-0.62	0.25
SU	-0.58	0.25
SU	-0.49	0.25

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Fe_2O_3	XRF	72	0.27	0.02	9	%

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Fe_2O_3	XRF	SA	8	0.224	0.007	0.033	3.325
Fe_2O_3	XRF	SB	8	0.275	0.012	0.043	4.346
Fe_2O_3	XRF	SC	8	0.269	0.004	0.013	1.316
Fe_2O_3	XRF	SD	8	0.264	0.005	0.020	1.962
Fe_2O_3	XRF	SE	8	0.249	0.004	0.014	1.421
Fe_2O_3	XRF	SJ	8	0.274	0.008	0.028	2.820
Fe_2O_3	XRF	SK	8	0.314	0.005	0.016	1.650
Fe_2O_3	XRF	ST	8	0.276	0.007	0.027	2.693
Fe_2O_3	XRF	SU	8	0.250	0.003	0.011	1.107
			Average	0.266	0.007	0.023	2.293

12.15. Fe_2O_3 XRF (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Fe_2O_3	XRF	68	0.26	0.02	8	%

Std mean	0.264
SD	0.021
2SD	0.042
3SD	0.063
Std mean+2SD	0.307
Std mean-2SD	0.222
Std mean+3SD	0.328
Std mean-3SD	0.201

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Fe_2O_3	XRF	0.006	0.0003	0.017	0.007	%

Comment: 4 results out of 72 were rejected as outliers using z score.

12.16. Ga 4A_MICP

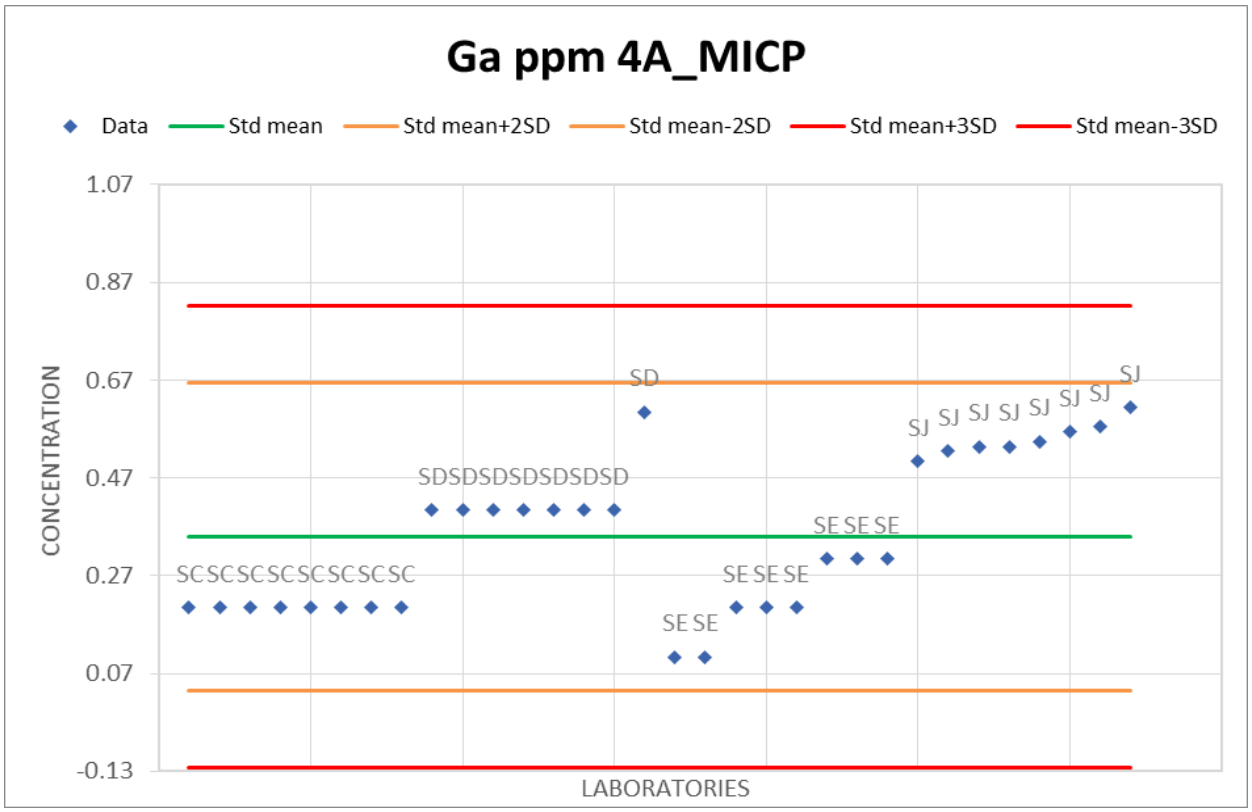
Lab_ID	Z_Score	Data
SC	-0.92	0.20
SC	-0.92	0.20
SC	-0.92	0.20
SC	-0.92	0.20
SC	-0.92	0.20
SC	-0.92	0.20
SC	-0.92	0.20
SC	-0.92	0.20
SD	0.34	0.40
SD	0.34	0.40
SD	0.34	0.40
SD	0.34	0.40
SD	0.34	0.40
SD	0.34	0.40
SD	0.34	0.40
SD	1.61	0.60
SE	-1.56	0.10
SE	-1.56	0.10
SE	-0.92	0.20
SE	-0.92	0.20
SE	-0.92	0.20
SE	-0.29	0.30
SE	-0.29	0.30
SE	-0.29	0.30

Lab_ID	Z_Score	Data
SJ	0.98	0.50
SJ	1.11	0.52
SJ	1.17	0.53
SJ	1.17	0.53
SJ	1.23	0.54
SJ	1.36	0.56
SJ	1.42	0.57
SJ	1.68	0.61

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Ga	4A_MICP	32	0.35	0.16	46	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Ga	4A_MICP	SC	8	0.200	0.000	0.000	0.001
Ga	4A_MICP	SD	8	0.425	0.071	0.166	16.638
Ga	4A_MICP	SE	8	0.213	0.083	0.393	39.272
Ga	4A_MICP	SJ	8	0.545	0.034	0.063	6.280
			Average	0.346	0.057	0.155	15.547

12.16. Ga 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Ga	4A_MICP	32	0.35	0.16	46	ppm

Std mean	0.346
SD	0.158
2SD	0.316
3SD	0.473
Std mean+2SD	0.661
Std mean-2SD	0.030
Std mean+3SD	0.819
Std mean-3SD	-0.128

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Ga	4A_MICP	0.119	0.056	0.236	0.057	ppm

Comment: No results were rejected as outliers using z score.

12.17. K 4A_MICP

Lab_ID	Z_Score	Data
SA	1.55	1800.00
SA	1.96	2100.00
SA	1.96	2100.00
SA	2.10	2200.00
SA	2.24	2300.00
SA	2.37	2400.00
SA	2.51	2500.00
SA	2.78	2700.00
SB	-0.49	300.00
SB	-0.49	300.00
SB	-0.49	300.00
SB	-0.49	300.00
SB	-0.49	300.00
SB	-0.49	300.00
SB	-0.49	300.00
SB	-0.49	300.00
SC	-0.49	300.00
SC	-0.36	400.00
SC	-0.36	400.00
SC	-0.36	400.00
SC	-0.36	400.00
SC	-0.36	400.00
SC	-0.36	400.00
SC	-0.36	400.00

Lab_ID	Z_Score	Data
SD	-0.49	300.00
SD	-0.49	300.00
SD	-0.49	300.00
SD	-0.49	300.00
SD	-0.49	300.00
SD	-0.49	300.00
SD	-0.36	400.00
SD	-0.36	400.00
SE	-0.55	256.00
SE	-0.52	279.00
SE	-0.52	282.00
SE	-0.52	282.00
SE	-0.48	312.00
SE	-0.46	323.00
SE	-0.45	334.00
SE	-0.43	347.00
SJ	-0.49	300.00
SJ	-0.36	400.00
SJ	-0.36	400.00
SJ	-0.36	400.00
SJ	-0.36	400.00
SJ	-0.36	400.00
SJ	-0.36	400.00
SJ	-0.36	400.00

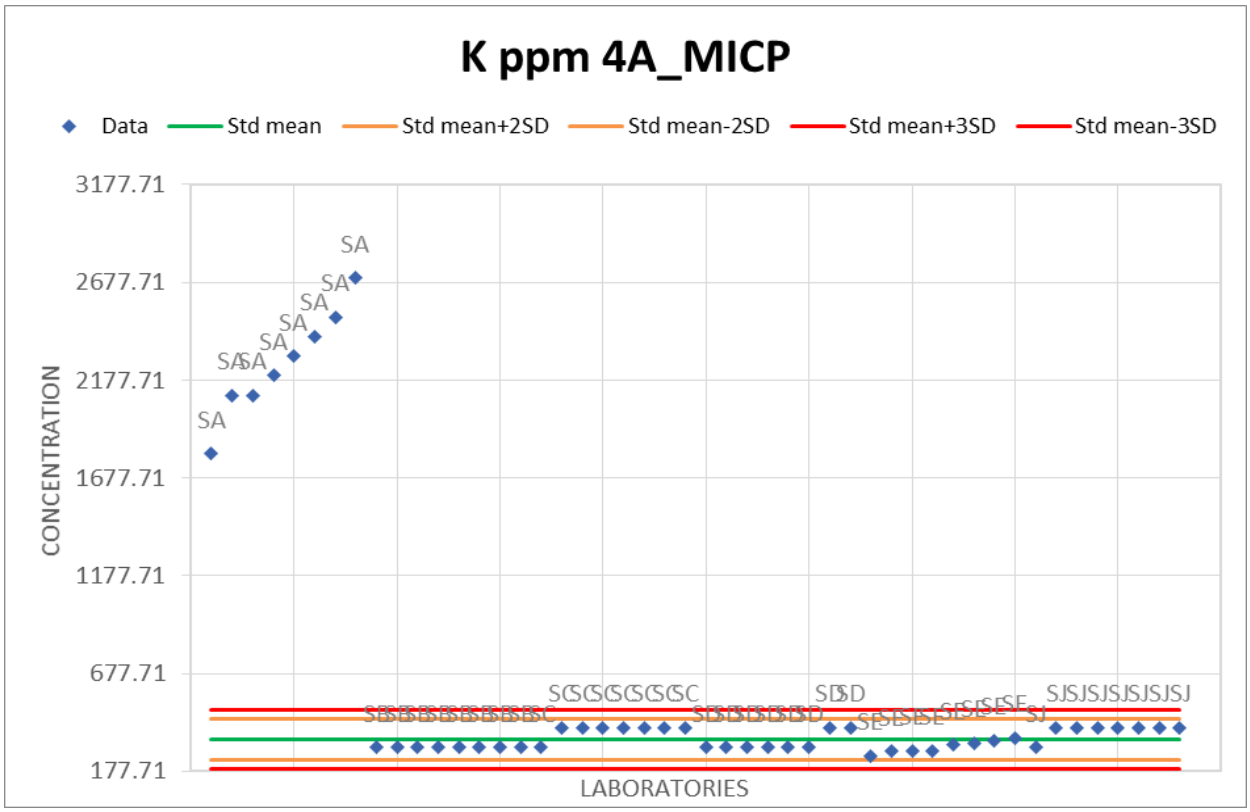
Results with outliers

Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
K	4A_MICP	48	660.73	733.27	111	ppm

Between Laboratory Statistics

Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
K	4A_MICP	SA	8	2262.500	277.424	0.123	12.262
K	4A_MICP	SB	8	300.000	0.000	0.000	0.000
K	4A_MICP	SC	8	387.500	35.355	0.091	9.124
K	4A_MICP	SD	8	325.000	46.291	0.142	14.243
K	4A_MICP	SE	8	301.875	31.701	0.105	10.502
K	4A_MICP	SJ	8	387.500	35.355	0.091	9.124
			Average	660.729	117.340	0.092	9.209

12.17. K 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
K	4A_MICP	40	340.38	51.11	15	ppm

Std mean	340.375
SD	51.105
2SD	102.210
3SD	153.315
Std mean+2SD	442.585
Std mean-2SD	238.165
Std mean+3SD	493.690
Std mean-3SD	187.060

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
K	4A_MICP	31.346	3753.791	61.268	37.576	ppm

Comment: 8 results out of 48 were rejected as outliers using z score.

12.18. K_2O XRF

Lab_ID	Z_Score	Data
SA	-1.07	0.030
SA	-1.07	0.030
SA	-1.07	0.030
SA	0.29	0.040
SA	0.29	0.040
SA	0.29	0.040
SA	0.29	0.040
SA	0.29	0.040
SC	-1.07	0.030
SC	-1.07	0.030
SC	-1.07	0.030
SC	-1.07	0.030
SC	-1.07	0.030
SC	0.29	0.040
SC	0.29	0.040
SC	0.29	0.040
SD	-1.07	0.030
SD	-1.07	0.030
SD	-1.07	0.030
SD	-1.07	0.030
SD	-1.07	0.030
SD	-1.07	0.030
SD	0.29	0.040
SD	0.29	0.040

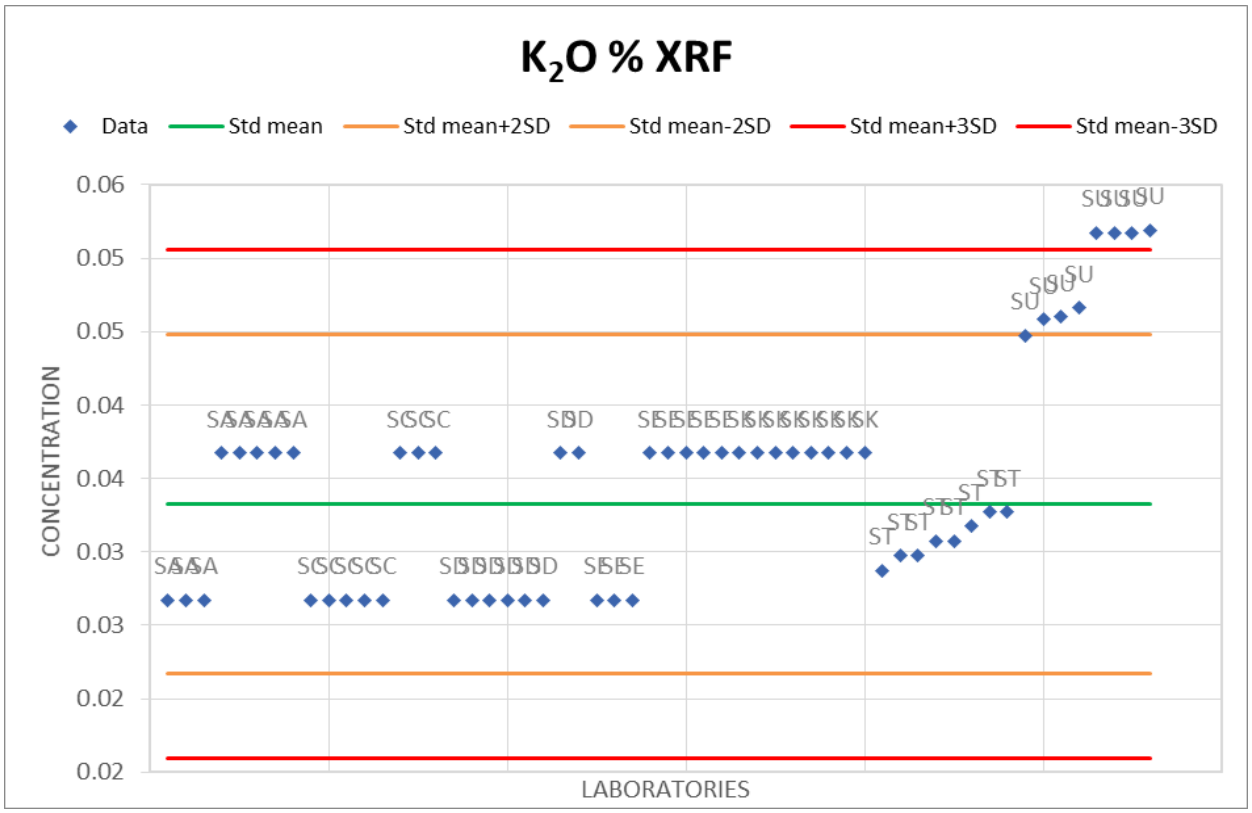
Lab_ID	Z_Score	Data
SE	-1.07	0.030
SE	-1.07	0.030
SE	-1.07	0.030
SE	0.29	0.040
SE	0.29	0.040
SE	0.29	0.040
SE	0.29	0.040
SE	0.29	0.040
SK	0.29	0.040
SK	0.29	0.040
SK	0.29	0.040
SK	0.29	0.040
SK	0.29	0.040
SK	0.29	0.040
SK	0.29	0.040
SK	0.29	0.040
ST	-0.80	0.032
ST	-0.66	0.033
ST	-0.66	0.033
ST	-0.52	0.034
ST	-0.52	0.034
ST	-0.39	0.035
ST	-0.25	0.036
ST	-0.25	0.036

Lab_ID	Z_Score	Data
SU	1.38	0.048
SU	1.53	0.049
SU	1.56	0.049
SU	1.64	0.050
SU	2.33	0.055
SU	2.33	0.055
SU	2.33	0.055
SU	2.36	0.055

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
K_2O	XRF	56	0.04	0.01	19	%

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
K_2O	XRF	SA	8	0.036	0.005	0.143	14.277
K_2O	XRF	SC	8	0.034	0.005	0.153	15.335
K_2O	XRF	SD	8	0.033	0.005	0.142	14.243
K_2O	XRF	SE	8	0.036	0.005	0.143	14.277
K_2O	XRF	SK	8	0.040	0.000	0.000	0.001
K_2O	XRF	ST	8	0.034	0.001	0.043	4.272
K_2O	XRF	SU	8	0.052	0.003	0.062	6.216
			Average	0.038	0.004	0.098	9.803

12.18. K_2O XRF (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
K_2O	XRF	52	0.037	0.01	16	%

Std mean	0.037
SD	0.006
2SD	0.012
3SD	0.017
Std mean+2SD	0.048
Std mean-2SD	0.025
Std mean+3SD	0.054
Std mean-3SD	0.019

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
K_2O	XRF	0.002	0.00002	0.005	0.004	%

Comment: 4 results out of 56 were rejected as outliers using z score.

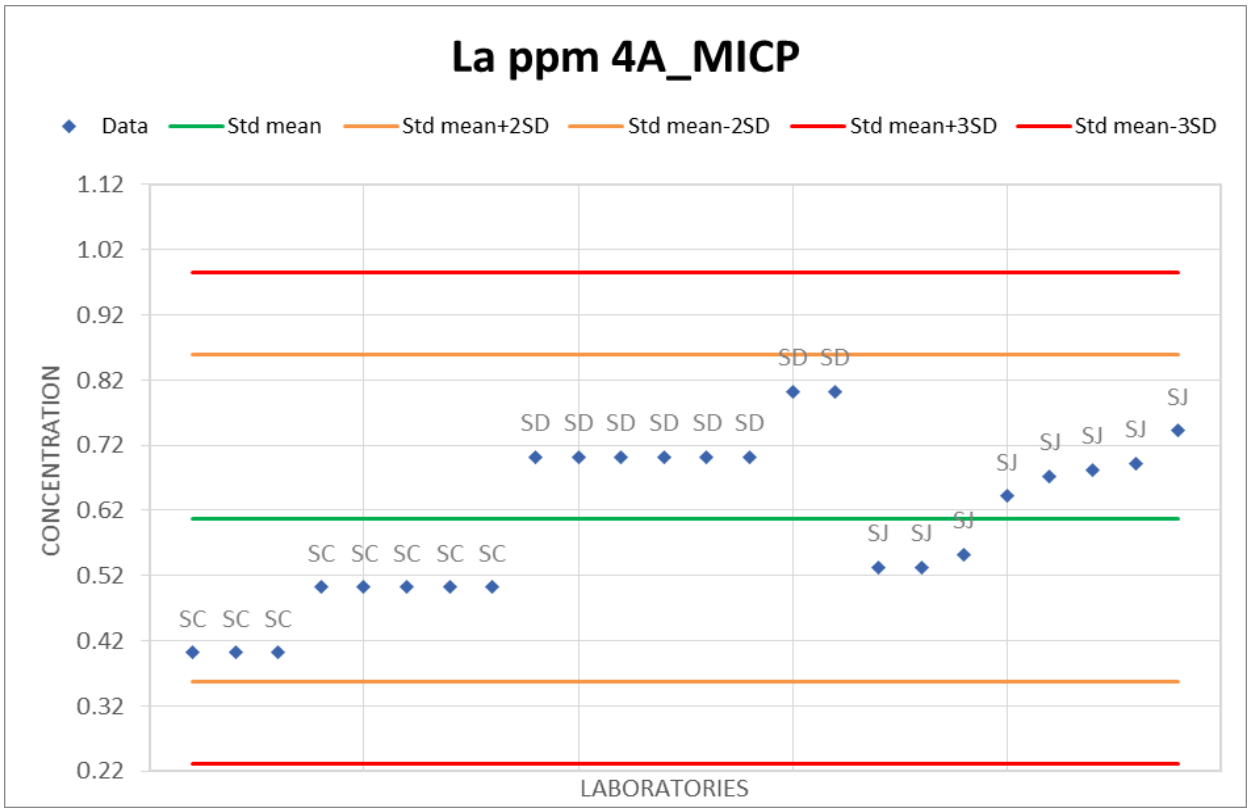
12.19. La 4A_MICP

Lab_ID	Z_Score	Data
SC	-1.64	0.40
SC	-1.64	0.40
SC	-1.64	0.40
SC	-0.84	0.50
SC	-0.84	0.50
SC	-0.84	0.50
SC	-0.84	0.50
SC	-0.84	0.50
SD	0.75	0.70
SD	0.75	0.70
SD	0.75	0.70
SD	0.75	0.70
SD	0.75	0.70
SD	0.75	0.70
SD	1.55	0.80
SD	1.55	0.80
SJ	-0.60	0.53
SJ	-0.60	0.53
SJ	-0.44	0.55
SJ	0.28	0.64
SJ	0.51	0.67
SJ	0.59	0.68
SJ	0.67	0.69
SJ	1.07	0.74

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
La	4A_MICP	24	0.61	0.13	21	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
La	4A_MICP	SC	8	0.463	0.052	0.112	11.190
La	4A_MICP	SD	8	0.725	0.046	0.064	6.385
La	4A_MICP	SJ	8	0.629	0.081	0.129	12.933
			Average	0.605	0.062	0.102	10.169

12.19. La 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
La	4A_MICP	24	0.61	0.13	21	ppm

Std mean	0.605
SD	0.125
2SD	0.251
3SD	0.376
Std mean+2SD	0.856
Std mean-2SD	0.354
Std mean+3SD	0.982
Std mean-3SD	0.229

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
La	4A_MICP	0.124	0.046	0.214	0.062	ppm

Comment: No results were rejected as outliers using z score.

12.20. Li 4A_MICP

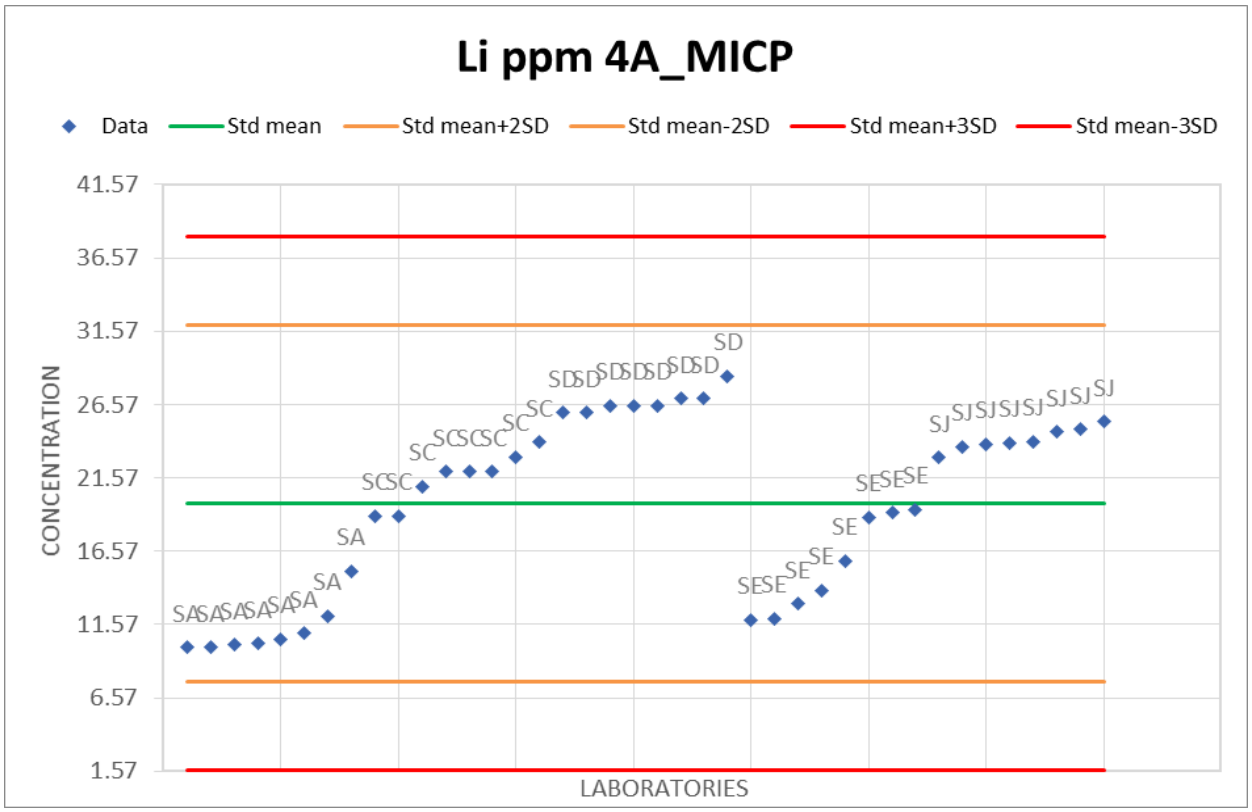
Lab_ID	Z_Score	Data
SA	-1.62	10.03
SA	-1.62	10.03
SA	-1.59	10.17
SA	-1.58	10.28
SA	-1.52	10.60
SA	-1.46	10.99
SA	-1.26	12.17
SA	-0.76	15.23
SC	-0.14	19.00
SC	-0.14	19.00
SC	0.19	21.00
SC	0.36	22.00
SC	0.36	22.00
SC	0.36	22.00
SC	0.52	23.00
SC	0.69	24.00
SD	1.02	26.00
SD	1.02	26.00
SD	1.10	26.50
SD	1.10	26.50
SD	1.10	26.50
SD	1.18	27.00
SD	1.18	27.00
SD	1.43	28.50

Lab_ID	Z_Score	Data
SE	-1.31	11.90
SE	-1.29	12.00
SE	-1.13	13.00
SE	-0.98	13.90
SE	-0.65	15.90
SE	-0.15	18.90
SE	-0.10	19.20
SE	-0.07	19.40
SJ	0.51	22.95
SJ	0.64	23.70
SJ	0.67	23.90
SJ	0.68	23.95
SJ	0.70	24.06
SJ	0.81	24.71
SJ	0.83	24.87
SJ	0.92	25.43

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Li	4A_MICP	40	19.83	6.06	31	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Li	4A_MICP	SA	8	11.188	1.782	0.159	15.929
Li	4A_MICP	SC	8	21.500	1.773	0.082	8.246
Li	4A_MICP	SD	8	26.750	0.802	0.030	2.997
Li	4A_MICP	SE	8	15.525	3.265	0.210	21.032
Li	4A_MICP	SJ	8	24.196	0.775	0.032	3.204
			Average	19.832	1.909	0.103	10.282

12.20. Li 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Li	4A_MICP	40	19.83	6.06	31	ppm

Std mean	19.832
SD	6.058
2SD	12.116
3SD	18.174
Std mean+2SD	31.948
Std mean-2SD	7.716
Std mean+3SD	38.006
Std mean-3SD	1.658

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Li	4A_MICP	3.603	64.457	8.029	1.909	ppm

Comment: No results were rejected as outliers using z score.

12.21. LOI

Lab_ID	Z_Score	Data
SA	-0.83	8.34
SA	-0.83	8.34
SA	-0.73	8.42
SA	-0.70	8.45
SA	-0.69	8.46
SA	-0.68	8.47
SA	-0.55	8.58
SA	-0.51	8.61
SB	1.70	10.50
SB	1.70	10.50
SB	1.71	10.51
SB	1.71	10.51
SB	1.82	10.60
SB	1.82	10.60
SB	1.86	10.64
SB	1.92	10.69
SC	-0.94	8.24
SC	-0.87	8.30
SC	-0.82	8.35
SC	-0.70	8.45
SC	-0.62	8.52
SC	-0.58	8.55
SC	-0.52	8.60
SC	-0.51	8.61

Lab_ID	Z_Score	Data
SD	0.45	9.43
SD	1.30	10.16
SD	1.35	10.20
SD	1.40	10.24
SD	1.69	10.49
SD	1.95	10.71
SD	2.19	10.92
SD	2.98	11.59
SE	-0.46	8.65
SE	-0.31	8.78
SE	-0.31	8.78
SE	-0.30	8.79
SE	-0.17	8.90
SE	0.07	9.11
SE	0.10	9.13
SE	0.35	9.35
SJ	-0.68	8.46
SJ	-0.45	8.67
SJ	-0.28	8.81
SJ	-0.22	8.86
SJ	-0.11	8.96
SJ	-0.05	9.01
SJ	0.39	9.38
SJ	0.71	9.66

Lab_ID	Z_Score	Data
SK	-0.57	8.56
SK	-0.50	8.62
SK	-0.49	8.63
SK	-0.44	8.67
SK	-0.43	8.68
SK	-0.41	8.70
SK	-0.39	8.71
SK	-0.28	8.81
ST	-0.78	8.38
ST	-0.76	8.40
ST	-0.76	8.40
ST	-0.75	8.41
ST	-0.69	8.46
ST	-0.69	8.46
ST	-0.68	8.47
ST	-0.64	8.50
SU	-0.72	8.43
SU	-0.71	8.44
SU	-0.70	8.45
SU	-0.70	8.45
SU	-0.70	8.45
SU	-0.69	8.46
SU	-0.64	8.50
SU	-0.64	8.50

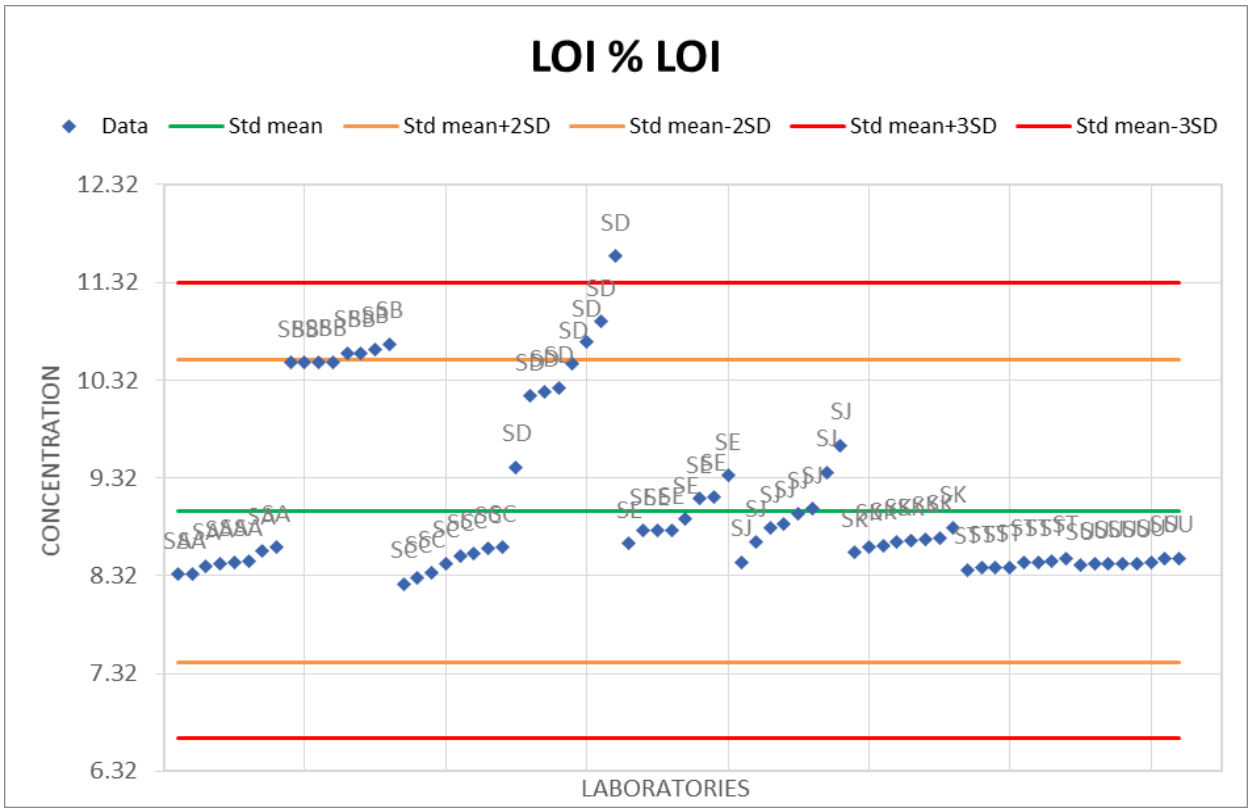
Results with outliers

Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
LOI	LOI	72	9.05	0.85	9	%

Between Laboratory Statistics

Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
LOI	LOI	SA	8	8.459	0.098	0.012	1.161
LOI	LOI	SB	8	10.569	0.074	0.007	0.698
LOI	LOI	SC	8	8.453	0.141	0.017	1.670
LOI	LOI	SD	8	10.468	0.635	0.061	6.062
LOI	LOI	SE	8	8.936	0.237	0.026	2.649
LOI	LOI	SJ	8	8.974	0.383	0.043	4.271
LOI	LOI	SK	8	8.673	0.074	0.009	0.853
LOI	LOI	ST	8	8.435	0.043	0.005	0.507
LOI	LOI	SU	8	8.460	0.025	0.003	0.300
			Average	9.047	0.268	0.020	2.019

12.21. LOI (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
LOI	LOI	70	8.98	0.78	9	%

Std mean	8.984
SD	0.776
2SD	1.552
3SD	2.329
Std mean+2SD	10.536
Std mean-2SD	7.432
Std mean+3SD	11.313
Std mean-3SD	6.656

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
LOI	LOI	0.245	0.536	0.732	0.209	%

Comment: 2 results out of 72 were rejected as outliers using z score.

12.22. Mg 4A_MICP

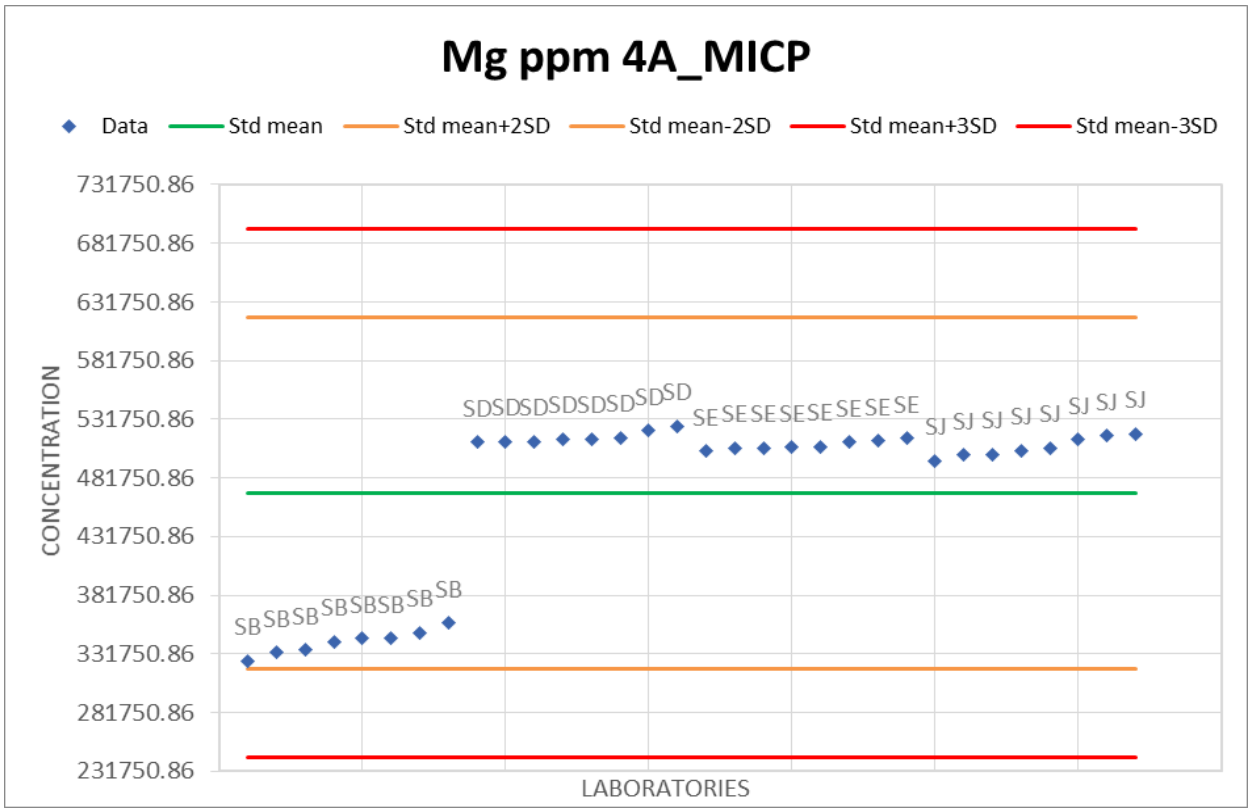
Lab_ID	Z_Score	Data
SB	-1.91	326000.00
SB	-1.81	333000.00
SB	-1.79	335000.00
SB	-1.69	342000.00
SB	-1.65	345000.00
SB	-1.65	345000.00
SB	-1.59	350000.00
SB	-1.48	358000.00
SD	0.57	512000.00
SD	0.59	513000.00
SD	0.59	513000.00
SD	0.61	515000.00
SD	0.61	515000.00
SD	0.63	516000.00
SD	0.71	522000.00
SD	0.76	526000.00
SE	0.48	504600.00
SE	0.51	507200.00
SE	0.51	507300.00
SE	0.52	508100.00
SE	0.52	508200.00
SE	0.58	512400.00
SE	0.59	513200.00
SE	0.62	515300.00

Lab_ID	Z_Score	Data
SJ	0.37	496576.00
SJ	0.43	501358.00
SJ	0.44	502041.00
SJ	0.48	504971.00
SJ	0.51	507277.00
SJ	0.61	514654.00
SJ	0.65	517525.00
SJ	0.67	519441.00

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Mg	4A_MICP	32	468941.97	74997.89	16	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Mg	4A_MICP	SB	8	341750.000	10166.472	0.030	2.975
Mg	4A_MICP	SD	8	516500.000	4928.054	0.010	0.954
Mg	4A_MICP	SE	8	509537.500	3655.109	0.007	0.717
Mg	4A_MICP	SJ	8	507980.375	8330.031	0.016	1.640
			Average	468941.969	7252.450	0.016	1.572

12.22. Mg 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Mg	4A_MICP	32	468941.97	74997.89	16	ppm

Std mean	468941.969
SD	74997.894
2SD	149995.787
3SD	224993.681
Std mean+2SD	618937.756
Std mean-2SD	318946.182
Std mean+3SD	693935.649
Std mean-3SD	243948.288

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Mg	4A_MICP	60002.355	14394555541.170	119977.313	7252.450	ppm

Comment: No results were rejected as outliers using z score.

12.23. Mg XRF

Lab_ID	Z_Score	Data
SA	0.07	51.70
SA	0.08	51.73
SA	0.09	51.74
SA	0.10	51.76
SA	0.13	51.80
SA	0.14	51.81
SA	0.17	51.85
SA	0.17	51.85
SB	-1.74	49.12
SB	-1.69	49.19
SB	-1.54	49.42
SB	-1.52	49.44
SB	-1.41	49.60
SB	-1.39	49.63
SB	-1.34	49.69
SB	-1.20	49.89
SC	0.12	51.78
SC	0.21	51.90
SC	0.33	52.08
SC	0.33	52.08
SC	0.33	52.08
SC	0.42	52.20
SC	0.42	52.20
SC	0.50	52.32

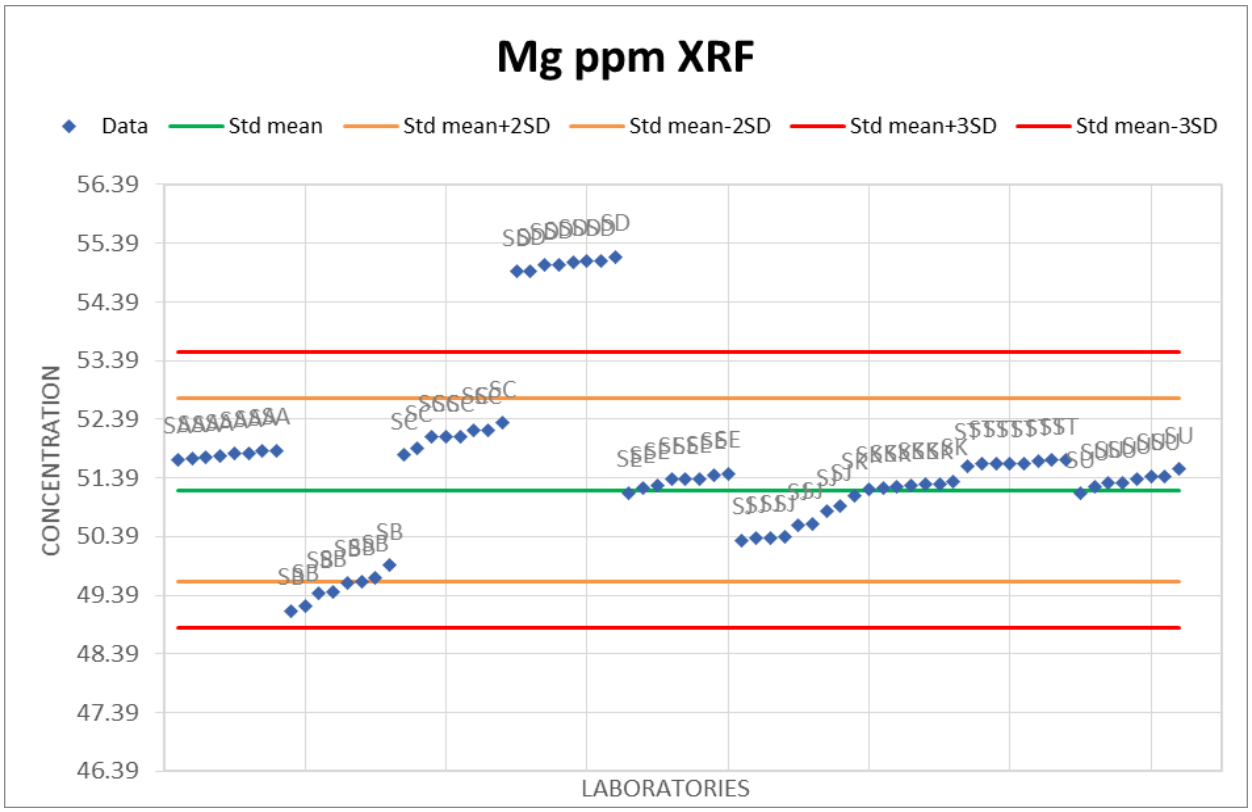
Lab_ID	Z_Score	Data
SD	2.32	54.91
SD	2.32	54.91
SD	2.39	55.01
SD	2.40	55.02
SD	2.43	55.07
SD	2.44	55.08
SD	2.44	55.08
SD	2.49	55.16
SE	-0.33	51.13
SE	-0.28	51.21
SE	-0.24	51.26
SE	-0.17	51.36
SE	-0.17	51.37
SE	-0.16	51.37
SE	-0.12	51.43
SE	-0.11	51.46
SJ	-0.90	50.32
SJ	-0.88	50.35
SJ	-0.87	50.37
SJ	-0.86	50.38
SJ	-0.72	50.58
SJ	-0.71	50.59
SJ	-0.56	50.81
SJ	-0.50	50.90

Lab_ID	Z_Score	Data
SK	-0.37	51.08
SK	-0.29	51.20
SK	-0.27	51.22
SK	-0.26	51.23
SK	-0.24	51.26
SK	-0.24	51.27
SK	-0.23	51.28
SK	-0.20	51.32
ST	-0.01	51.59
ST	0.02	51.63
ST	0.02	51.64
ST	0.02	51.64
ST	0.02	51.64
ST	0.04	51.67
ST	0.05	51.68
ST	0.05	51.68
SU	-0.34	51.12
SU	-0.26	51.24
SU	-0.22	51.30
SU	-0.22	51.30
SU	-0.17	51.36
SU	-0.13	51.42
SU	-0.13	51.42
SU	-0.05	51.54

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Mg	XRF	72	51.61	1.42	3	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Mg	XRF	SA	8	51.779	0.056	0.001	0.108
Mg	XRF	SB	8	49.497	0.257	0.005	0.519
Mg	XRF	SC	8	52.080	0.173	0.003	0.332
Mg	XRF	SD	8	55.029	0.087	0.002	0.158
Mg	XRF	SE	8	51.324	0.112	0.002	0.218
Mg	XRF	SJ	8	50.537	0.223	0.004	0.442
Mg	XRF	SK	8	51.233	0.071	0.001	0.139
Mg	XRF	ST	8	51.645	0.032	0.001	0.062
Mg	XRF	SU	8	51.338	0.128	0.002	0.249
			Average	51.607	0.146	0.002	0.247

12.23. Mg XRF (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Mg	XRF	64	51.18	0.78	2	ppm

Std mean	51.179
SD	0.784
2SD	1.568
3SD	2.352
Std mean+2SD	52.747
Std mean-2SD	49.611
Std mean+3SD	53.531
Std mean-3SD	48.827

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Mg	XRF	0.289	0.666	0.816	0.152	ppm

Comment: 8 results out of 72 were rejected as outliers using z score.

12.24. MgO XRF

Lab_ID	Z_Score	Data
SA	0.07	86.17
SA	0.08	86.21
SA	0.09	86.23
SA	0.10	86.26
SA	0.13	86.33
SA	0.14	86.35
SA	0.17	86.41
SA	0.17	86.42
SB	-1.74	81.87
SB	-1.69	81.99
SB	-1.54	82.36
SB	-1.52	82.40
SB	-1.41	82.66
SB	-1.39	82.71
SB	-1.34	82.82
SB	-1.20	83.15
SC	0.12	86.30
SC	0.21	86.50
SC	0.33	86.80
SC	0.33	86.80
SC	0.33	86.80
SC	0.42	87.00
SC	0.42	87.00
SC	0.50	87.20

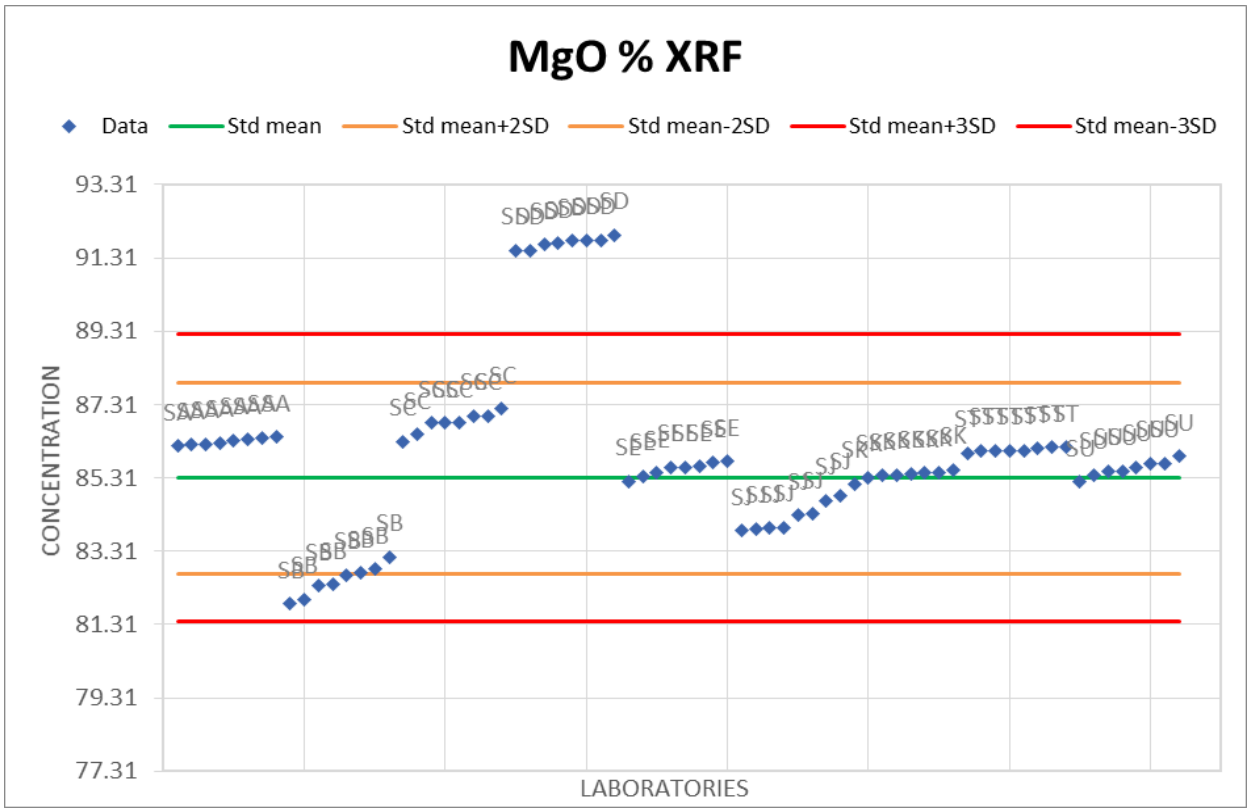
Lab_ID	Z_Score	Data
SD	2.32	91.51
SD	2.32	91.52
SD	2.39	91.68
SD	2.40	91.70
SD	2.43	91.78
SD	2.44	91.80
SD	2.44	91.80
SD	2.49	91.93
SE	-0.33	85.22
SE	-0.28	85.35
SE	-0.24	85.44
SE	-0.17	85.60
SE	-0.17	85.61
SE	-0.16	85.62
SE	-0.12	85.72
SE	-0.11	85.76
SJ	-0.90	83.86
SJ	-0.88	83.92
SJ	-0.87	83.95
SJ	-0.86	83.96
SJ	-0.72	84.30
SJ	-0.71	84.32
SJ	-0.56	84.69
SJ	-0.50	84.83

Lab_ID	Z_Score	Data
SK	-0.37	85.14
SK	-0.29	85.33
SK	-0.27	85.37
SK	-0.26	85.39
SK	-0.24	85.43
SK	-0.24	85.45
SK	-0.23	85.46
SK	-0.20	85.54
ST	-0.01	85.98
ST	0.02	86.05
ST	0.02	86.06
ST	0.02	86.06
ST	0.02	86.06
ST	0.04	86.11
ST	0.05	86.14
ST	0.05	86.14
SU	-0.34	85.20
SU	-0.26	85.40
SU	-0.22	85.50
SU	-0.22	85.50
SU	-0.17	85.60
SU	-0.13	85.70
SU	-0.13	85.70
SU	-0.05	85.90

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
MgO	XRF	72	86.01	2.37	3	%

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
MgO	XRF	SA	8	86.298	0.094	0.001	0.108
MgO	XRF	SB	8	82.495	0.428	0.005	0.519
MgO	XRF	SC	8	86.800	0.288	0.003	0.332
MgO	XRF	SD	8	91.715	0.145	0.002	0.158
MgO	XRF	SE	8	85.540	0.187	0.002	0.218
MgO	XRF	SJ	8	84.228	0.372	0.004	0.442
MgO	XRF	SK	8	85.389	0.119	0.001	0.139
MgO	XRF	ST	8	86.075	0.053	0.001	0.062
MgO	XRF	SU	8	85.563	0.213	0.002	0.249
			Average	86.011	0.243	0.002	0.247

12.24. MgO XRF (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
MgO	XRF	64	85.30	1.31	2	%

Std mean	85.298
SD	1.307
2SD	2.613
3SD	3.920
Std mean+2SD	87.911
Std mean-2SD	82.685
Std mean+3SD	89.218
Std mean-3SD	81.379

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
MgO	XRF	0.482	1.849	1.360	0.253	%

Comment: 8 results out of 72 were rejected as outliers using z score.

12.25. Mn 4A_MICP

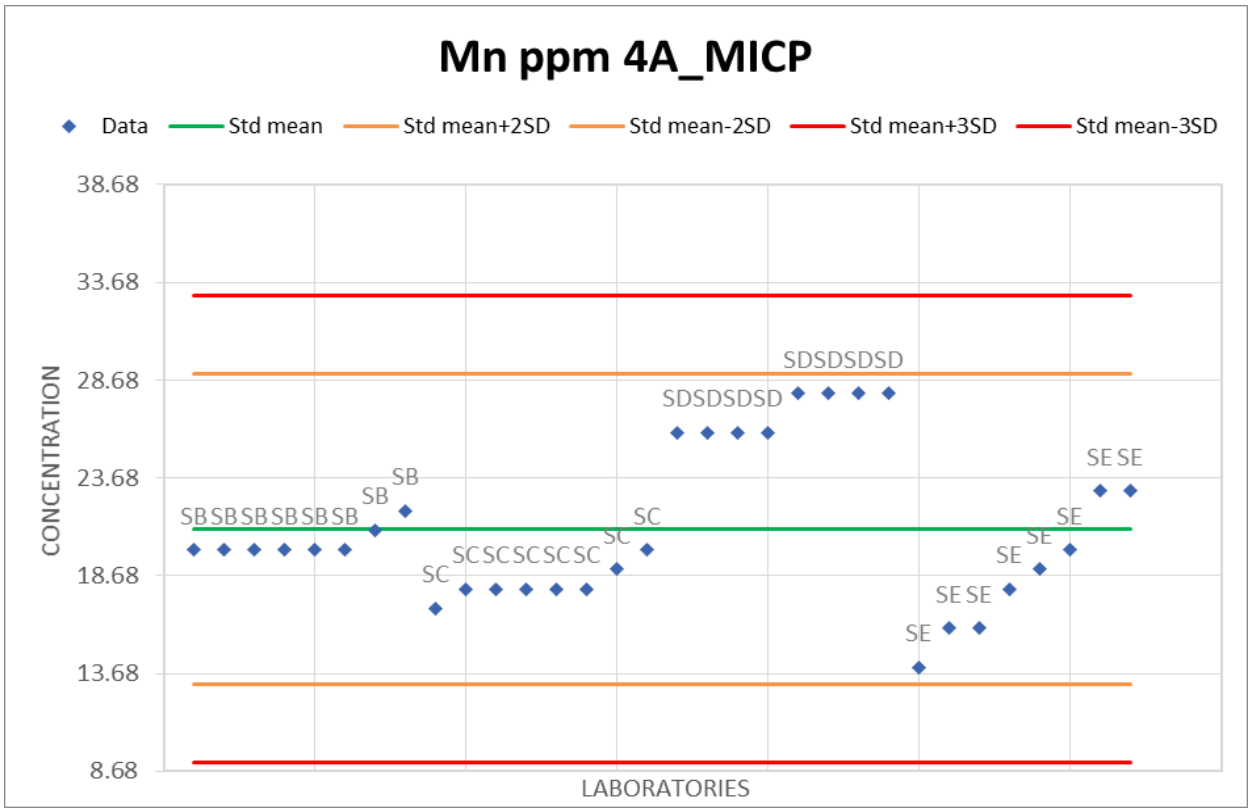
Lab_ID	Z_Score	Data
SB	-0.27	20.00
SB	-0.27	20.00
SB	-0.27	20.00
SB	-0.27	20.00
SB	-0.27	20.00
SB	-0.27	20.00
SB	-0.02	21.00
SB	0.24	22.00
SC	-1.02	17.00
SC	-0.77	18.00
SC	-0.77	18.00
SC	-0.77	18.00
SC	-0.77	18.00
SC	-0.77	18.00
SC	-0.52	19.00
SC	-0.27	20.00
SD	1.24	26.00
SD	1.24	26.00
SD	1.24	26.00
SD	1.24	26.00
SD	1.75	28.00
SD	1.75	28.00
SD	1.75	28.00
SD	1.75	28.00

Lab_ID	Z_Score	Data
SE	-1.78	14.00
SE	-1.27	16.00
SE	-1.27	16.00
SE	-0.77	18.00
SE	-0.52	19.00
SE	-0.27	20.00
SE	0.49	23.00
SE	0.49	23.00

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Mn	4A_MICP	32	21.06	3.98	19	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Mn	4A_MICP	SB	8	20.375	0.744	0.037	3.652
Mn	4A_MICP	SC	8	18.250	0.886	0.049	4.857
Mn	4A_MICP	SD	8	27.000	1.069	0.040	3.959
Mn	4A_MICP	SE	8	18.625	3.292	0.177	17.677
			Average	21.063	1.825	0.075	7.536

12.25. Mn 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Mn	4A_MICP	32	21.06	3.98	19	ppm

Std mean	21.063
SD	3.975
2SD	7.950
3SD	11.926
Std mean+2SD	29.013
Std mean-2SD	13.112
Std mean+3SD	32.988
Std mean-3SD	9.137

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Mn	4A_MICP	2.856	32.219	5.676	1.825	ppm

Comment: No results were rejected as outliers using z score.

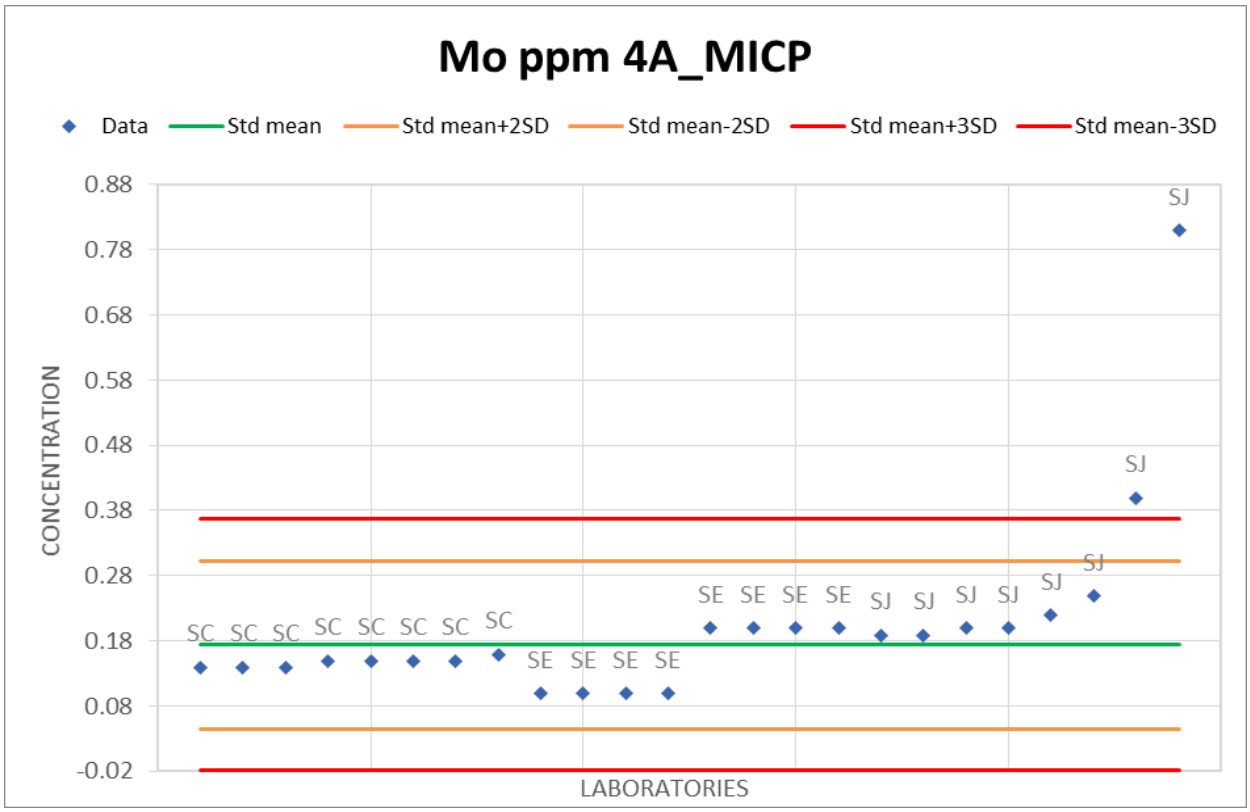
12.26. Mo 4A_MICP

Lab_ID	Z_Score	Data
SC	-0.43	0.14
SC	-0.43	0.14
SC	-0.43	0.14
SC	-0.36	0.15
SC	-0.36	0.15
SC	-0.36	0.15
SC	-0.36	0.15
SC	-0.29	0.16
SE	-0.71	0.10
SE	-0.71	0.10
SE	-0.71	0.10
SE	-0.71	0.10
SE	-0.01	0.20
SE	-0.01	0.20
SE	-0.01	0.20
SE	-0.01	0.20
SJ	-0.08	0.19
SJ	-0.08	0.19
SJ	-0.01	0.20
SJ	-0.01	0.20
SJ	0.13	0.22
SJ	0.34	0.25
SJ	1.38	0.40
SJ	4.22	0.81

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Mo	4A_MICP	24	0.20	0.14	71	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Mo	4A_MICP	SC	8	0.148	0.007	0.048	4.794
Mo	4A_MICP	SE	8	0.150	0.053	0.356	35.635
Mo	4A_MICP	SJ	8	0.308	0.215	0.698	69.830
			Average	0.202	0.128	0.368	36.753

12.26. Mo 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Mo	4A_MICP	23	0.18	0.06	37	ppm

Std mean	0.175
SD	0.064
2SD	0.129
3SD	0.193
Std mean+2SD	0.304
Std mean-2SD	0.046
Std mean+3SD	0.369
Std mean-3SD	-0.018

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Mo	4A_MICP	0.043	0.005	0.072	0.052	ppm

Comment: 1 result out of 24 was rejected as an outlier using z score.

12.27. Moisture

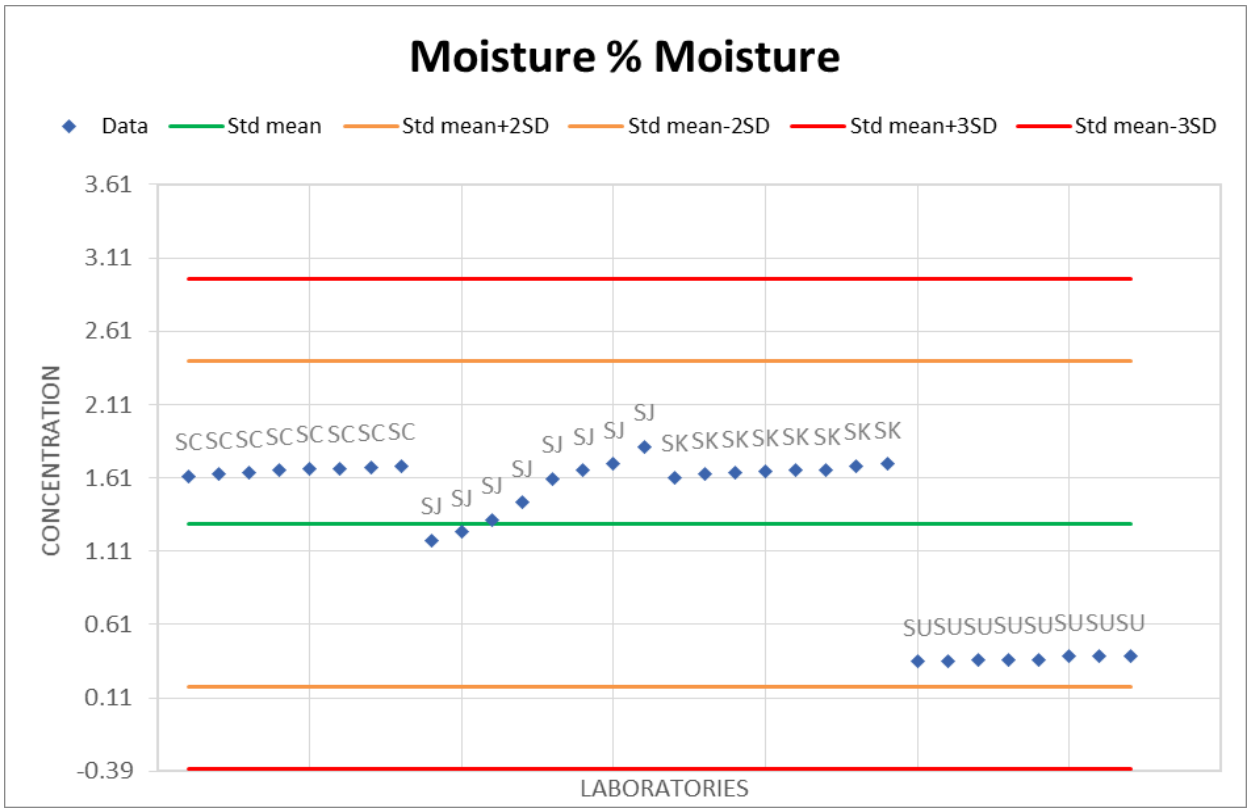
Lab_ID	Z_Score	Data
SC	0.58	1.62
SC	0.60	1.63
SC	0.62	1.64
SC	0.66	1.66
SC	0.67	1.67
SC	0.67	1.67
SC	0.69	1.68
SC	0.71	1.69
SJ	-0.21	1.18
SJ	-0.10	1.24
SJ	0.04	1.32
SJ	0.26	1.44
SJ	0.55	1.60
SJ	0.66	1.66
SJ	0.73	1.70
SJ	0.94	1.82
SK	0.57	1.61
SK	0.60	1.63
SK	0.62	1.64
SK	0.64	1.65
SK	0.66	1.66
SK	0.66	1.66
SK	0.71	1.69
SK	0.73	1.70

Lab_ID	Z_Score	Data
SU	-1.69	0.36
SU	-1.68	0.36
SU	-1.67	0.37
SU	-1.66	0.37
SU	-1.66	0.37
SU	-1.63	0.39
SU	-1.63	0.39
SU	-1.63	0.39

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Moisture	Moisture	32	1.30	0.56	43	%

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Moisture	Moisture	SC	8	1.658	0.025	0.015	1.504
Moisture	Moisture	SJ	8	1.495	0.234	0.157	15.663
Moisture	Moisture	SK	8	1.655	0.030	0.018	1.798
Moisture	Moisture	SU	8	0.373	0.014	0.037	3.716
			Average	1.295	0.119	0.057	5.670

12.27. Moisture (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Moisture	Moisture	32	1.30	0.56	43	%

Std mean	1.295
SD	0.556
2SD	1.113
3SD	1.669
Std mean+2SD	2.408
Std mean-2SD	0.182
Std mean+3SD	2.965
Std mean-3SD	-0.374

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Moisture	Moisture	0.437	0.763	0.874	0.119	%

Comment: No results were rejected as outliers using z score.

12.28. Na 4A_MICP

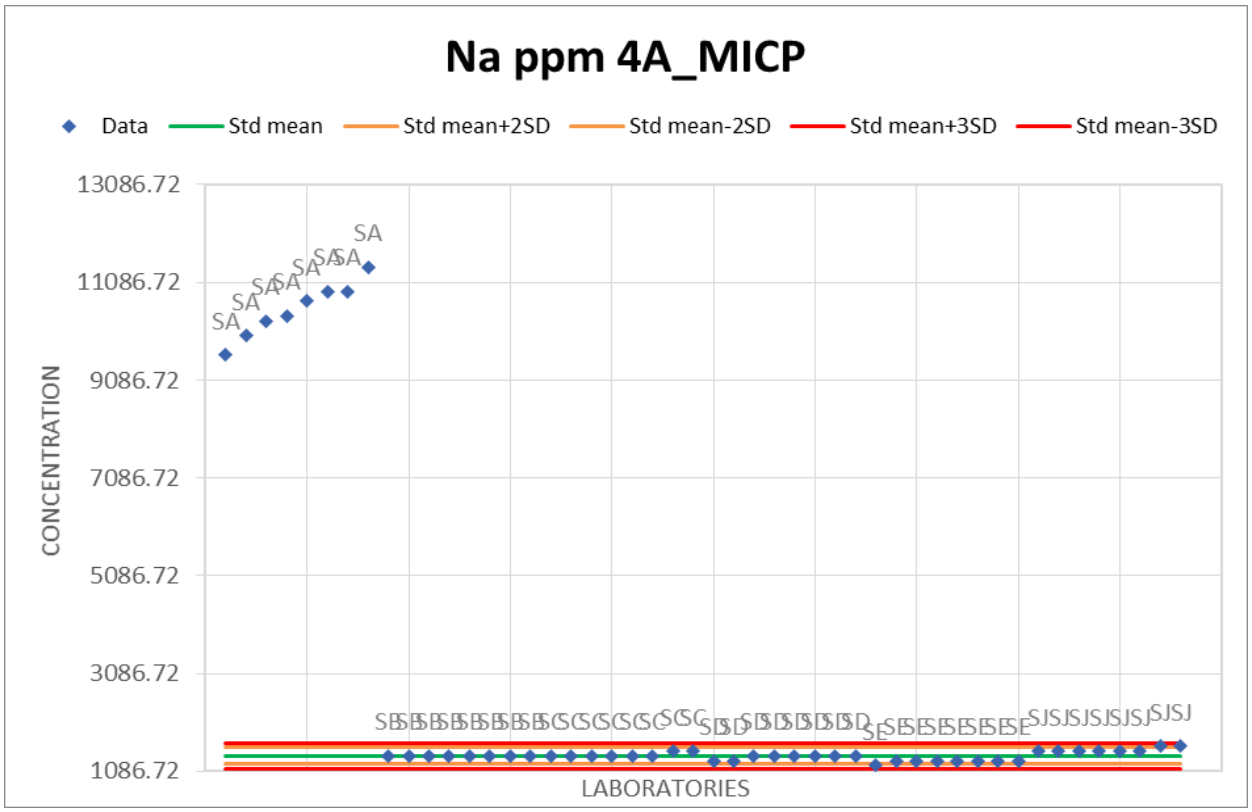
Lab_ID	Z_Score	Data
SA	1.94	9600.00
SA	2.06	10000.00
SA	2.14	10300.00
SA	2.17	10400.00
SA	2.26	10700.00
SA	2.32	10900.00
SA	2.32	10900.00
SA	2.46	11400.00
SB	-0.44	1400.00
SB	-0.44	1400.00
SB	-0.44	1400.00
SB	-0.44	1400.00
SB	-0.44	1400.00
SB	-0.44	1400.00
SB	-0.44	1400.00
SB	-0.44	1400.00
SC	-0.44	1400.00
SC	-0.44	1400.00
SC	-0.44	1400.00
SC	-0.44	1400.00
SC	-0.44	1400.00
SC	-0.44	1400.00
SC	-0.41	1500.00
SC	-0.41	1500.00

Lab_ID	Z_Score	Data
SD	-0.47	1300.00
SD	-0.47	1300.00
SD	-0.44	1400.00
SD	-0.44	1400.00
SD	-0.44	1400.00
SD	-0.44	1400.00
SD	-0.44	1400.00
SD	-0.44	1400.00
SE	-0.50	1200.00
SE	-0.47	1300.00
SE	-0.47	1300.00
SE	-0.47	1300.00
SE	-0.47	1300.00
SE	-0.47	1300.00
SE	-0.47	1300.00
SE	-0.47	1300.00
SJ	-0.41	1500.00
SJ	-0.41	1500.00
SJ	-0.41	1500.00
SJ	-0.41	1500.00
SJ	-0.41	1500.00
SJ	-0.41	1500.00
SJ	-0.38	1600.00
SJ	-0.38	1600.00

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Na	4A_MICP	48	2922.92	3443.66	118	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Na	4A_MICP	SA	8	10525.000	570.088	0.054	5.417
Na	4A_MICP	SB	8	1400.000	0.000	0.000	0.000
Na	4A_MICP	SC	8	1425.000	46.291	0.032	3.248
Na	4A_MICP	SD	8	1375.000	46.291	0.034	3.367
Na	4A_MICP	SE	8	1287.500	35.355	0.027	2.746
Na	4A_MICP	SJ	8	1525.000	46.291	0.030	3.035
			Average	2922.917	235.471	0.030	2.969

12.28. Na 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Na	4A_MICP	40	1402.50	86.19	6	ppm

Std mean	1402.500
SD	86.194
2SD	172.389
3SD	258.583
Std mean+2SD	1574.889
Std mean-2SD	1230.111
Std mean+3SD	1661.083
Std mean-3SD	1143.917

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Na	4A_MICP	69.682	19182.589	138.501	43.814	ppm

Comment: 8 results out of 48 were rejected as outliers using z score.

12.29. Na_2O XRF

Lab_ID	Z_Score	Data
SA	-0.74	0.14
SA	-0.74	0.14
SA	-0.74	0.14
SA	-0.64	0.15
SA	-0.55	0.16
SA	-0.55	0.16
SA	-0.55	0.16
SA	-0.46	0.17
SB	1.79	0.41
SB	1.79	0.41
SB	1.79	0.41
SB	1.89	0.42
SB	1.89	0.42
SB	1.98	0.43
SB	1.98	0.43
SB	1.98	0.43
SC	-0.55	0.16
SC	-0.36	0.18
SC	-0.36	0.18
SC	-0.36	0.18
SC	-0.36	0.18
SC	-0.36	0.18
SC	-0.27	0.19
SC	-0.17	0.20

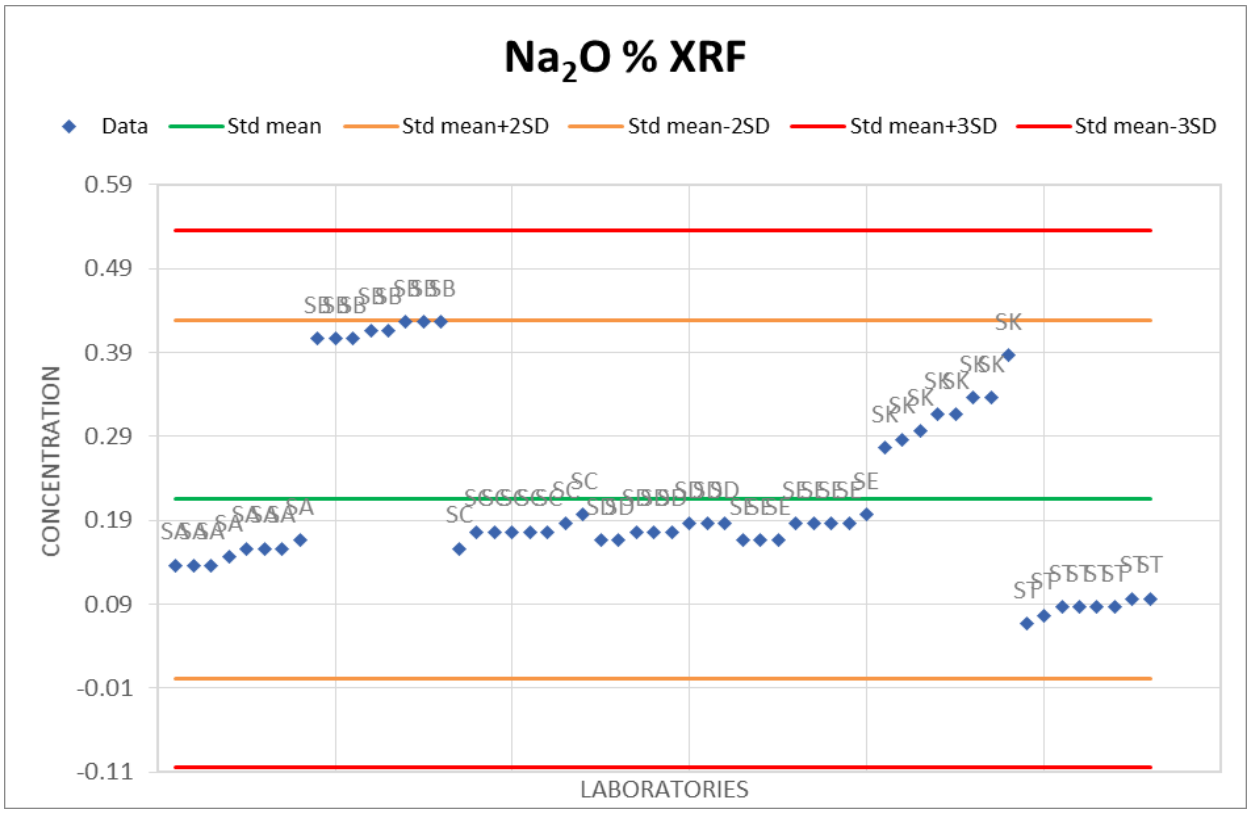
Lab_ID	Z_Score	Data
SD	-0.46	0.17
SD	-0.46	0.17
SD	-0.36	0.18
SD	-0.36	0.18
SD	-0.36	0.18
SD	-0.27	0.19
SD	-0.27	0.19
SD	-0.27	0.19
SE	-0.46	0.17
SE	-0.46	0.17
SE	-0.46	0.17
SE	-0.27	0.19
SE	-0.27	0.19
SE	-0.27	0.19
SE	-0.27	0.19
SE	-0.17	0.20
SK	0.58	0.28
SK	0.67	0.29
SK	0.76	0.30
SK	0.95	0.32
SK	0.95	0.32
SK	1.14	0.34
SK	1.14	0.34
SK	1.61	0.39

Lab_ID	Z_Score	Data
ST	-1.39	0.070
ST	-1.30	0.080
ST	-1.21	0.090
ST	-1.21	0.090
ST	-1.21	0.090
ST	-1.21	0.090
ST	-1.11	0.10
ST	-1.11	0.10

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Na_2O	XRF	56	0.22	0.11	49	%

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Na_2O	XRF	SA	8	0.153	0.012	0.076	7.639
Na_2O	XRF	SB	8	0.420	0.009	0.022	2.204
Na_2O	XRF	SC	8	0.181	0.011	0.062	6.212
Na_2O	XRF	SD	8	0.181	0.008	0.046	4.604
Na_2O	XRF	SE	8	0.184	0.012	0.065	6.464
Na_2O	XRF	SK	8	0.323	0.035	0.108	10.837
Na_2O	XRF	ST	8	0.089	0.010	0.112	11.167
			Average	0.219	0.016	0.070	7.018

12.29. Na_2O XRF (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Na_2O	XRF	56	0.22	0.11	49	%

Std mean	0.219
SD	0.107
2SD	0.213
3SD	0.320
Std mean+2SD	0.432
Std mean-2SD	0.005
Std mean+3SD	0.539
Std mean-3SD	-0.101

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Na_2O	XRF	0.046	0.015	0.121	0.016	%

Comment: No results were rejected as outliers using z score.

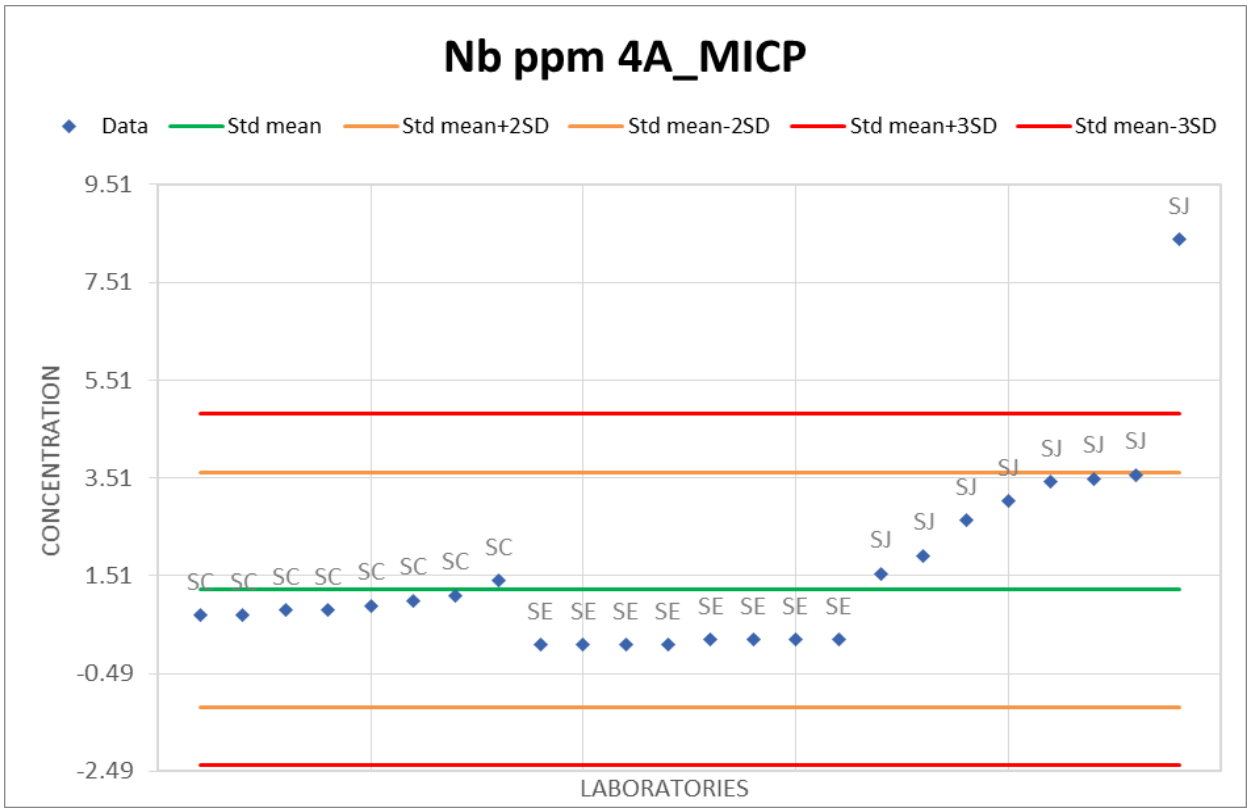
12.30. Nb 4A_MICP

Lab_ID	Z_Score	Data
SC	-0.44	0.70
SC	-0.44	0.70
SC	-0.39	0.80
SC	-0.39	0.80
SC	-0.33	0.90
SC	-0.28	1.00
SC	-0.23	1.10
SC	-0.07	1.40
SE	-0.76	0.10
SE	-0.76	0.10
SE	-0.76	0.10
SE	-0.76	0.10
SE	-0.71	0.20
SE	-0.71	0.20
SE	-0.71	0.20
SE	-0.71	0.20
SJ	0.01	1.55
SJ	0.21	1.92
SJ	0.59	2.64
SJ	0.80	3.03
SJ	1.01	3.42
SJ	1.05	3.49
SJ	1.09	3.57
SJ	3.66	8.39

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Nb	4A_MICP	24	1.53	1.87	123	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Nb	4A_MICP	SC	8	0.925	0.238	0.257	25.681
Nb	4A_MICP	SE	8	0.150	0.053	0.356	35.635
Nb	4A_MICP	SJ	8	3.501	2.111	0.603	60.282
			Average	1.525	1.227	0.405	40.532

12.30. Nb 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Nb	4A_MICP	23	1.23	1.20	98	ppm

Std mean	1.227
SD	1.200
2SD	2.400
3SD	3.600
Std mean+2SD	3.627
Std mean-2SD	-1.173
Std mean+3SD	4.827
Std mean-3SD	-2.373

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Nb	4A_MICP	1.228	4.494	2.120	0.463	ppm

Comment: 1 result out of 24 was rejected as an outlier using z score.

12.31. Ni 4A_MICP

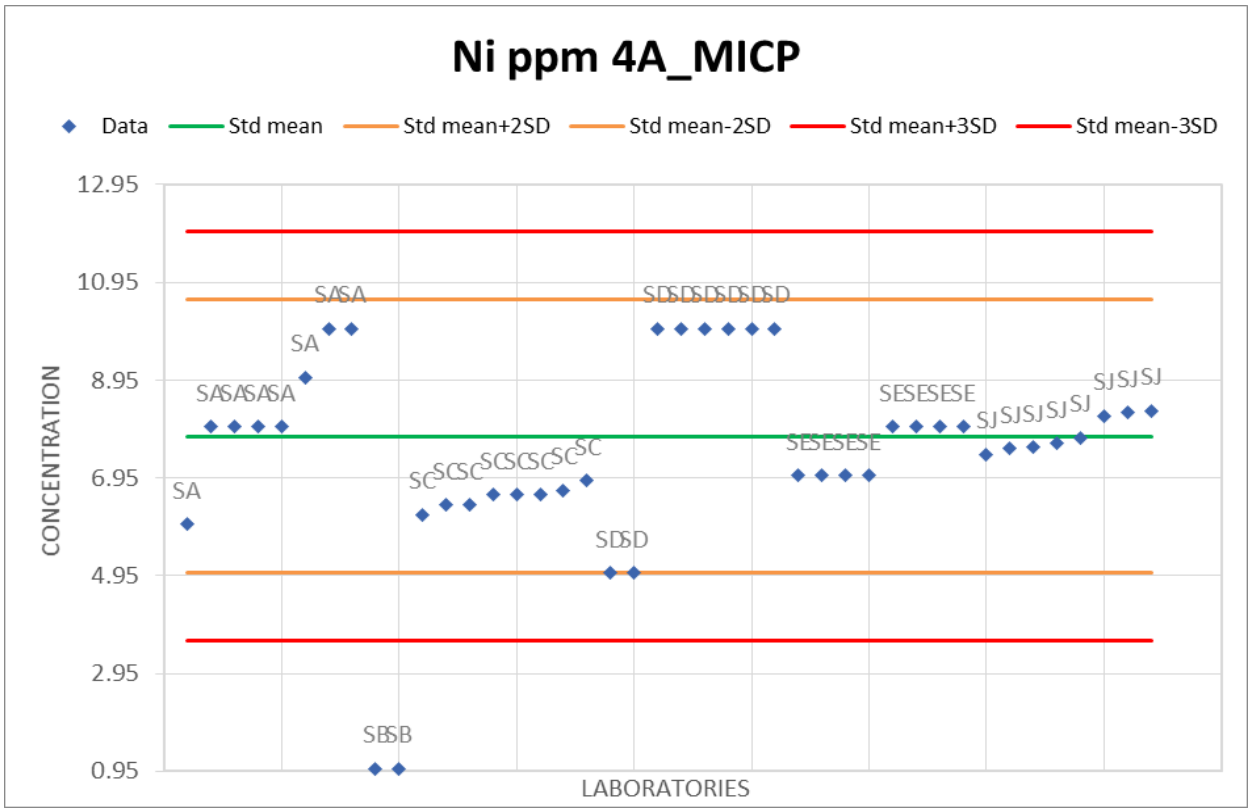
Lab_ID	Z_Score	Data
SA	-0.74	6.00
SA	0.26	8.00
SA	0.26	8.00
SA	0.26	8.00
SA	0.26	8.00
SA	0.76	9.00
SA	1.26	10.00
SA	1.26	10.00
SB	-3.24	1.00
SB	-3.24	1.00
SC	-0.64	6.20
SC	-0.54	6.40
SC	-0.54	6.40
SC	-0.44	6.60
SC	-0.44	6.60
SC	-0.44	6.60
SC	-0.39	6.70
SC	-0.29	6.90
SD	-1.24	5.00
SD	-1.24	5.00
SD	1.26	10.00
SD	1.26	10.00
SD	1.26	10.00
SD	1.26	10.00

Lab_ID	Z_Score	Data
SE	-0.24	7.00
SE	-0.24	7.00
SE	-0.24	7.00
SE	-0.24	7.00
SE	0.26	8.00
SE	0.26	8.00
SE	0.26	8.00
SE	0.26	8.00
SJ	-0.03	7.43
SJ	0.03	7.55
SJ	0.04	7.57
SJ	0.08	7.65
SJ	0.14	7.77
SJ	0.37	8.22
SJ	0.40	8.29
SJ	0.42	8.32

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Ni	4A_MICP	42	7.48	2.00	27	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Ni	4A_MICP	SA	8	8.375	1.302	0.156	15.552
Ni	4A_MICP	SB	2	1.000	0.000	0.000	0.000
Ni	4A_MICP	SC	8	6.550	0.214	0.033	3.264
Ni	4A_MICP	SD	8	8.750	2.315	0.265	26.452
Ni	4A_MICP	SE	8	7.500	0.535	0.071	7.127
Ni	4A_MICP	SJ	8	7.850	0.367	0.047	4.675
			Average	6.671	1.197	0.095	9.512

12.31. Ni 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Ni	4A_MICP	40	7.81	1.39	18	ppm

Std mean	7.805
SD	1.394
2SD	2.787
3SD	4.181
Std mean+2SD	10.592
Std mean-2SD	5.018
Std mean+3SD	11.986
Std mean-3SD	3.624

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Ni	4A_MICP	0.457	0.854	0.924	1.226	ppm

Comment: 2 results out of 42 were rejected as outliers using z score.

12.32. P_2O_5 XRF

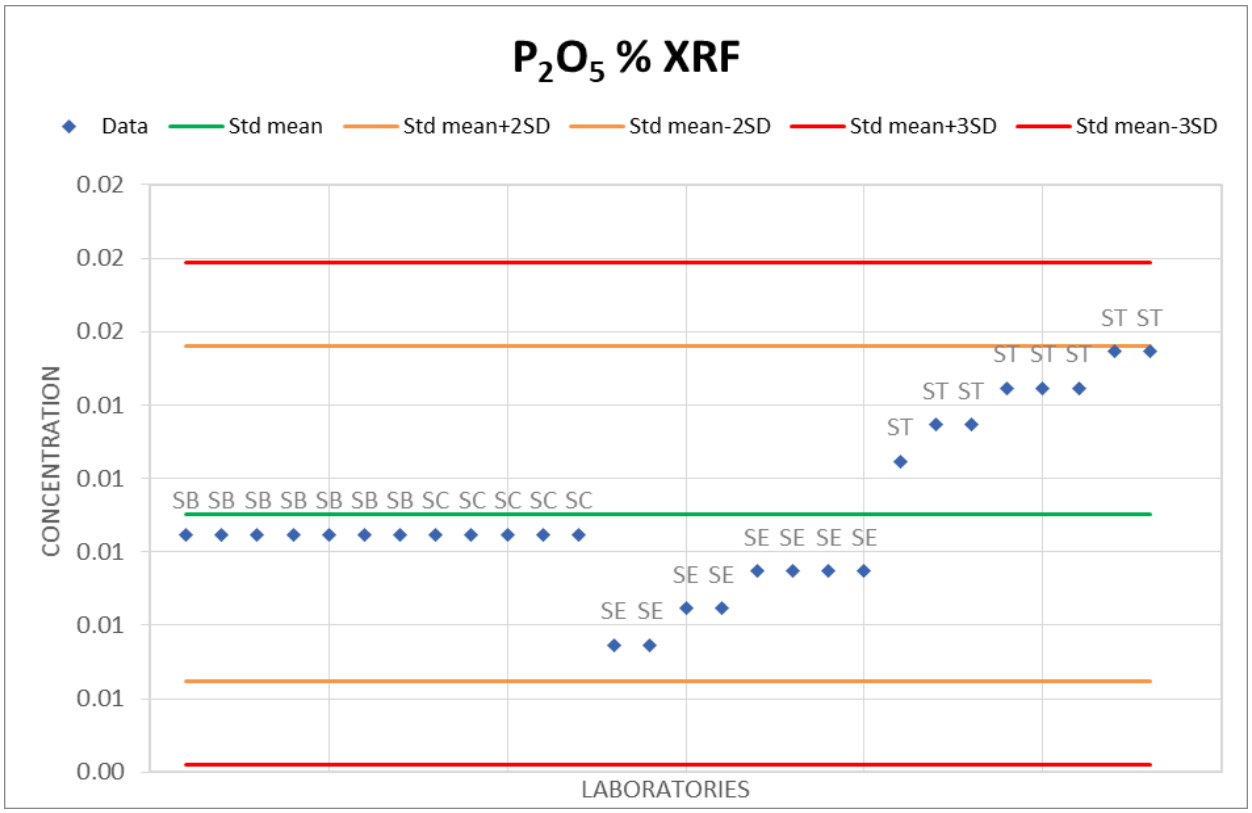
Lab_ID	Z_Score	Data
SB	-0.25	0.010
SB	-0.25	0.010
SB	-0.25	0.010
SB	-0.25	0.010
SB	-0.25	0.010
SB	-0.25	0.010
SB	-0.25	0.010
SC	-0.25	0.010
SC	-0.25	0.010
SC	-0.25	0.010
SC	-0.25	0.010
SC	-0.25	0.010
SE	-1.56	0.0070
SE	-1.56	0.0070
SE	-1.13	0.0080
SE	-1.13	0.0080
SE	-0.69	0.0090
SE	-0.69	0.0090
SE	-0.69	0.0090
SE	-0.69	0.0090

Lab_ID	Z_Score	Data
ST	0.63	0.012
ST	1.06	0.013
ST	1.06	0.013
ST	1.50	0.014
ST	1.50	0.014
ST	1.50	0.014
ST	1.94	0.015
ST	1.94	0.015

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
P_2O_5	XRF	28	0.011	0.002	22	%

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
P_2O_5	XRF	SB	7	0.010	0.000	0.000	0.000
P_2O_5	XRF	SC	5	0.010	0.000	0.000	0.000
P_2O_5	XRF	SE	8	0.008	0.001	0.107	10.744
P_2O_5	XRF	ST	8	0.014	0.001	0.075	7.528
			Average	0.011	0.001	0.046	4.568

12.32. P_2O_5 XRF (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
P_2O_5	XRF	28	0.011	0.002	22	%

Std mean	0.011
SD	0.002
2SD	0.005
3SD	0.007
Std mean+2SD	0.015
Std mean-2SD	0.006
Std mean+3SD	0.017
Std mean-3SD	0.004

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
P_2O_5	XRF	0.006	0.00006	0.008	0.001	%

Comment: No results were rejected as outliers using z score.

12.33. Pb 4A_MICP

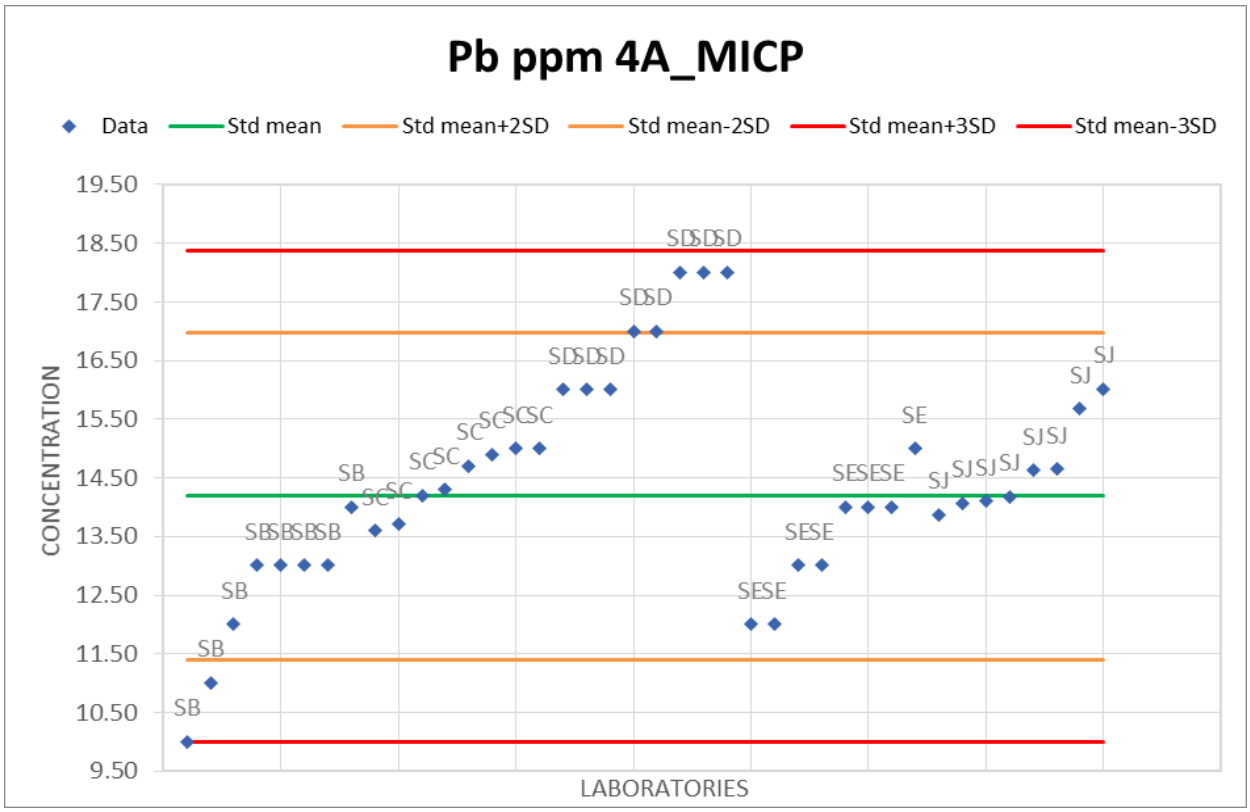
Lab_ID	Z_Score	Data
SB	-2.41	10.00
SB	-1.86	11.00
SB	-1.30	12.00
SB	-0.75	13.00
SB	-0.75	13.00
SB	-0.75	13.00
SB	-0.75	13.00
SB	-0.20	14.00
SC	-0.42	13.60
SC	-0.37	13.70
SC	-0.09	14.20
SC	-0.04	14.30
SC	0.19	14.70
SC	0.30	14.90
SC	0.35	15.00
SC	0.35	15.00
SD	0.90	16.00
SD	0.90	16.00
SD	0.90	16.00
SD	1.45	17.00
SD	1.45	17.00
SD	2.01	18.00
SD	2.01	18.00
SD	2.01	18.00

Lab_ID	Z_Score	Data
SE	-1.30	12.00
SE	-1.30	12.00
SE	-0.75	13.00
SE	-0.75	13.00
SE	-0.20	14.00
SE	-0.20	14.00
SE	-0.20	14.00
SE	0.35	15.00
SJ	-0.27	13.87
SJ	-0.16	14.07
SJ	-0.15	14.10
SJ	-0.10	14.18
SJ	0.14	14.62
SJ	0.16	14.65
SJ	0.72	15.67
SJ	0.91	16.01

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Pb	4A_MICP	40	14.36	1.81	13	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Pb	4A_MICP	SB	8	12.375	1.302	0.105	10.525
Pb	4A_MICP	SC	8	14.425	0.565	0.039	3.917
Pb	4A_MICP	SD	8	17.000	0.926	0.054	5.446
Pb	4A_MICP	SE	8	13.375	1.061	0.079	7.930
Pb	4A_MICP	SJ	8	14.646	0.789	0.054	5.388
			Average	14.364	0.961	0.066	6.641

12.33. Pb 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Pb	4A_MICP	36	14.18	1.40	10	ppm

Std mean	14.183
SD	1.396
2SD	2.791
3SD	4.187
Std mean+2SD	16.974
Std mean-2SD	11.391
Std mean+3SD	18.370
Std mean-3SD	9.995

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Pb	4A_MICP	0.680	2.218	1.489	0.825	ppm

Comment: 4 results out of 40 were rejected as outliers using z score.

12.34. Rb 4A_MICP

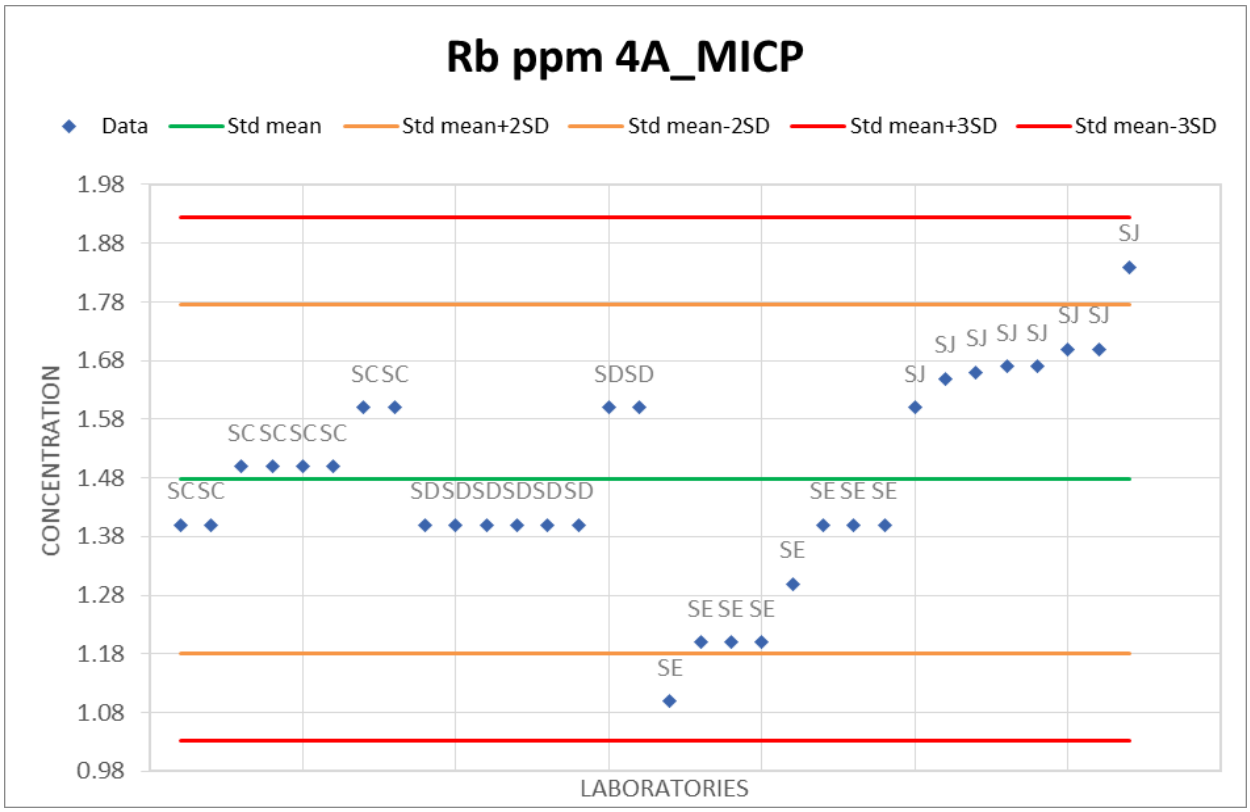
Lab_ID	Z_Score	Data
SC	-0.45	1.40
SC	-0.45	1.40
SC	0.13	1.50
SC	0.13	1.50
SC	0.13	1.50
SC	0.13	1.50
SC	0.71	1.60
SC	0.71	1.60
SD	-0.45	1.40
SD	-0.45	1.40
SD	-0.45	1.40
SD	-0.45	1.40
SD	-0.45	1.40
SD	-0.45	1.40
SD	0.71	1.60
SD	0.71	1.60
SE	-2.20	1.10
SE	-1.62	1.20
SE	-1.62	1.20
SE	-1.62	1.20
SE	-1.03	1.30
SE	-0.45	1.40
SE	-0.45	1.40
SE	-0.45	1.40

Lab_ID	Z_Score	Data
SJ	0.71	1.60
SJ	1.00	1.65
SJ	1.06	1.66
SJ	1.12	1.67
SJ	1.12	1.67
SJ	1.29	1.70
SJ	1.29	1.70
SJ	2.11	1.84

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Rb	4A_MICP	32	1.48	0.17	12	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Rb	4A_MICP	SC	8	1.500	0.076	0.050	5.040
Rb	4A_MICP	SD	8	1.450	0.093	0.064	6.385
Rb	4A_MICP	SE	8	1.275	0.116	0.091	9.137
Rb	4A_MICP	SJ	8	1.686	0.070	0.041	4.132
			Average	1.478	0.090	0.062	6.173

12.34. Rb 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Rb	4A_MICP	30	1.48	0.15	10	ppm

Std mean	1.478
SD	0.149
2SD	0.298
3SD	0.446
Std mean+2SD	1.776
Std mean-2SD	1.181
Std mean+3SD	1.925
Std mean-3SD	1.032

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Rb	4A_MICP	0.099	0.038	0.195	0.080	ppm

Comment: 2 results out of 32 were rejected as outliers using z score.

12.35. S 4A_MICP

Lab_ID	Z_Score	Data
SA	1.66	0.050
SA	1.66	0.050
SA	2.27	0.060
SA	2.27	0.060
SA	2.27	0.060
SA	2.27	0.060
SA	2.27	0.060
SA	2.27	0.060
SB	-0.78	0.010
SB	-0.78	0.010
SB	-0.78	0.010
SB	-0.78	0.010
SB	-0.78	0.010
SB	-0.78	0.010
SB	-0.78	0.010
SB	-0.78	0.010
SC	-0.78	0.010
SC	-0.17	0.020
SC	-0.17	0.020
SC	-0.17	0.020
SC	-0.17	0.020
SC	-0.17	0.020
SC	-0.17	0.020
SC	-0.17	0.020

Lab_ID	Z_Score	Data
SD	-0.47	0.015
SD	-0.47	0.015
SD	-0.47	0.015
SD	-0.17	0.020
SD	-0.17	0.020
SD	-0.17	0.020
SD	-0.17	0.020
SD	0.14	0.025
SE	-0.78	0.010
SE	-0.72	0.011
SE	-0.72	0.011
SE	-0.72	0.011
SE	-0.72	0.011
SE	-0.66	0.012
SE	-0.63	0.012
SE	-0.56	0.014
SJ	-0.17	0.020
SJ	-0.17	0.020
SJ	-0.17	0.020
SJ	-0.17	0.020
SJ	-0.17	0.020
SJ	-0.17	0.020
SJ	-0.17	0.020

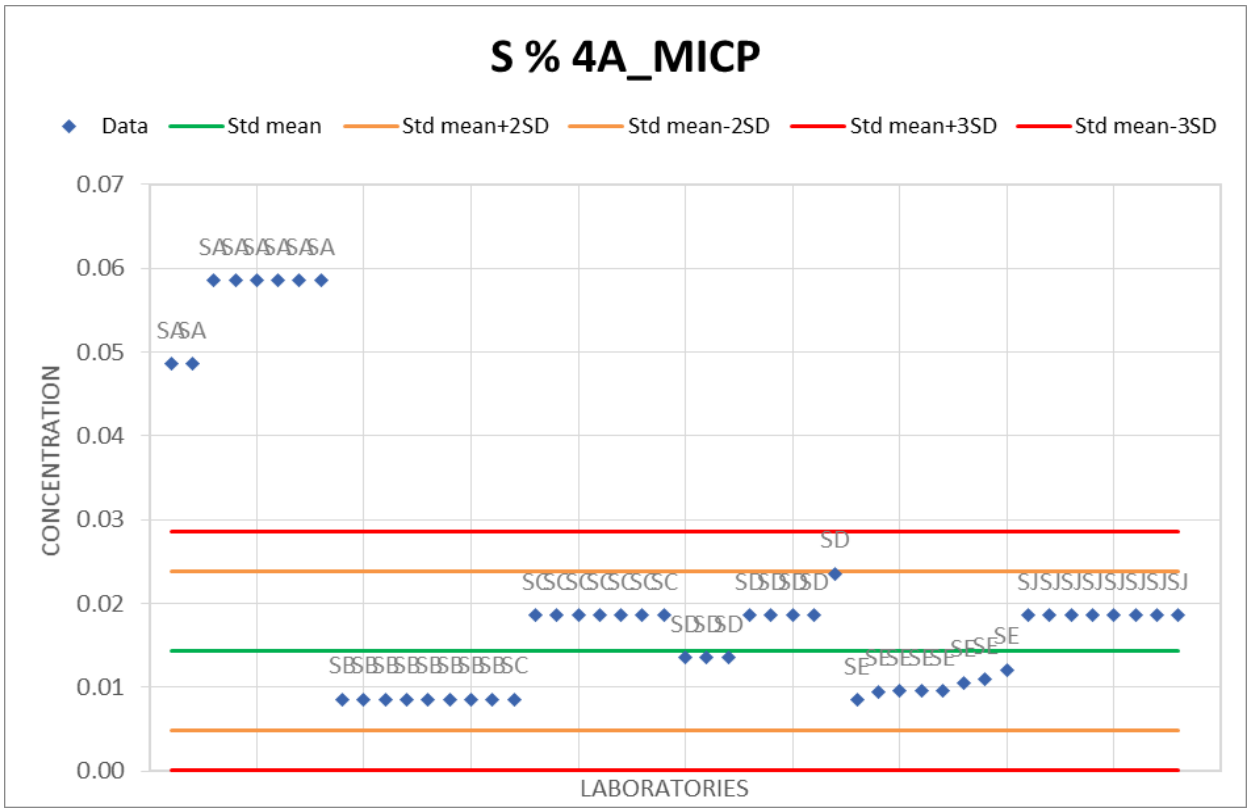
Results with outliers

Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
S	4A_MICP	48	0.023	0.02	72	%

Between Laboratory Statistics

Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
S	4A_MICP	SA	8	0.058	0.005	0.081	8.051
S	4A_MICP	SB	8	0.010	0.000	0.000	0.001
S	4A_MICP	SC	8	0.019	0.004	0.189	18.856
S	4A_MICP	SD	8	0.019	0.004	0.189	18.856
S	4A_MICP	SE	8	0.011	0.001	0.097	9.736
S	4A_MICP	SJ	8	0.020	0.000	0.000	0.001
			Average	0.023	0.003	0.092	9.250

12.35. S 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
S	4A_MICP	40	0.016	0.005	30	%

Std mean	0.016
SD	0.005
2SD	0.010
3SD	0.014
Std mean+2SD	0.025
Std mean-2SD	0.006
Std mean+3SD	0.030
Std mean-3SD	0.002

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
S	4A_MICP	0.003	0.00003	0.006	0.002	%

Comment: 8 results out of 48 were rejected as outliers using z score.

12.36. S Combustion LECO

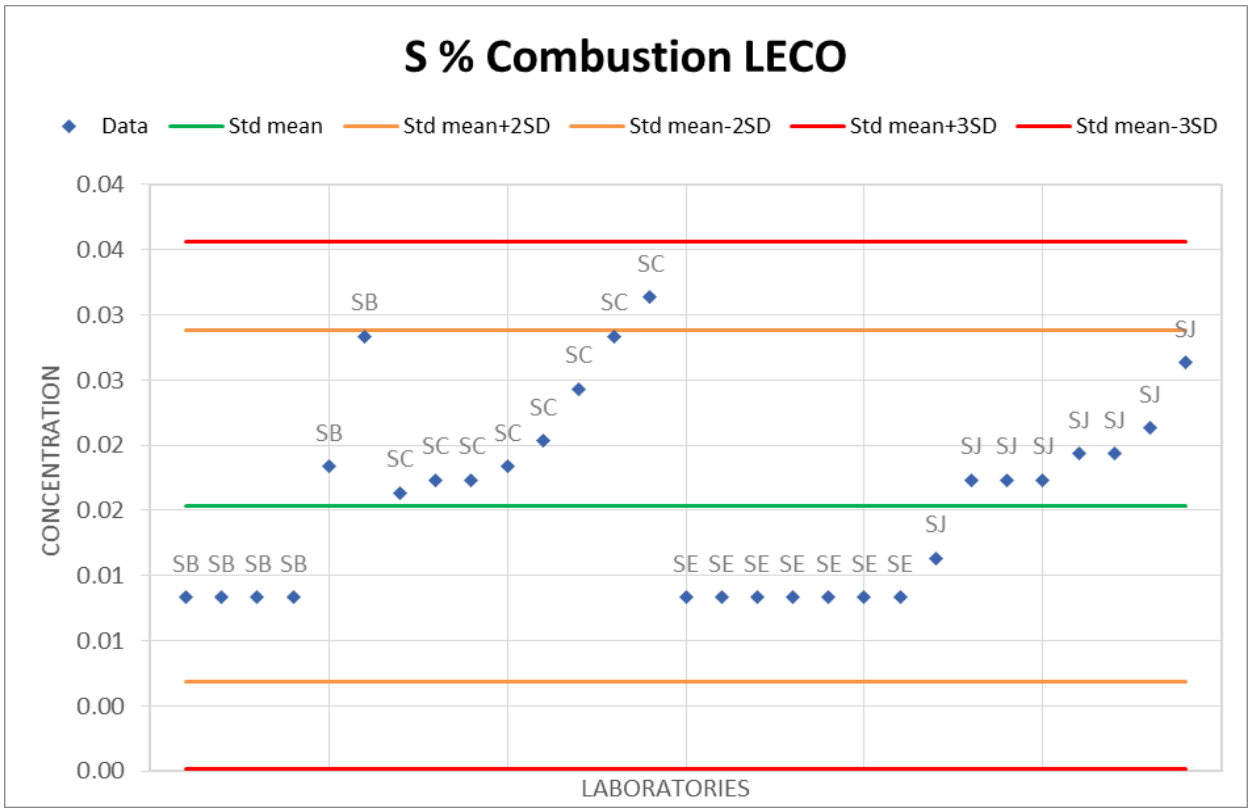
Lab_ID	Z_Score	Data
SB	-1.05	0.010
SB	-1.05	0.010
SB	-1.05	0.010
SB	-1.05	0.010
SB	0.33	0.020
SB	1.71	0.030
SC	0.06	0.018
SC	0.19	0.019
SC	0.19	0.019
SC	0.33	0.020
SC	0.61	0.022
SC	1.16	0.026
SC	1.71	0.030
SC	2.13	0.033
SE	-1.05	0.010
SE	-1.05	0.010
SE	-1.05	0.010
SE	-1.05	0.010
SE	-1.05	0.010
SE	-1.05	0.010
SE	-1.05	0.010

Lab_ID	Z_Score	Data
SJ	-0.63	0.013
SJ	0.19	0.019
SJ	0.19	0.019
SJ	0.19	0.019
SJ	0.47	0.021
SJ	0.47	0.021
SJ	0.75	0.023
SJ	1.44	0.028

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
S	Combustion/LECO	29	0.018	0.01	41	%

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
S	Combustion/LECO	SB	6	0.015	0.008	0.558	55.777
S	Combustion/LECO	SC	8	0.023	0.006	0.242	24.194
S	Combustion/LECO	SE	7	0.010	0.000	0.000	0.000
S	Combustion/LECO	SJ	8	0.020	0.004	0.208	20.812
			Average	0.017	0.005	0.252	25.196

12.36. S Combustion LECO (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
S	Combustion/LECO	28	0.017	0.01	40	%

Std mean	0.017
SD	0.007
2SD	0.013
3SD	0.020
Std mean+2SD	0.031
Std mean-2SD	0.004
Std mean+3SD	0.037
Std mean-3SD	-0.003

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
S	Combustion/LECO	0.004	0.00004	0.006	0.006	%

Comment: 1 result out of 29 was rejected as an outlier using z score.

12.37. Sb 4A_MICP

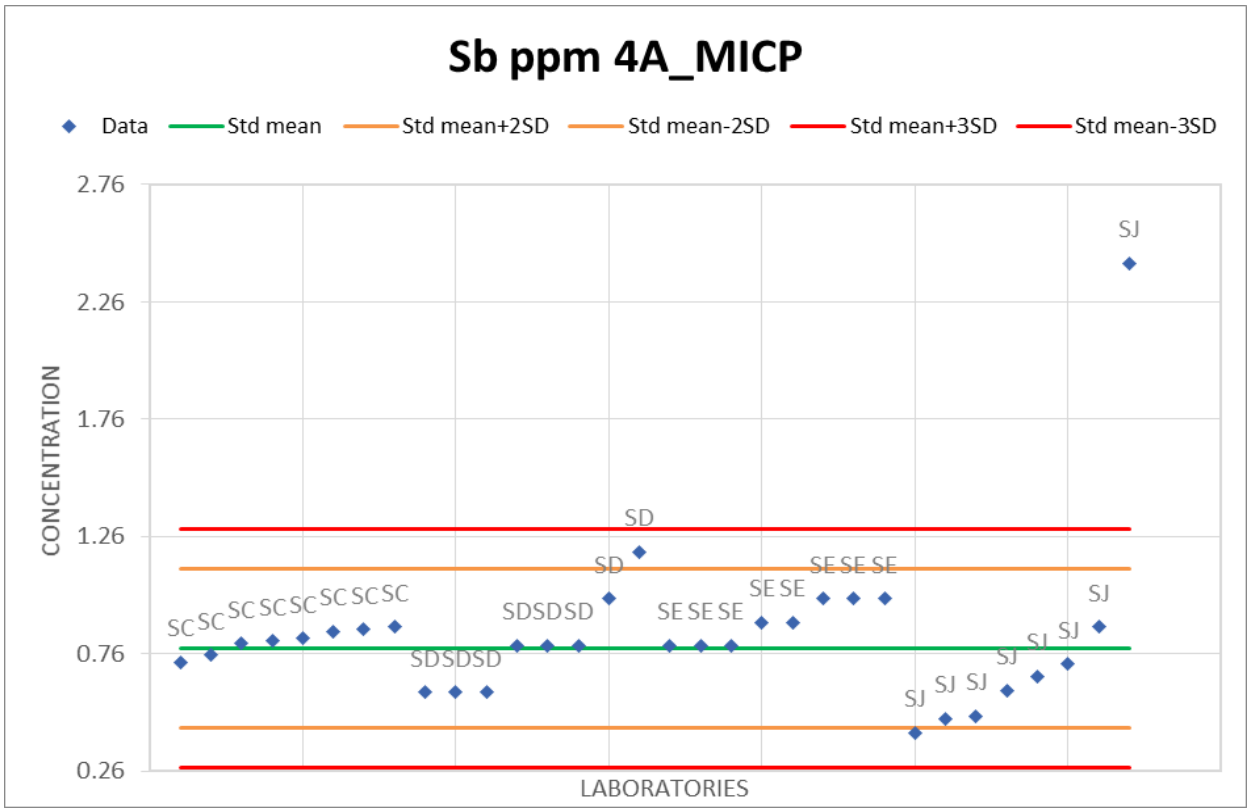
Lab_ID	Z_Score	Data
SC	-0.33	0.73
SC	-0.24	0.76
SC	-0.09	0.81
SC	-0.06	0.82
SC	-0.03	0.83
SC	0.06	0.86
SC	0.09	0.87
SC	0.12	0.88
SD	-0.72	0.60
SD	-0.72	0.60
SD	-0.72	0.60
SD	-0.12	0.80
SD	-0.12	0.80
SD	-0.12	0.80
SD	0.48	1.00
SD	1.07	1.20
SE	-0.12	0.80
SE	-0.12	0.80
SE	-0.12	0.80
SE	0.18	0.90
SE	0.18	0.90
SE	0.48	1.00
SE	0.48	1.00
SE	0.48	1.00

Lab_ID	Z_Score	Data
SJ	-1.23	0.43
SJ	-1.05	0.49
SJ	-1.02	0.50
SJ	-0.69	0.61
SJ	-0.51	0.67
SJ	-0.36	0.72
SJ	0.12	0.88
SJ	4.75	2.43

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Sb	4A_MICP	32	0.84	0.33	40	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Sb	4A_MICP	SC	8	0.820	0.053	0.065	6.453
Sb	4A_MICP	SD	8	0.800	0.214	0.267	26.726
Sb	4A_MICP	SE	8	0.900	0.093	0.103	10.287
Sb	4A_MICP	SJ	8	0.841	0.658	0.782	78.234
			Average	0.840	0.350	0.304	30.425

12.37. Sb 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Sb	4A_MICP	31	0.79	0.17	22	ppm

Std mean	0.789
SD	0.170
2SD	0.340
3SD	0.510
Std mean+2SD	1.129
Std mean-2SD	0.449
Std mean+3SD	1.299
Std mean-3SD	0.279

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Sb	4A_MICP	0.078	0.022	0.147	0.142	ppm

Comment: 1 result out of 32 was rejected as an outlier using z score.

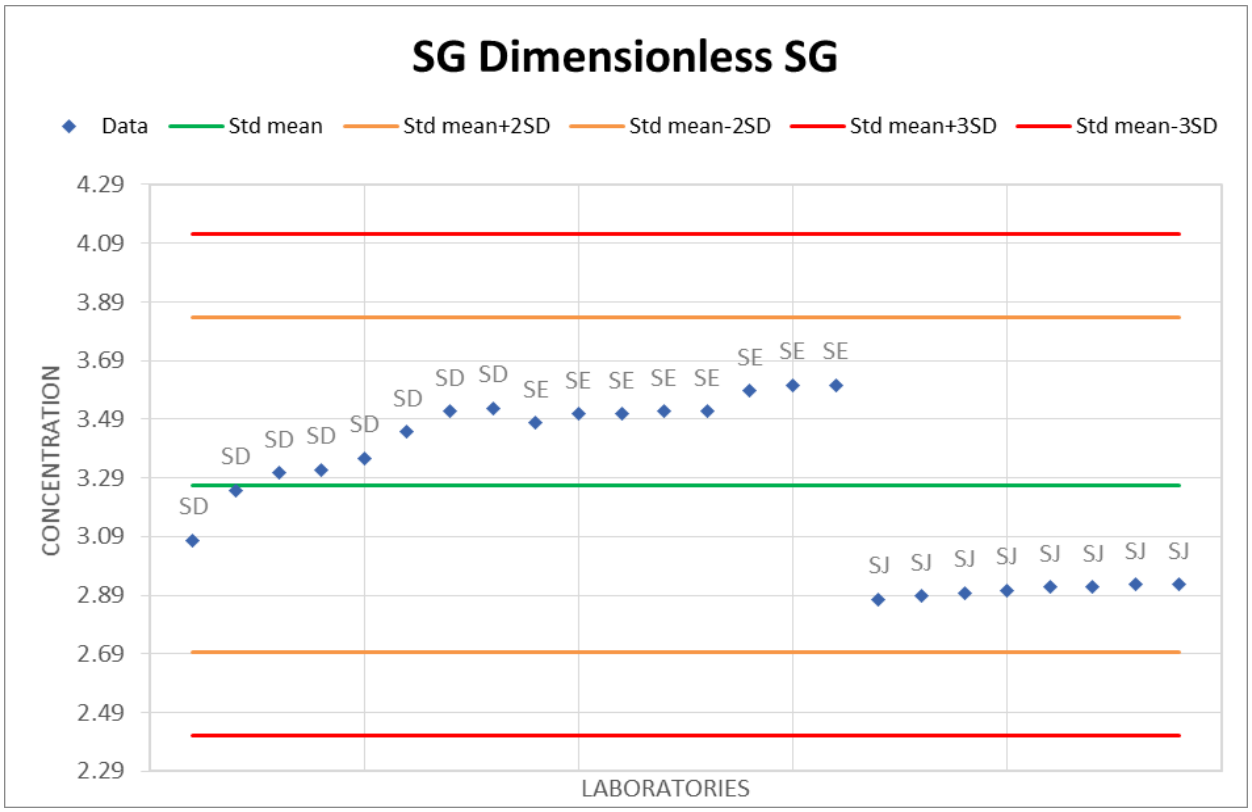
12.38. SG

Lab_ID	Z_Score	Data
SD	-0.66	3.08
SD	-0.07	3.25
SD	0.14	3.31
SD	0.18	3.32
SD	0.32	3.36
SD	0.64	3.45
SD	0.88	3.52
SD	0.92	3.53
SE	0.74	3.48
SE	0.85	3.51
SE	0.85	3.51
SE	0.88	3.52
SE	0.88	3.52
SE	1.13	3.59
SE	1.20	3.61
SE	1.20	3.61
SJ	-1.36	2.88
SJ	-1.33	2.89
SJ	-1.29	2.90
SJ	-1.26	2.91
SJ	-1.22	2.92
SJ	-1.22	2.92
SJ	-1.19	2.93
SJ	-1.19	2.93

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
SG	SG	24	3.27	0.29	9	Dimensionless

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
SG	SG	SD	8	3.353	0.150	0.045	4.464
SG	SG	SE	8	3.544	0.051	0.014	1.446
SG	SG	SJ	8	2.910	0.019	0.006	0.636
			Average	3.269	0.092	0.022	2.182

12.38. SG (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
SG	SG	24	3.27	0.29	9	Dimensionless

Std mean	3.269
SD	0.285
2SD	0.570
3SD	0.855
Std mean+2SD	3.839
Std mean-2SD	2.699
Std mean+3SD	4.124
Std mean-3SD	2.414

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
SG	SG	0.306	0.279	0.528	0.092	Dimensionless

Comment: No results were rejected as outliers using z score.

12.39. SiO_2 XRF

Lab_ID	Z_Score	Data
SA	-1.59	2.84
SA	-1.55	2.85
SA	-1.43	2.88
SA	-1.43	2.88
SA	-1.43	2.88
SA	-1.43	2.88
SA	-1.27	2.92
SA	-1.12	2.96
SB	-0.77	3.05
SB	-0.73	3.06
SB	-0.65	3.08
SB	-0.61	3.09
SB	-0.61	3.09
SB	-0.57	3.10
SB	-0.49	3.12
SB	-0.49	3.12
SC	-0.26	3.18
SC	-0.18	3.20
SC	-0.14	3.21
SC	-0.10	3.22
SC	-0.06	3.23
SC	-0.06	3.23
SC	-0.06	3.23
SC	-0.02	3.24

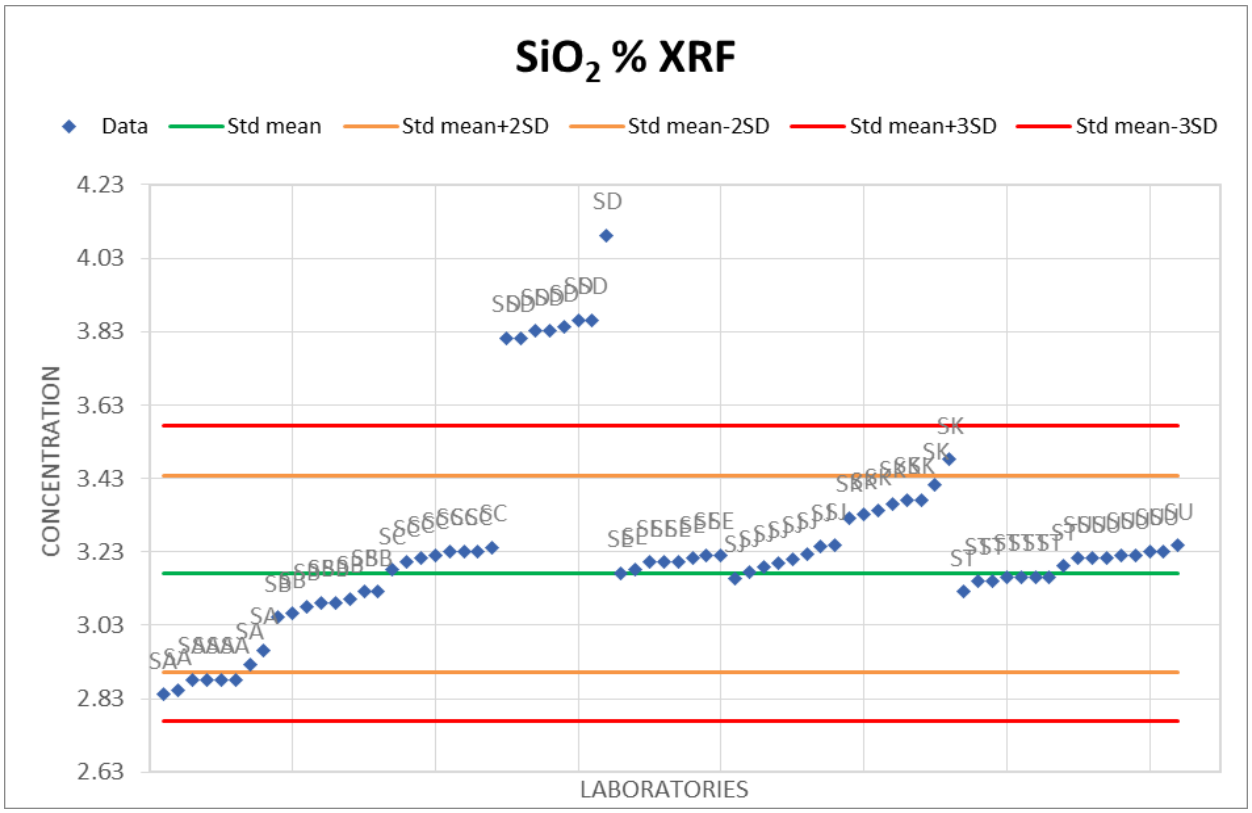
Lab_ID	Z_Score	Data
SD	2.20	3.81
SD	2.20	3.81
SD	2.28	3.83
SD	2.28	3.83
SD	2.32	3.84
SD	2.40	3.86
SD	2.40	3.86
SD	3.30	4.09
SE	-0.30	3.17
SE	-0.26	3.18
SE	-0.18	3.20
SE	-0.18	3.20
SE	-0.18	3.20
SE	-0.14	3.21
SE	-0.10	3.22
SE	-0.10	3.22
SJ	-0.35	3.16
SJ	-0.29	3.17
SJ	-0.23	3.19
SJ	-0.19	3.20
SJ	-0.14	3.21
SJ	-0.10	3.22
SJ	-0.02	3.24
SJ	0.00	3.25

Lab_ID	Z_Score	Data
SK	0.29	3.32
SK	0.33	3.33
SK	0.37	3.34
SK	0.45	3.36
SK	0.48	3.37
SK	0.48	3.37
SK	0.64	3.41
SK	0.91	3.48
ST	-0.49	3.12
ST	-0.37	3.15
ST	-0.37	3.15
ST	-0.34	3.16
ST	-0.34	3.16
ST	-0.34	3.16
ST	-0.34	3.16
ST	-0.22	3.19
SU	-0.14	3.21
SU	-0.14	3.21
SU	-0.14	3.21
SU	-0.10	3.22
SU	-0.10	3.22
SU	-0.06	3.23
SU	-0.06	3.23
SU	0.00	3.25

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
SiO_2	XRF	72	3.25	0.26	8	%

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
SiO_2	XRF	SA	8	2.886	0.038	0.013	1.322
SiO_2	XRF	SB	8	3.089	0.025	0.008	0.820
SiO_2	XRF	SC	8	3.218	0.020	0.006	0.616
SiO_2	XRF	SD	8	3.866	0.092	0.024	2.390
SiO_2	XRF	SE	8	3.200	0.018	0.006	0.554
SiO_2	XRF	SJ	8	3.204	0.032	0.010	0.994
SiO_2	XRF	SK	8	3.373	0.052	0.015	1.535
SiO_2	XRF	ST	8	3.156	0.019	0.006	0.609
SiO_2	XRF	SU	8	3.222	0.013	0.004	0.389
			Average	3.246	0.042	0.010	1.025

12.39. SiO_2 XRF (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
SiO_2	XRF	64	3.17	0.13	4	%

Std mean	3.168
SD	0.134
2SD	0.268
3SD	0.402
Std mean+2SD	3.436
Std mean-2SD	2.900
Std mean+3SD	3.570
Std mean-3SD	2.766

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
SiO_2	XRF	0.049	0.019	0.139	0.030	%

Comment: 8 results out of 72 were rejected as outliers using z score.

12.40. Sr 4A_MICP

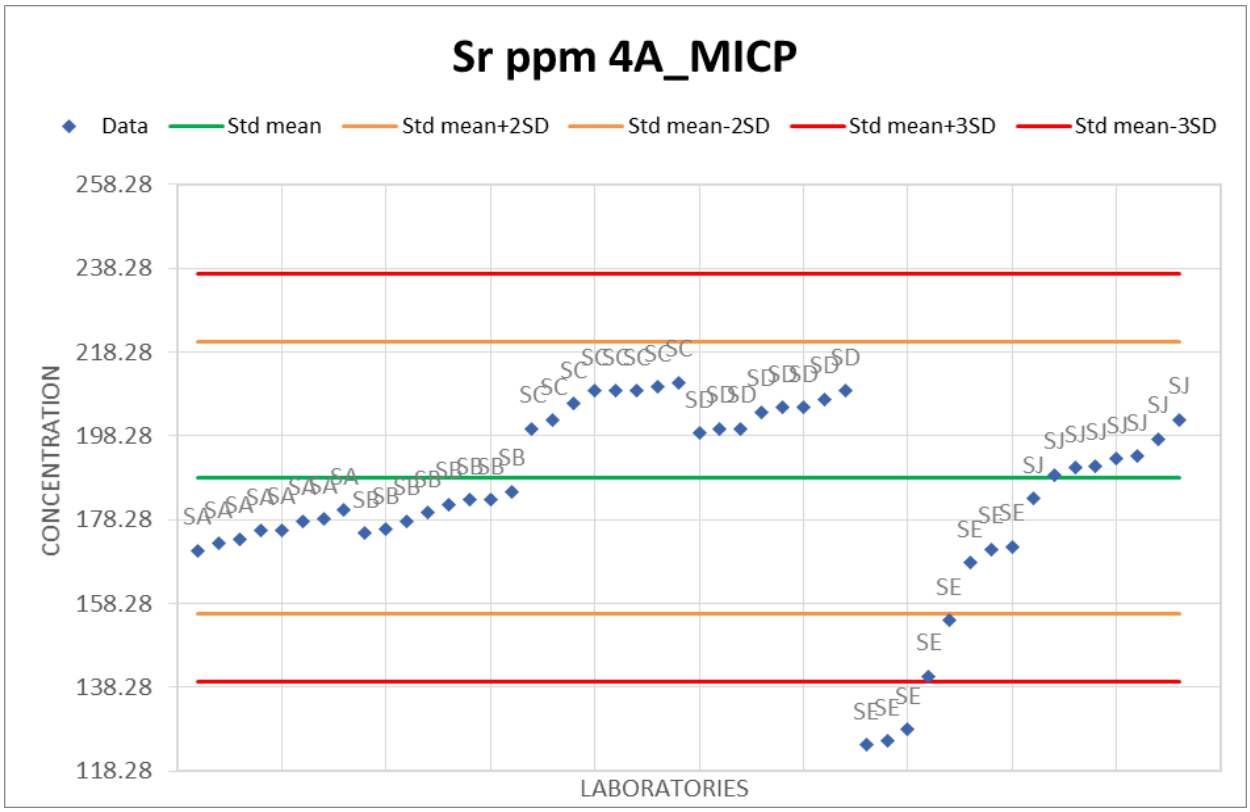
Lab_ID	Z_Score	Data
SA	-0.62	171.00
SA	-0.54	172.60
SA	-0.49	173.70
SA	-0.40	175.70
SA	-0.40	175.80
SA	-0.30	177.90
SA	-0.28	178.50
SA	-0.18	180.60
SB	-0.44	175.00
SB	-0.39	176.00
SB	-0.30	178.00
SB	-0.21	180.00
SB	-0.12	182.00
SB	-0.07	183.00
SB	-0.07	183.00
SB	0.02	185.00
SC	0.71	200.00
SC	0.80	202.00
SC	0.98	206.00
SC	1.12	209.00
SC	1.12	209.00
SC	1.12	209.00
SC	1.16	210.00
SC	1.21	211.00

Lab_ID	Z_Score	Data
SD	0.66	199.00
SD	0.71	200.00
SD	0.71	200.00
SD	0.89	204.00
SD	0.94	205.00
SD	0.94	205.00
SD	1.03	207.00
SD	1.12	209.00
SE	-2.74	124.50
SE	-2.70	125.50
SE	-2.57	128.20
SE	-1.99	140.90
SE	-1.39	154.20
SE	-0.75	168.10
SE	-0.61	171.20
SE	-0.58	171.80
SJ	-0.06	183.28
SJ	0.20	189.00
SJ	0.28	190.64
SJ	0.31	191.21
SJ	0.38	192.84
SJ	0.41	193.45
SJ	0.60	197.58
SJ	0.81	202.20

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Sr	4A_MICP	48	184.53	21.89	12	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Sr	4A_MICP	SA	8	175.725	3.216	0.018	1.830
Sr	4A_MICP	SB	8	180.250	3.615	0.020	2.006
Sr	4A_MICP	SC	8	207.000	4.000	0.019	1.932
Sr	4A_MICP	SD	8	203.625	3.623	0.018	1.779
Sr	4A_MICP	SE	8	148.050	20.867	0.141	14.095
Sr	4A_MICP	SJ	8	192.525	5.648	0.029	2.934
			Average	184.529	9.308	0.041	4.096

12.40. Sr 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Sr	4A_MICP	45	188.43	16.22	9	ppm

Std mean	188.427
SD	16.220
2SD	32.439
3SD	48.659
Std mean+2SD	220.866
Std mean-2SD	155.988
Std mean+3SD	237.085
Std mean-3SD	139.768

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Sr	4A_MICP	7.539	336.497	18.344	5.800	ppm

Comment: 3 results out of 48 were rejected as outliers using z score.

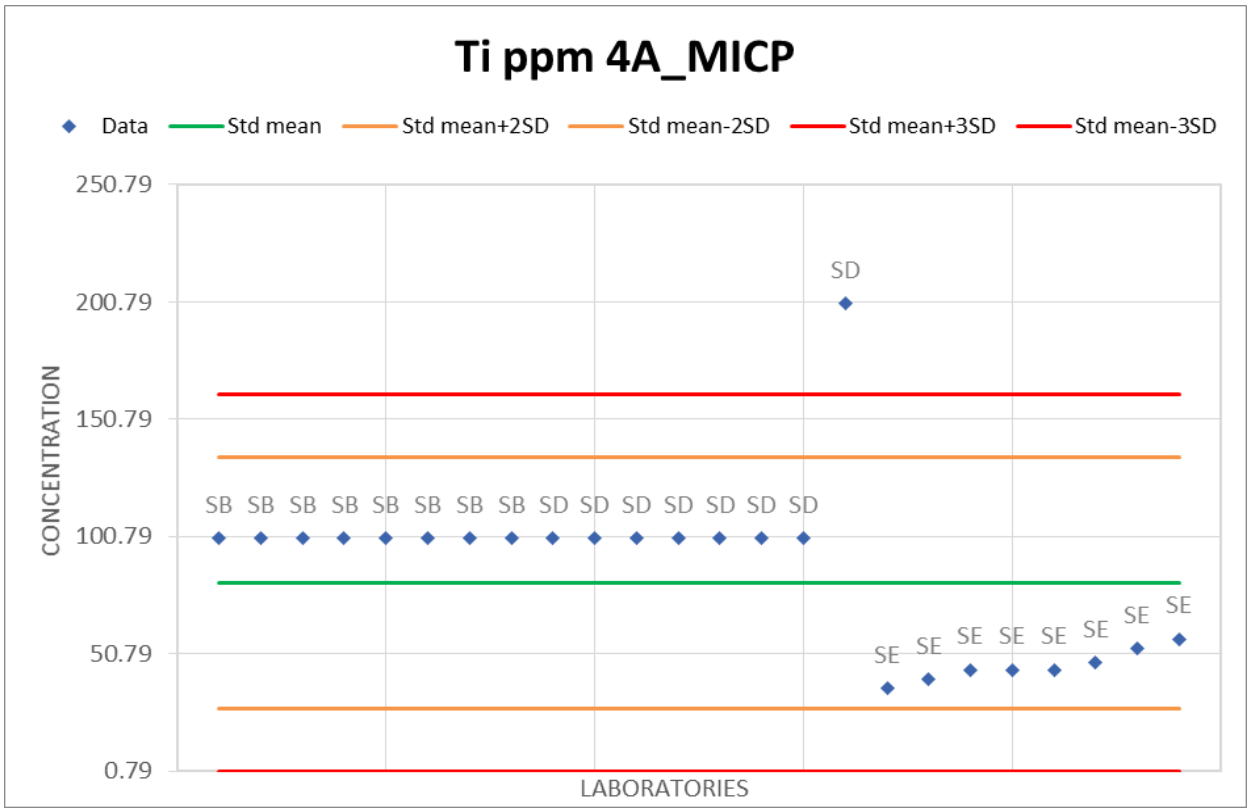
12.41. Ti 4A_MICP

Lab_ID	Z_Score	Data
SB	0.39	100.00
SB	0.39	100.00
SB	0.39	100.00
SB	0.39	100.00
SB	0.39	100.00
SB	0.39	100.00
SB	0.39	100.00
SB	0.39	100.00
SD	0.39	100.00
SD	0.39	100.00
SD	0.39	100.00
SD	0.39	100.00
SD	0.39	100.00
SD	0.39	100.00
SD	0.39	100.00
SD	3.19	200.00
SE	-1.40	36.00
SE	-1.29	40.00
SE	-1.18	44.00
SE	-1.18	44.00
SE	-1.18	44.00
SE	-1.09	47.00
SE	-0.93	53.00
SE	-0.81	57.00

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Ti	4A_MICP	24	86.04	35.69	41	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Ti	4A_MICP	SB	8	100.000	0.000	0.000	0.000
Ti	4A_MICP	SD	8	112.500	35.355	0.314	31.427
Ti	4A_MICP	SE	8	45.625	6.739	0.148	14.770
			Average	86.042	20.780	0.154	15.399

12.41. Ti 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Ti	4A_MICP	23	81.09	26.75	33	ppm

Std mean	81.087
SD	26.751
2SD	53.502
3SD	80.254
Std mean+2SD	134.589
Std mean-2SD	27.584
Std mean+3SD	161.341
Std mean-3SD	0.833

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Ti	4A_MICP	29.256	2565.694	50.653	3.987	ppm

Comment: 1 result out of 24 was rejected as an outlier using z score.

12.42. TiO_2 XRF

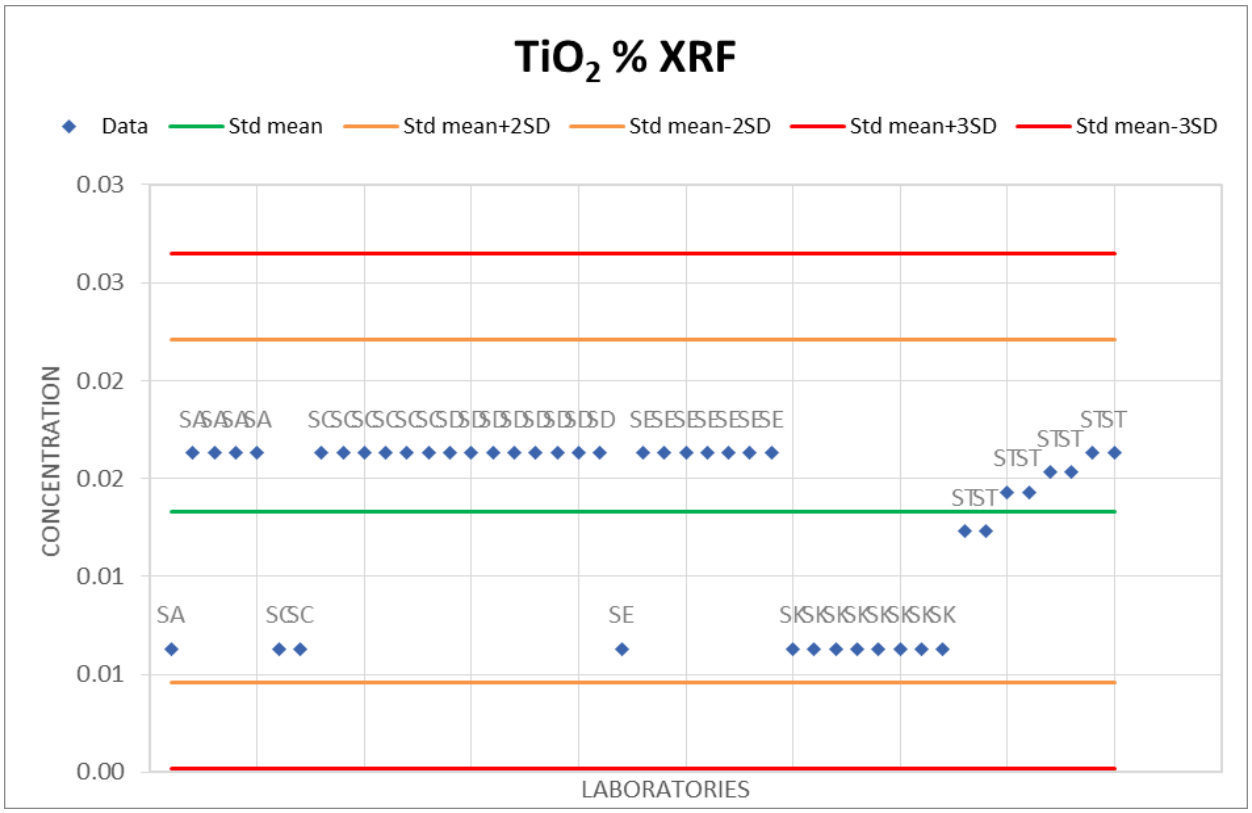
Lab_ID	Z_Score	Data
SA	-1.60	0.010
SA	0.68	0.020
SA	0.68	0.020
SA	0.68	0.020
SA	0.68	0.020
SC	-1.60	0.010
SC	-1.60	0.010
SC	0.68	0.020
SC	0.68	0.020
SC	0.68	0.020
SC	0.68	0.020
SC	0.68	0.020
SC	0.68	0.020
SD	0.68	0.020
SD	0.68	0.020
SD	0.68	0.020
SD	0.68	0.020
SD	0.68	0.020
SD	0.68	0.020
SD	0.68	0.020

Lab_ID	Z_Score	Data
SE	-1.60	0.010
SE	0.68	0.020
SE	0.68	0.020
SE	0.68	0.020
SE	0.68	0.020
SE	0.68	0.020
SE	0.68	0.020
SE	0.68	0.020
SK	-1.60	0.010
SK	-1.60	0.010
SK	-1.60	0.010
SK	-1.60	0.010
SK	-1.60	0.010
SK	-1.60	0.010
SK	-1.60	0.010
SK	-1.60	0.010
ST	-0.23	0.016
ST	-0.23	0.016
ST	0.22	0.018
ST	0.22	0.018
ST	0.45	0.019
ST	0.45	0.019
ST	0.68	0.020
ST	0.68	0.020

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
TiO_2	XRF	45	0.017	0.004	26	%

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
TiO_2	XRF	SA	5	0.018	0.004	0.248	24.845
TiO_2	XRF	SC	8	0.018	0.005	0.265	26.452
TiO_2	XRF	SD	8	0.020	0.000	0.000	0.001
TiO_2	XRF	SE	8	0.019	0.004	0.189	18.856
TiO_2	XRF	SK	8	0.010	0.000	0.000	0.001
TiO_2	XRF	ST	8	0.018	0.002	0.087	8.664
			Average	0.017	0.003	0.131	13.136

12.42. TiO_2 XRF (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
TiO_2	XRF	45	0.017	0.004	26	%

Std mean	0.017
SD	0.004
2SD	0.009
3SD	0.013
Std mean+2SD	0.026
Std mean-2SD	0.008
Std mean+3SD	0.030
Std mean-3SD	0.004

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
TiO_2	XRF	0.002	0.00002	0.004	0.003	%

Comment: No results were rejected as outliers using z score.

12.43. U 4A_MICP

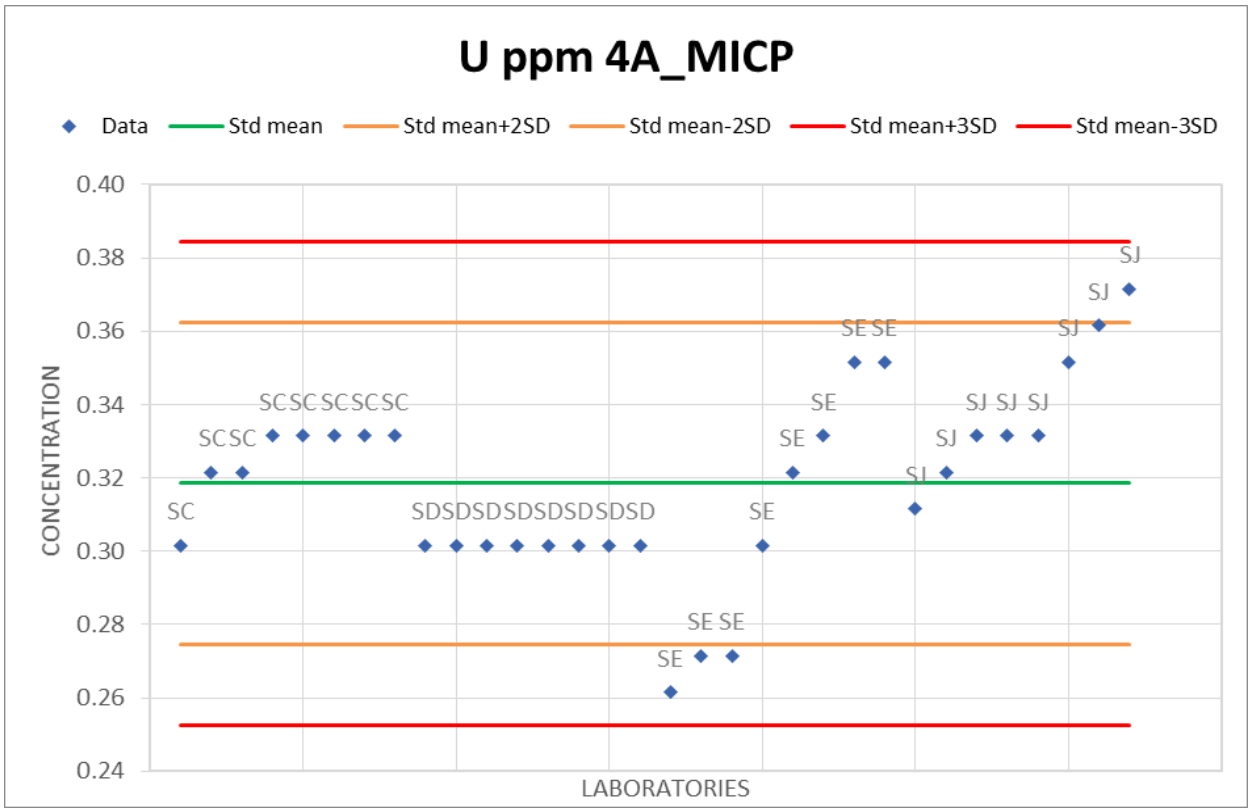
Lab_ID	Z_Score	Data
SC	-0.66	0.30
SC	0.12	0.32
SC	0.12	0.32
SC	0.52	0.33
SC	0.52	0.33
SC	0.52	0.33
SC	0.52	0.33
SC	0.52	0.33
SD	-0.66	0.30
SD	-0.66	0.30
SD	-0.66	0.30
SD	-0.66	0.30
SD	-0.66	0.30
SD	-0.66	0.30
SD	-0.66	0.30
SD	-0.66	0.30
SE	-2.23	0.26
SE	-1.84	0.27
SE	-1.84	0.27
SE	-0.66	0.30
SE	0.12	0.32
SE	0.52	0.33
SE	1.30	0.35
SE	1.30	0.35

Lab_ID	Z_Score	Data
SJ	-0.27	0.31
SJ	0.12	0.32
SJ	0.52	0.33
SJ	0.52	0.33
SJ	0.52	0.33
SJ	1.30	0.35
SJ	1.69	0.36
SJ	2.09	0.37

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
U	4A_MICP	32	0.32	0.03	8	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
U	4A_MICP	SC	8	0.324	0.011	0.033	3.276
U	4A_MICP	SD	8	0.300	0.000	0.000	0.000
U	4A_MICP	SE	8	0.306	0.037	0.120	11.958
U	4A_MICP	SJ	8	0.338	0.021	0.061	6.083
			Average	0.317	0.022	0.053	5.329

12.43. U 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
U	4A_MICP	30	0.32	0.02	7	ppm

Std mean	0.317
SD	0.022
2SD	0.044
3SD	0.066
Std mean+2SD	0.361
Std mean-2SD	0.273
Std mean+3SD	0.383
Std mean-3SD	0.251

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
U	4A_MICP	0.010	0.001	0.014	0.022	ppm

Comment: 2 results out of 32 were rejected as outliers using z score.

12.44. V 4A_MICP

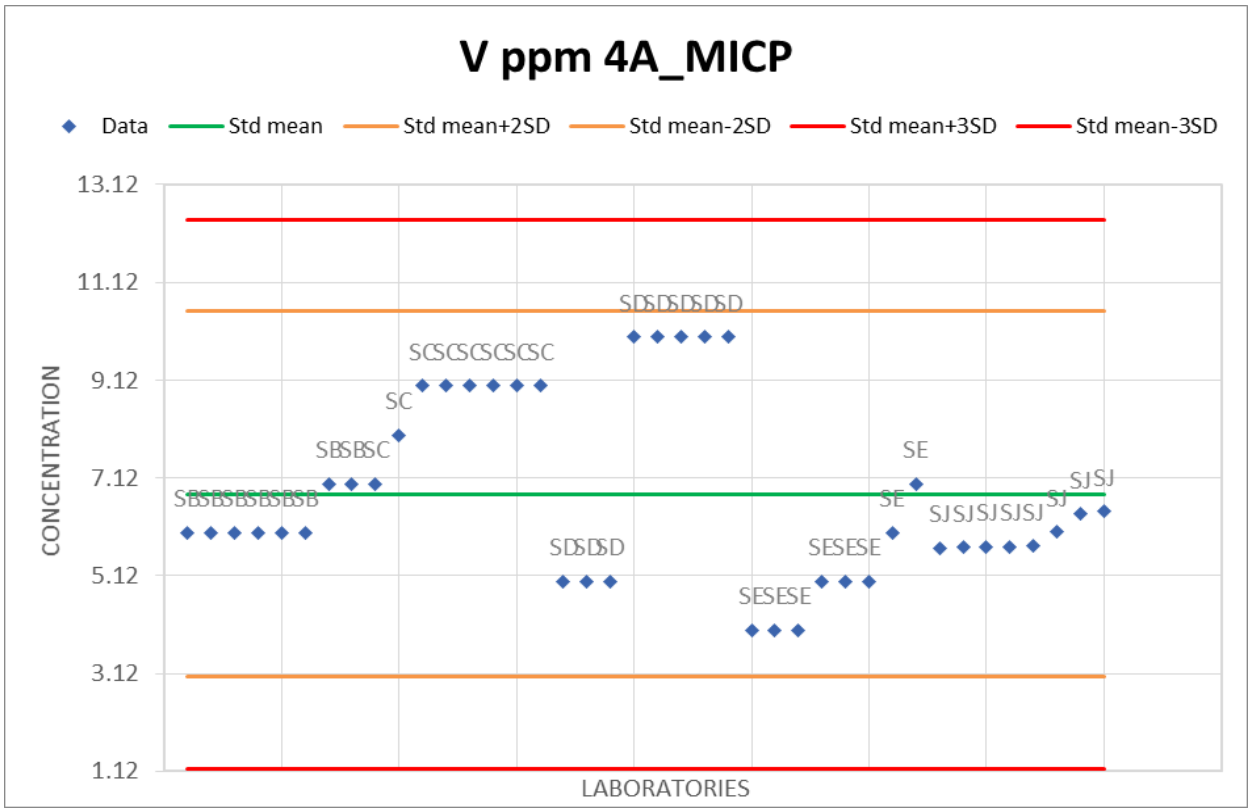
Lab_ID	Z_Score	Data
SB	-0.42	6.00
SB	-0.42	6.00
SB	-0.42	6.00
SB	-0.42	6.00
SB	-0.42	6.00
SB	-0.42	6.00
SB	0.12	7.00
SB	0.12	7.00
SC	0.12	7.00
SC	0.65	8.00
SC	1.19	9.00
SC	1.19	9.00
SC	1.19	9.00
SC	1.19	9.00
SC	1.19	9.00
SC	1.19	9.00
SD	-0.95	5.00
SD	-0.95	5.00
SD	-0.95	5.00
SD	1.72	10.00
SD	1.72	10.00
SD	1.72	10.00
SD	1.72	10.00
SD	1.72	10.00

Lab_ID	Z_Score	Data
SE	-1.49	4.00
SE	-1.49	4.00
SE	-1.49	4.00
SE	-0.95	5.00
SE	-0.95	5.00
SE	-0.95	5.00
SE	-0.42	6.00
SE	0.12	7.00
SJ	-0.59	5.69
SJ	-0.58	5.70
SJ	-0.57	5.71
SJ	-0.57	5.71
SJ	-0.56	5.73
SJ	-0.41	6.01
SJ	-0.22	6.38
SJ	-0.19	6.43

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
V	4A_MICP	40	6.78	1.87	28	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
V	4A_MICP	SB	8	6.250	0.463	0.074	7.407
V	4A_MICP	SC	8	8.625	0.744	0.086	8.626
V	4A_MICP	SD	8	8.125	2.588	0.318	31.849
V	4A_MICP	SE	8	5.000	1.069	0.214	21.381
V	4A_MICP	SJ	8	5.920	0.317	0.054	5.362
			Average	6.784	1.320	0.149	14.925

12.44. V 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
V	4A_MICP	40	6.78	1.87	28	ppm

Std mean	6.784
SD	1.869
2SD	3.737
3SD	5.606
Std mean+2SD	10.521
Std mean-2SD	3.047
Std mean+3SD	12.390
Std mean-3SD	1.178

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
V	4A_MICP	0.852	3.412	1.847	1.320	ppm

Comment: No results were rejected as outliers using z score.

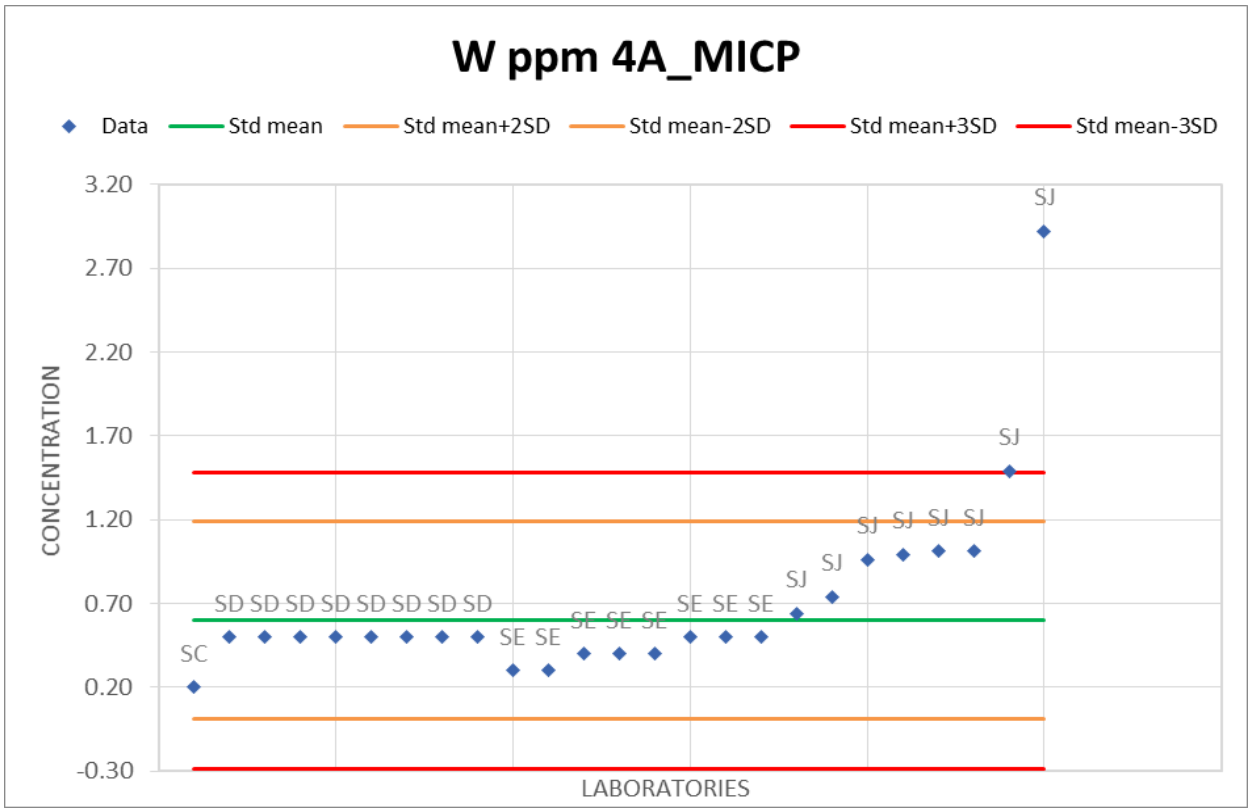
12.45. W 4A_MICP

Lab_ID	Z_Score	Data
SC	-0.90	0.20
SD	-0.35	0.50
SD	-0.35	0.50
SD	-0.35	0.50
SD	-0.35	0.50
SD	-0.35	0.50
SD	-0.35	0.50
SD	-0.35	0.50
SD	-0.35	0.50
SE	-0.71	0.30
SE	-0.71	0.30
SE	-0.53	0.40
SE	-0.53	0.40
SE	-0.53	0.40
SE	-0.35	0.50
SE	-0.35	0.50
SE	-0.35	0.50
SJ	-0.09	0.64
SJ	0.09	0.74
SJ	0.49	0.96
SJ	0.55	0.99
SJ	0.58	1.01
SJ	0.58	1.01
SJ	1.46	1.49

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
W	4A_MICP	25	0.69	0.55	79	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
W	4A_MICP	SC	1	0.200	<0.0001	<0.0001	<0.0001
W	4A_MICP	SD	8	0.500	0.000	0.000	0.000
W	4A_MICP	SE	8	0.413	0.083	0.202	20.231
W	4A_MICP	SJ	8	1.220	0.731	0.599	59.901
			Average	0.583	0.416	0.267	26.711

12.45. W 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
W	4A_MICP	24	0.60	0.29	49	ppm

Std mean	0.598
SD	0.295
2SD	0.590
3SD	0.885
Std mean+2SD	1.187
Std mean-2SD	0.008
Std mean+3SD	1.482
Std mean-3SD	-0.287

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
W	4A_MICP	0.560	0.623	0.789	0.193	ppm

Comment: 1 result out of 25 was rejected as an outlier using z score.

12.46. Y 4A_MICP

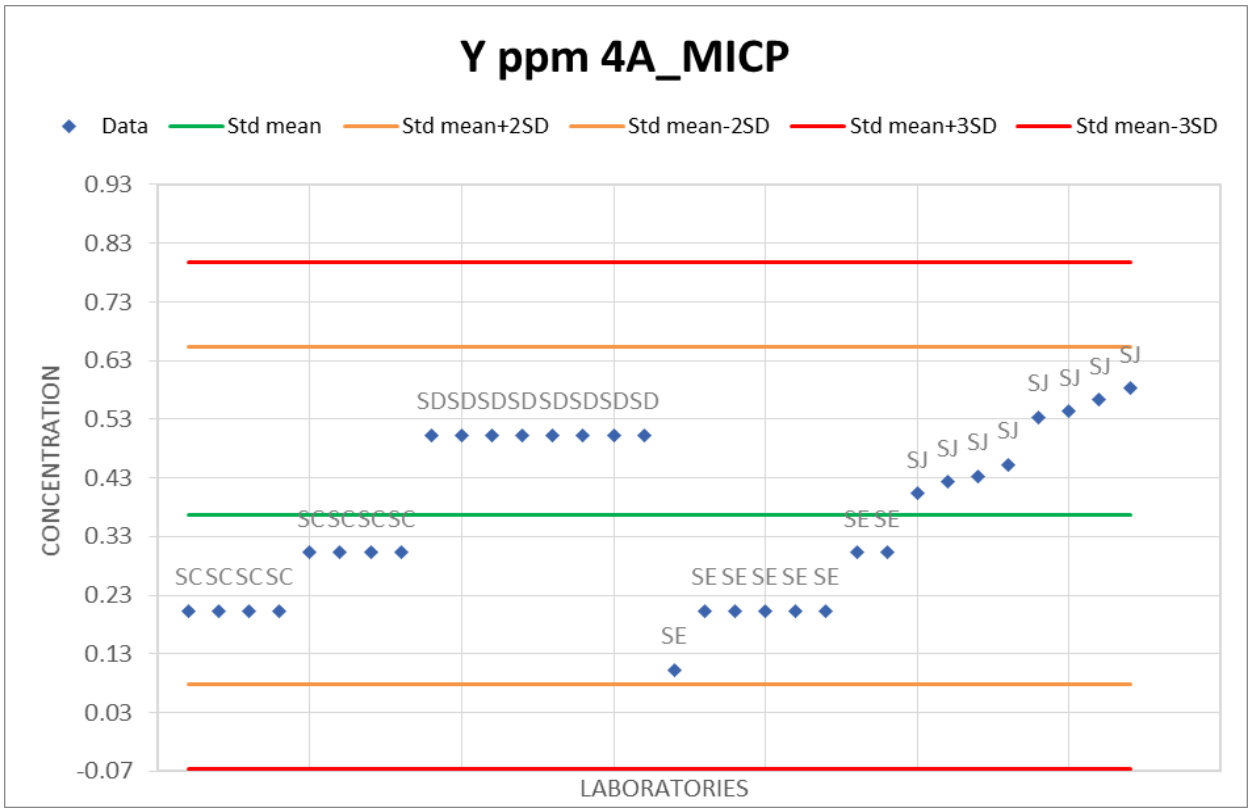
Lab_ID	Z_Score	Data
SC	-1.13	0.20
SC	-1.13	0.20
SC	-1.13	0.20
SC	-1.13	0.20
SC	-0.44	0.30
SC	-0.44	0.30
SC	-0.44	0.30
SC	-0.44	0.30
SD	0.95	0.50
SD	0.95	0.50
SD	0.95	0.50
SD	0.95	0.50
SD	0.95	0.50
SD	0.95	0.50
SD	0.95	0.50
SD	0.95	0.50
SE	-1.82	0.10
SE	-1.13	0.20
SE	-1.13	0.20
SE	-1.13	0.20
SE	-1.13	0.20
SE	-1.13	0.20
SE	-0.44	0.30
SE	-0.44	0.30

Lab_ID	Z_Score	Data
SJ	0.26	0.40
SJ	0.40	0.42
SJ	0.47	0.43
SJ	0.60	0.45
SJ	1.16	0.53
SJ	1.23	0.54
SJ	1.37	0.56
SJ	1.51	0.58

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Y	4A_MICP	32	0.36	0.14	40	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Y	4A_MICP	SC	8	0.250	0.053	0.214	21.381
Y	4A_MICP	SD	8	0.500	0.000	0.000	0.000
Y	4A_MICP	SE	8	0.213	0.064	0.302	30.159
Y	4A_MICP	SJ	8	0.489	0.071	0.145	14.527
			Average	0.363	0.055	0.165	16.517

12.46. Y 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Y	4A_MICP	32	0.36	0.14	40	ppm

Std mean	0.363
SD	0.144
2SD	0.288
3SD	0.432
Std mean+2SD	0.651
Std mean-2SD	0.075
Std mean+3SD	0.795
Std mean-3SD	-0.070

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Y	4A_MICP	0.150	0.067	0.259	0.063	ppm

Comment: No results were rejected as outliers using z score.

12.47. Zn 4A_MICP

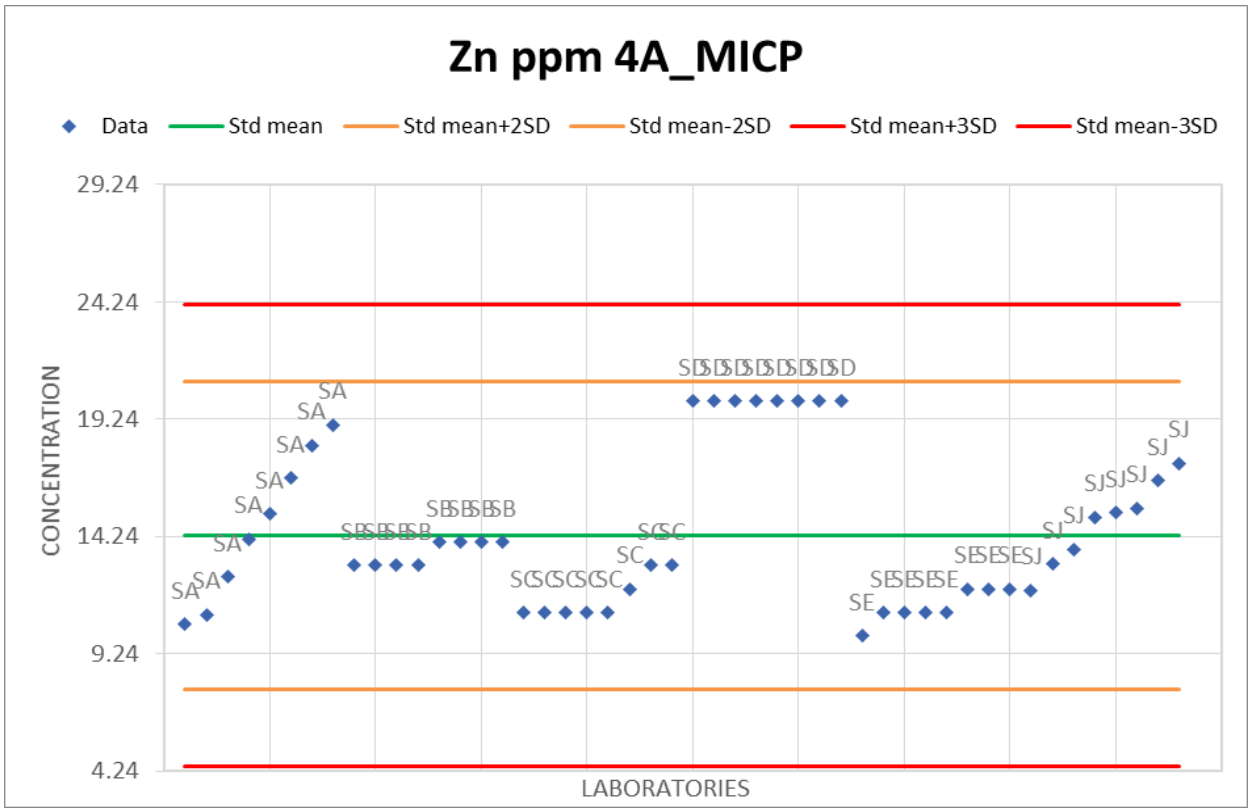
Lab_ID	Z_Score	Data
SA	-1.16	10.50
SA	-1.03	10.91
SA	-0.54	12.52
SA	-0.05	14.13
SA	0.27	15.19
SA	0.74	16.74
SA	1.16	18.12
SA	1.43	19.01
SB	-0.40	13.00
SB	-0.40	13.00
SB	-0.40	13.00
SB	-0.40	13.00
SB	-0.09	14.00
SB	-0.09	14.00
SB	-0.09	14.00
SB	-0.09	14.00
SC	-1.01	11.00
SC	-1.01	11.00
SC	-1.01	11.00
SC	-1.01	11.00
SC	-1.01	11.00
SC	-0.70	12.00
SC	-0.40	13.00
SC	-0.40	13.00

Lab_ID	Z_Score	Data
SD	1.74	20.00
SD	1.74	20.00
SD	1.74	20.00
SD	1.74	20.00
SD	1.74	20.00
SD	1.74	20.00
SD	1.74	20.00
SD	1.74	20.00
SE	-1.31	10.00
SE	-1.01	11.00
SE	-1.01	11.00
SE	-1.01	11.00
SE	-1.01	11.00
SE	-0.70	12.00
SE	-0.70	12.00
SE	-0.70	12.00
SJ	-0.72	11.94
SJ	-0.38	13.07
SJ	-0.18	13.70
SJ	0.23	15.07
SJ	0.29	15.26
SJ	0.35	15.44
SJ	0.71	16.62
SJ	0.93	17.37

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Zn	4A_MICP	48	14.30	3.28	23	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Zn	4A_MICP	SA	8	14.640	3.201	0.219	21.865
Zn	4A_MICP	SB	8	13.500	0.535	0.040	3.959
Zn	4A_MICP	SC	8	11.625	0.916	0.079	7.881
Zn	4A_MICP	SD	8	20.000	0.000	0.000	0.000
Zn	4A_MICP	SE	8	11.250	0.707	0.063	6.285
Zn	4A_MICP	SJ	8	14.809	1.812	0.122	12.239
			Average	14.304	1.589	0.087	8.705

12.47. Zn 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Zn	4A_MICP	48	14.30	3.28	23	ppm

Std mean	14.304
SD	3.280
2SD	6.561
3SD	9.841
Std mean+2SD	20.865
Std mean-2SD	7.743
Std mean+3SD	24.145
Std mean-3SD	4.462

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Zn	4A_MICP	1.164	6.401	2.530	1.741	ppm

Comment: No results were rejected as outliers using z score.

12.48. Zr 4A_MICP

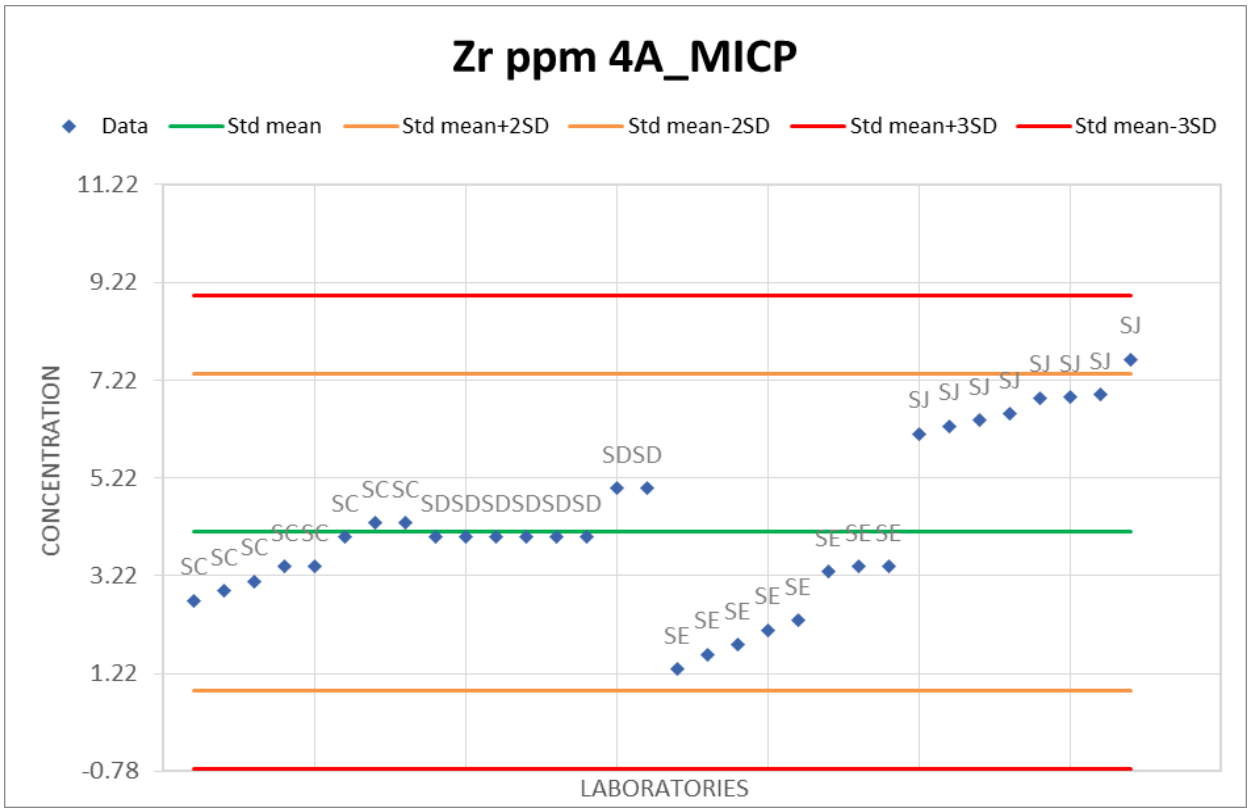
Lab_ID	Z_Score	Data
SC	-0.89	2.70
SC	-0.77	2.90
SC	-0.65	3.10
SC	-0.48	3.40
SC	-0.48	3.40
SC	-0.13	4.00
SC	0.05	4.30
SC	0.05	4.30
SD	-0.13	4.00
SD	-0.13	4.00
SD	-0.13	4.00
SD	-0.13	4.00
SD	-0.13	4.00
SD	-0.13	4.00
SD	0.46	5.00
SD	0.46	5.00
SE	-1.71	1.30
SE	-1.53	1.60
SE	-1.41	1.80
SE	-1.24	2.10
SE	-1.12	2.30
SE	-0.54	3.30
SE	-0.48	3.40
SE	-0.48	3.40

Lab_ID	Z_Score	Data
SJ	1.11	6.12
SJ	1.20	6.27
SJ	1.27	6.39
SJ	1.35	6.53
SJ	1.54	6.85
SJ	1.55	6.86
SJ	1.58	6.92
SJ	2.00	7.64

Results with outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Zr	4A_MICP	32	4.22	1.71	41	ppm

Between Laboratory Statistics							
Element	Gen Method	Lab ID	N	LAB_Mean	LAB_SD	RSD	RSD_%
Zr	4A_MICP	SC	8	3.513	0.622	0.177	17.710
Zr	4A_MICP	SD	8	4.250	0.463	0.109	10.892
Zr	4A_MICP	SE	8	2.400	0.855	0.356	35.635
Zr	4A_MICP	SJ	8	6.698	0.482	0.072	7.197
			Average	4.215	0.626	0.179	17.858

12.48. Zr 4A_MICP (cont.)



Results without outliers						
Element	Gen Method	N	Std_Mean	SD	RSD_%	Unit
Zr	4A_MICP	31	4.10	1.62	39	ppm

Std mean	4.105
SD	1.617
2SD	3.234
3SD	4.852
Std mean+2SD	7.339
Std mean-2SD	0.870
Std mean+3SD	8.956
Std mean-3SD	-0.747

Measurement of uncertainty						
Element	Gen Method	CSU	BtwnLabVar	BtwnLabSD	WithinLabSD	Unit
Zr	4A_MICP	1.190	5.618	2.370	0.607	ppm

Comment: 1 result out of 32 was rejected as an outlier using z score.

End of Report