Test Group Summary Report C39 Inorganics by TCLP June 2025 PT Round

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1.0 The Proficiency Testing Report

The Proficiency Testing Report consists of two parts.

- PTC Proficiency Testing Report: This report contains participant-specific data and other confidential information. This report is emailed to participants at the end of the PT round.
- Test Group Summary Report: A Test Group Summary Report is created for each quantified test group at the end of the PT round. These reports contain more detailed information on the round than is found in the participant-specific PTC Proficiency Testing Report. These reports do not contain any confidential information and are made available on the PTC web site.

2.0 Definitions

The PTC Proficiency Testing Reports contain some terms that new participants may not be familiar with:

PT Code: The PT Code is unique to each analyte that a participant is registered for.

Lab Info: If a participant is accredited by CALA, this three-digit number in the Laboratory Information

is the appendix number that the accredited method is assigned to.

N: The number of participants results that were used to calculate the summary statistics. This

excludes qualified data (e.g., <) and any results that were flagged as outliers.

Assigned Value: The Assigned Value is the Robust Mean of the reported results, outliers excluded. This is

often referred to as the "target" value.

Reported Value: The result reported by the participant.

SDPTA: The Standard Deviation of Proficiency Testing Assessment; this value is used to determine

the acceptance limits for the PT evaluation. The calculations examine the Robust Standard Deviation (from consensus STD) and Regression Standard Deviation (STD from historical studies or TNI limits); and, if any, Homogeneity and Stability flags to determine the SDPTA

(whichever is higher).

z-Score: A value assigned to each reported result that is a measure of the degree to which it deviates

from the Assigned Value.

PT Score: The composite score of the four results reported for each analyte. It is normalized to a score

out of 100.

Bias: A flag assigned if bias is detected using the re-scaled z-score procedure.

U: The Uncertainty of the assigned value.

3.0 Scoring System

Participant performance is evaluated for each proficiency testing sample by a quantitative method that is consistent with ISO/IEC 17043 - Conformity assessment- General requirements for the competence of proficiency testing providers, the International Harmonized Protocol for Proficiency Testing of (Chemical) Analytical Laboratories (2006), and ISO 13528 Statistical methods for use in proficiency testing by interlaboratory comparison.

The following is a brief description of the evaluation procedure used by PTC. The detailed evaluation procedure is described in PROC09 – PT Evaluation *Procedure*, which is available on the PTC website www.PTCanada.org).

3.1 HOMOGENEITY AND STABILITY ASSESSMENT

Homogeneity and stability are assessed using participant data. Regression analysis is performed on reported result against order of sample production (Homogeneity) and reported result against date of analysis (Stability). If the slope is significantly different than zero for either then the Standard Deviation of Proficiency Assessment (s) is increased to minimize the impact.

3.2 THE Z SCORE

A "z-score" is calculated for each reported result as follows:

$$z-Score = \frac{(x-\bar{X})}{SDPA} \qquad \text{where:} \quad \frac{\text{x = participant result;}}{\bar{X} \text{= the Assigned Value;}} \\ \text{SDPA = the Standard Deviation for Proficiency Assessment.}$$

The assigned value X is generally estimated from the inter-laboratory Robust mean after outliers due to obvious gross errors (e.g., reported in wrong units) have been removed.

The Standard Deviation for Proficiency Assessment, s, is determined as follows:

- The inter-laboratory Robust standard deviation (Stdev_{rob}) is calculated using reported results, obvious outliers removed;
- The regression equation standard deviation (Stdev_{reg}) is estimated from regression equations derived from previous studies (see PROC11- PT Regression Equations for details);
- The SDPA is the higher of Stdev_{rob} and Stdev_{reg};
- When a laboratory reports its detection limit, s will be estimated using a pooled variance procedure that uses both the inter-laboratory data and the reported detection limit.

3.2 COMPOSITE (PT) SCORE

Since each PT round involves four or two separate samples of distinct concentration for each test, it is necessary to calculate a composite PT score for each test to determine overall performance. The composite score is calculated by first averaging the absolute z-scores for the four results and then calculating a final score as $100 + (-15 \times avg |z|)$.

Acceptable PT Scores equal or exceed 70.

3.3 IDENTIFYING BIAS

The proficiency testing report provides flags for bias. These are determined using the re-scaled z-score procedure.

$$RSZ = \frac{\Box z}{\sqrt{N}}$$
 where z = the z- score N = the number of samples

Flags are assigned for each test group/parameter combination as follows:

$$RSZ \ge -2$$
 and ≤ 2 no flag assigned

RSZ > 2 H (High) RSZ > 3 VH (Very High) RSZ < -2 L (LOW) RSZ < -3 VL (Very Low)

3.4 DEVIATIONS FROM EVALUATION PROCEDURE

Other than changes to the Standard Deviation of Proficiency Assessment due to homogeneity or stability flags, any deviation from the published evaluation procedure is described on the cover page(s) of the final PTC Proficiency Testing Report.

4.0 PT Round Specific Data Summary

The following pages provide more detailed information about the PT round indicated in the cover page of this report than is found in the participant-specific PTC Proficiency Testing Report. The graphical representations and the statistical summaries are based upon the data after outliers have been removed.

4.1 SUMMARY STATISTICS

In addition to some of the statistics found in the customer reports, this table includes additional summary statistics such as Median, different measures of dispersion, the number of outliers removed, the number of results in the Questionable range (z > 3), and the Unacceptable range (z > 3), and whether a data set was flagged for Homogeneity or Stability. This section also includes sorted scatter plots of the data for each sample.

4.2 z-SCORE PLOTS

The z -scores for each sample are ranked in increasing order and plotted. When the data is normally distributed, the plot should show a slight sigmoidal curve, with an equal number of points above zero as below. Each bar in these plots is colour-coded to indicate the analytical method used by the participant.

4.3 KERNEL DENSITY PLOTS

Kernel density plots are generated for each data set. These plots are a graphical way to represent the overall data distribution and are used to visualize possible deviations from normality and unimodality.

4.4 STABILITY AND HOMOGENEITY PLOTS

Plots of reported result against analysis date, and reported result against order of bottling are displayed, along with the regression line. These regression analyses are used to determine if the SDPA should be adjusted due to homogeneity or stability.

4.5 BOX-AND-WHISKER PLOTS

Box-and-Whisker plots are another way to display the distribution of the data. The box denotes the first and third quartile and the whiskers are the 5^{th} and 95th percentile.

4.6 HISTORIC COMPARISON PLOT

The Historic Comparison Plot is a plot of robust mean against robust standard deviation for the previous ten PT rounds as well as the current PT round. This plot can be used to identify possible changes in the sample formulation.

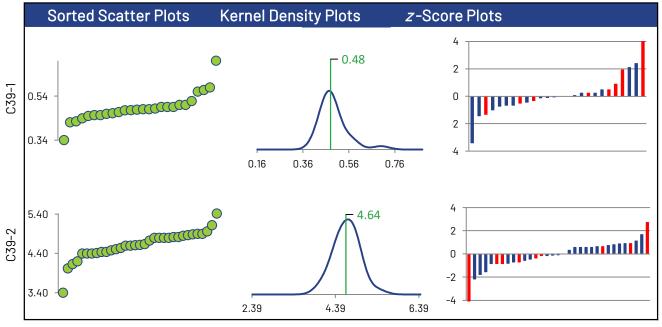
Arsenic

Summary Statistics

Statistic	C39-1	C39-2	C39-3	C39-4
No. of results used for summary statistics	26	33	0	0
Median mg/L	0.479	4.62		
Robust Mean mg/L	0.480	4.64		
Uncdrtainty of the Assigned Value mg/L	0.0101	0.0627		
Robust Standard Deviation mg/L	0.0412	0.288		
Regression Standard Deviation mg/L				
Stability Flag				
Homogeneity Flag				
Standard Deviation Used (SDPA) mg/L	0.0412	0.288		
Flagged Outliers	0	1	0	0
z >3.0	2	1	0	0
2< z <3	2	2	0	0
Failure Rate %*		8	.8	

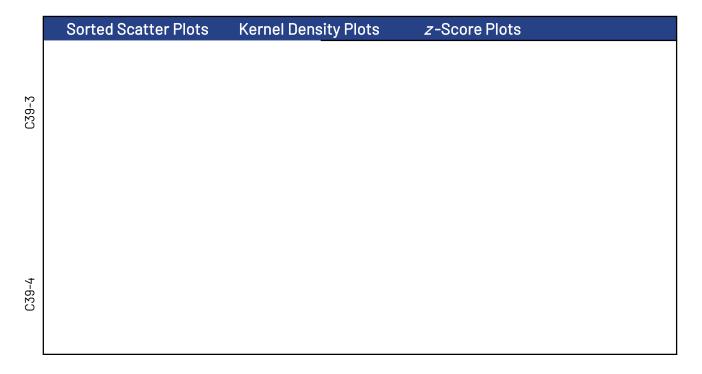
Methods Used

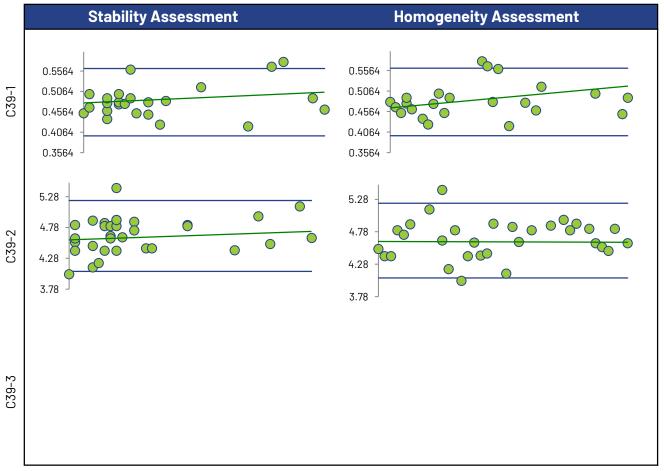
Method	C39-1	C39-2	C39-3	C39-4
ICP/MS(Blue)	18	24	0	0
ICP/0ES(Red)	8	9	0	0



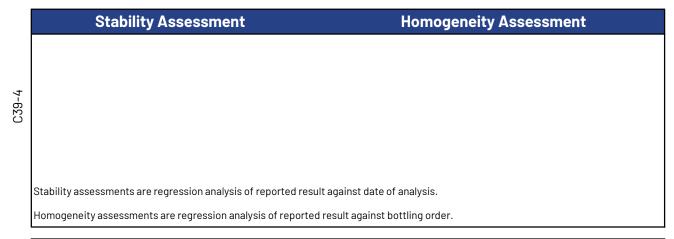
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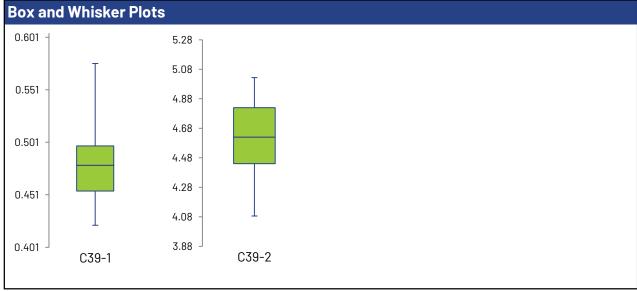
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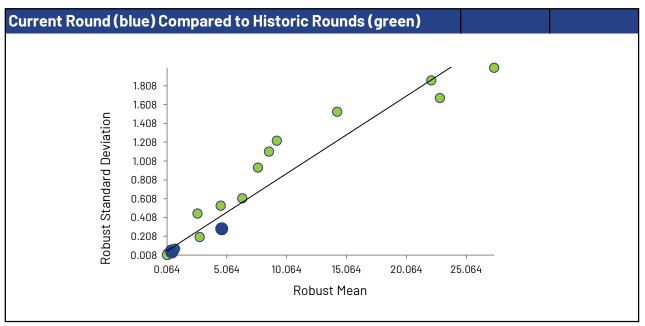




Arsenic







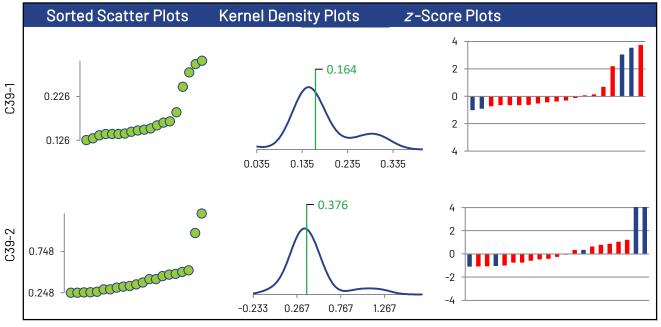
Barium

Summary Statistics

Statistic	C39-1	C39-2	C39-3	C39-4
No. of results used for summary statistics	19	21	0	0
Median mg/L	0.150	0.350		
Robust Mean mg/L	0.164	0.376		
Uncdrtainty of the Assigned Value mg/L	0.0111	0.0333		
Robust Standard Deviation mg/L	0.0386	0.122		
Regression Standard Deviation mg/L				
Stability Flag				
Homogeneity Flag				
Standard Deviation Used (SDPA) mg/L	0.0386	0.122		
Flagged Outliers	0	0	0	0
z >3.0	3	2	0	0
2< z <3	1	0	0	0
Failure Rate %*		0	.0	

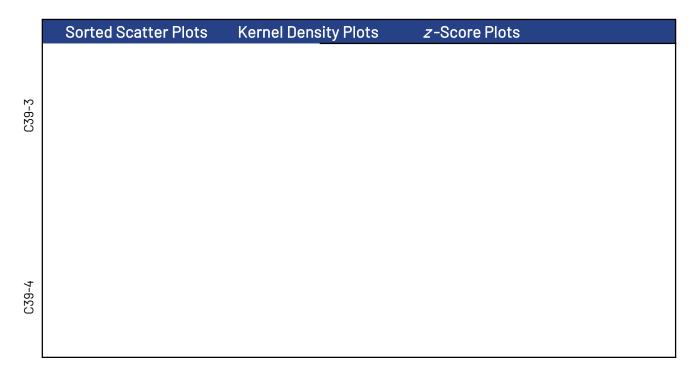
Methods Used

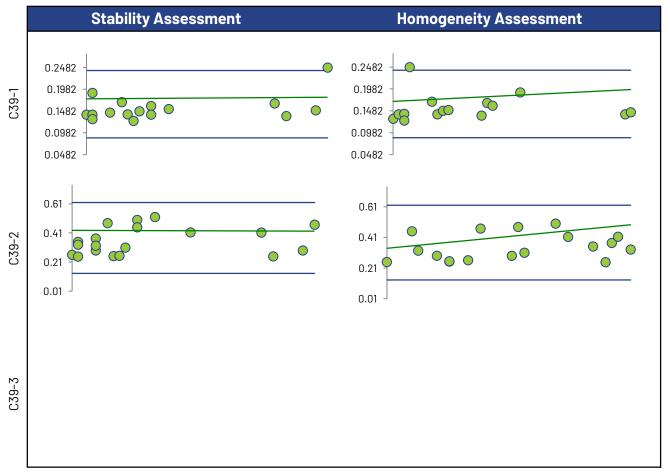
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ICP/0ES (Blue)	4	5	0	0
ICP/MS(Red)	15	16	0	0



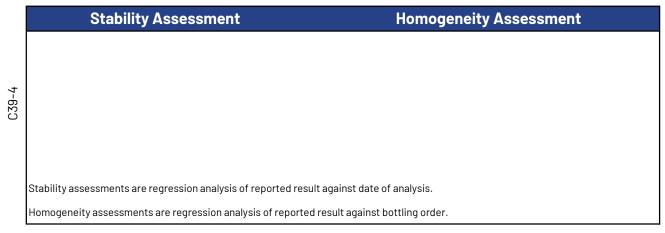
^{*} Displayed failure rate does not account for the RDL modified z-Scores or inaccurately reported non-detects.

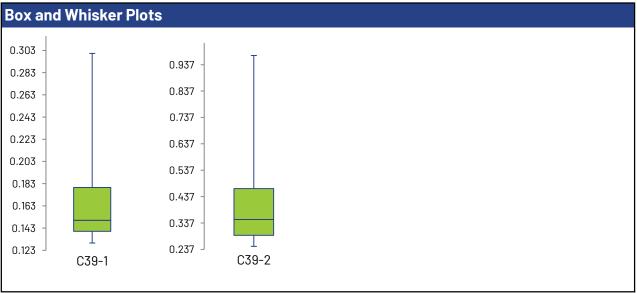
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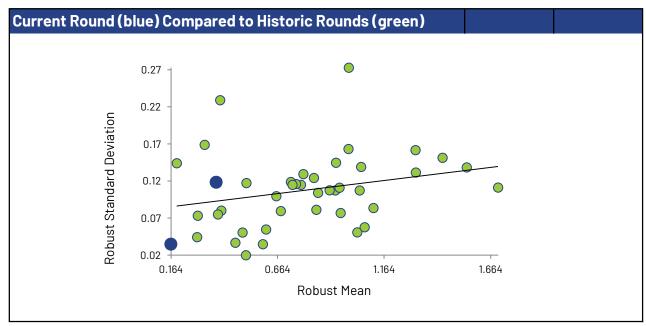




Barium







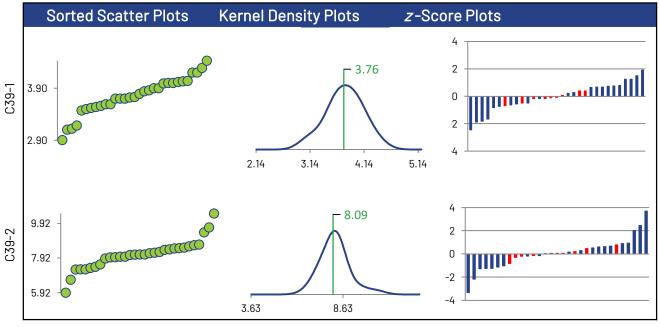
Boron

Summary Statistics

Statistic	C39-1	C39-2	C39-3	C39-4
No. of results used for summary statistics	31	31	0	0
Median mg/L	3.73	8.13		
Robust Mean mg/L	3.76	8.09		
Uncdrtainty of the Assigned Value mg/L	0.0784	0.147		
Robust Standard Deviation mg/L	0.349	0.654		
Regression Standard Deviation mg/L				
Stability Flag				
Homogeneity Flag				
Standard Deviation Used (SDPA) mg/L	0.349	0.654		
Flagged Outliers	0	0	0	0
z >3.0	0	2	0	0
2< z <3	1	3	0	0
Failure Rate %*		3	.1	

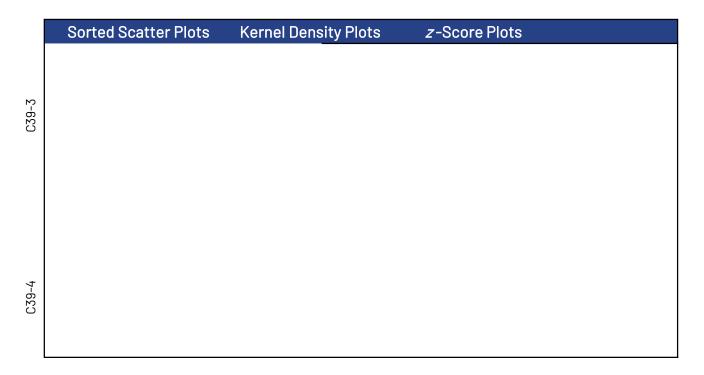
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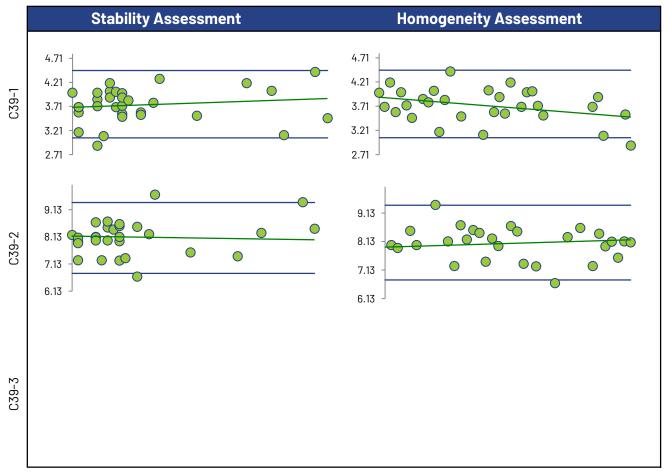
Method	C39-1	C39-2	C39-3	C39-4
ICP/MS(Blue)	22	22	0	0
ICP/0ES(Red)	9	9	0	0



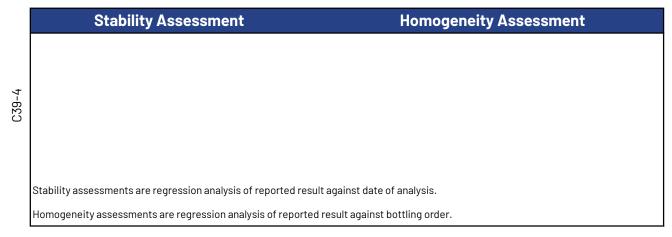
^{*} Displayed failure rate does not account for the RDL modified z-Scores or inaccurately reported non-detects.

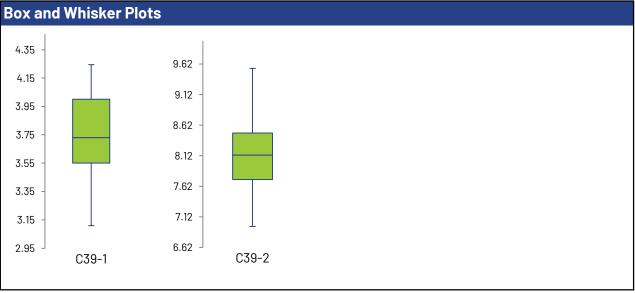
Boron

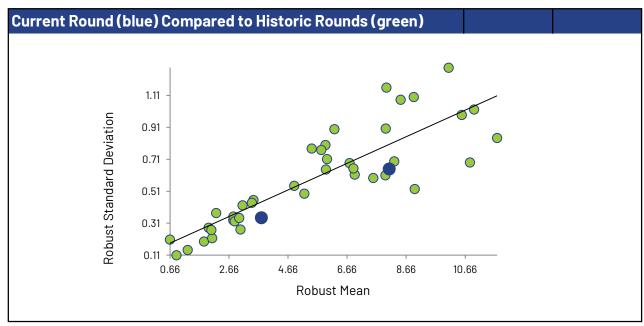




Boron







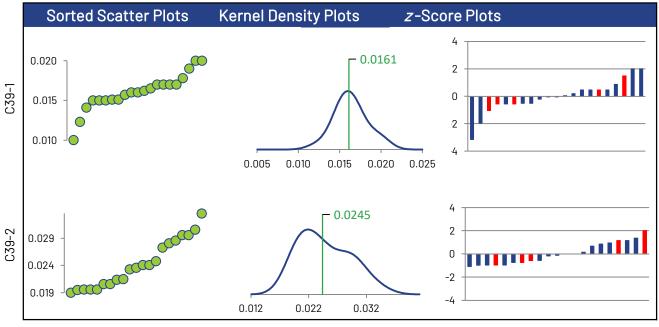
Cadmium

Summary Statistics

Statistic	C39-1	C39-2	C39-3	C39-4
No. of results used for summary statistics	21	21	0	0
Median mg/L	0.0160	0.0240		
Robust Mean mg/L	0.0161	0.0245		
Uncdrtainty of the Assigned Value mg/L	0.000526	0.00129		
Robust Standard Deviation mg/L	0.00193	0.00473		
Regression Standard Deviation mg/L				
Stability Flag				
Homogeneity Flag				
Standard Deviation Used (SDPA) mg/L	0.00193	0.00473		
Flagged Outliers	0	0	0	0
z >3.0	1	0	0	0
2< z <3	2	1	0	0
Failure Rate %*		0	.0	

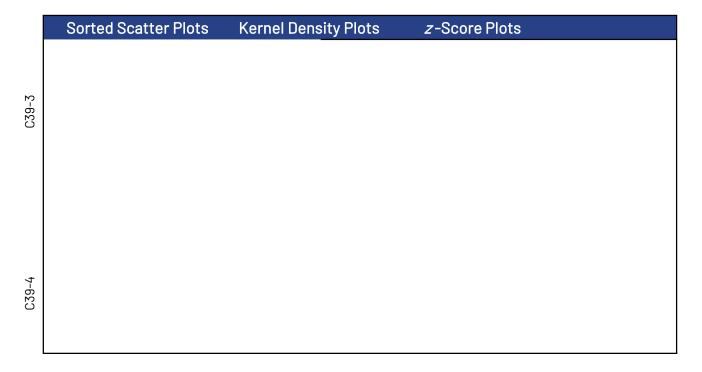
Methods Used

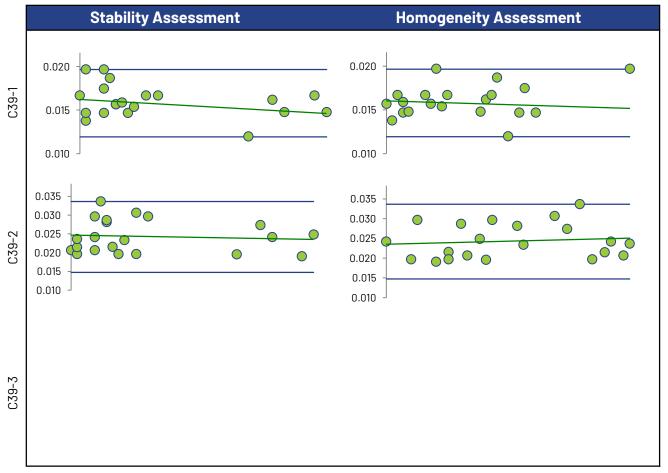
Method	C39-1	C39-2	C39-3	C39-4
ICP/MS (Blue)	16	16	0	0
ICP/0ES(Red)	5	5	0	0



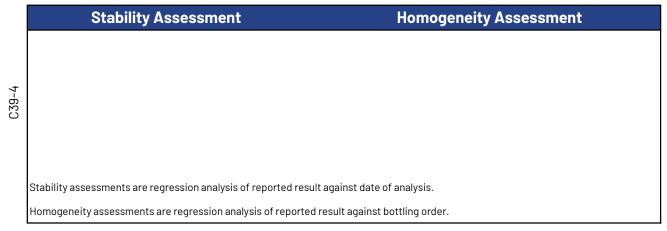
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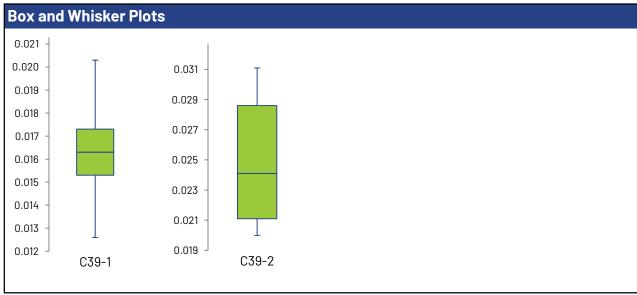
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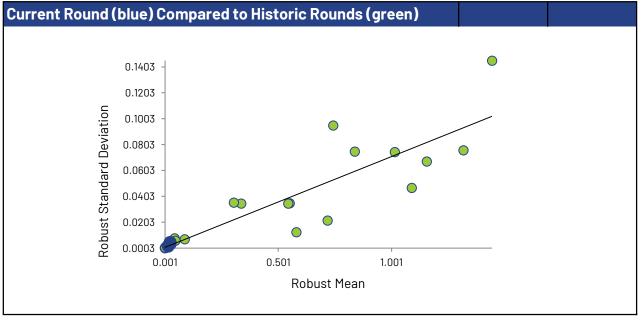




Cadmium







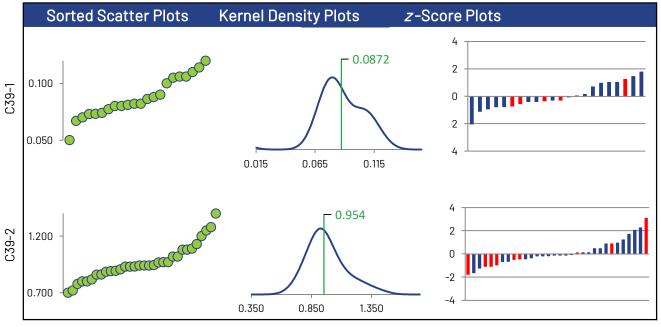
Chromium

Summary Statistics

Statistic	C39-1	C39-2	C39-3	C39-4
No. of results used for summary statistics	22	32	0	0
Median mg/L	0.0820	0.940		
Robust Mean mg/L	0.0872	0.954		
Uncdrtainty of the Assigned Value mg/L	0.00490	0.0320		
Robust Standard Deviation mg/L	0.0184	0.145		
Regression Standard Deviation mg/L				
Stability Flag				
Homogeneity Flag				
Standard Deviation Used (SDPA) mg/L	0.0184	0.145		
Flagged Outliers	0	0	0	0
z >3.0	0	1	0	0
2< z <3	1	2	0	0
Failure Rate %*		2	.9	

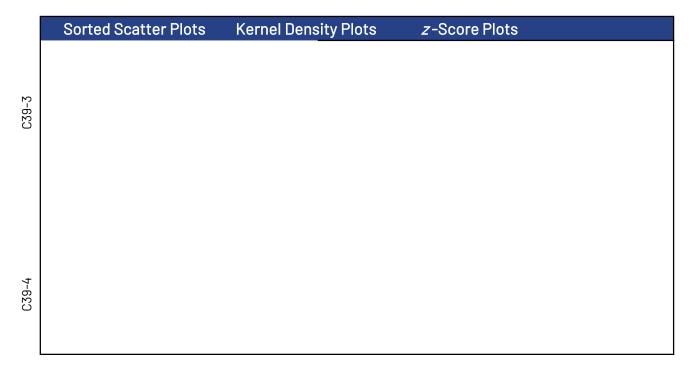
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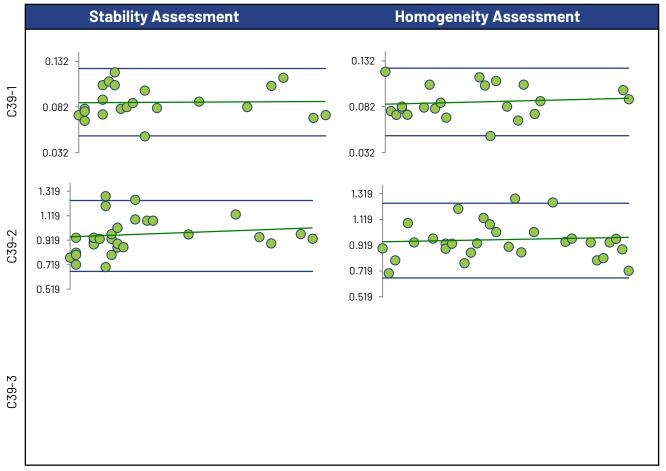
Method	C39-1	C39-2	C39-3	C39-4
ICP/MS(Blue)	16	23	0	0
ICP/0ES(Red)	6	9	0	0



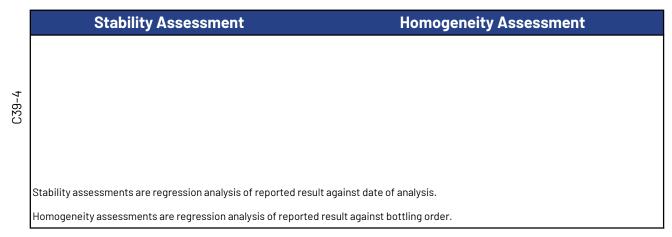
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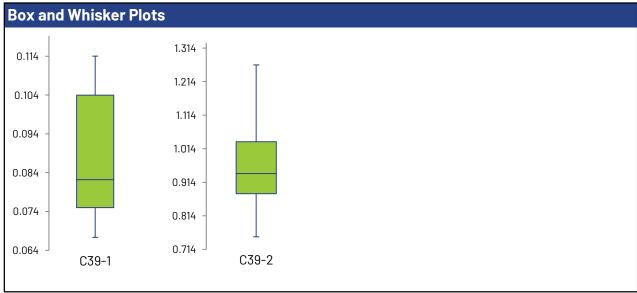
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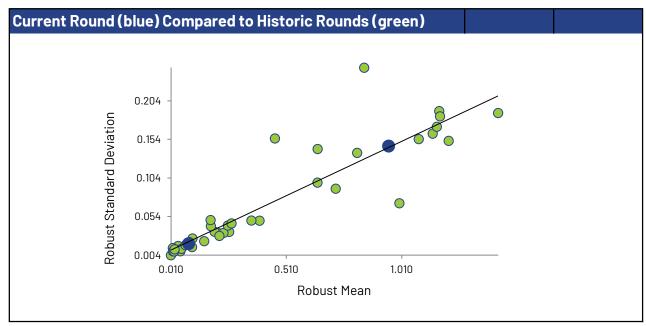




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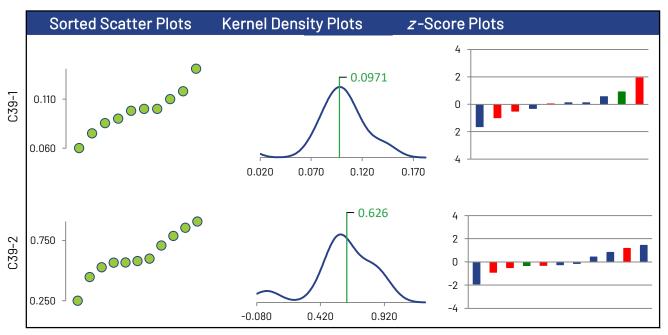
Cyanide (WAD)

Summary Statistics

Statistic	C39-1	C39-2	C39-3	C39-4
No. of results used for summary statistics	10	11	0	0
Median mg/L	0.0990	0.581		
Robust Mean mg/L	0.0971	0.626		
Uncdrtainty of the Assigned Value mg/L	0.00893	0.0750		
Robust Standard Deviation mg/L	0.0226	0.199		
Regression Standard Deviation mg/L				
Stability Flag				
Homogeneity Flag				
Standard Deviation Used (SDPA) mg/L	0.0226	0.199		
Flagged Outliers	0	0	0	0
z >3.0	0	0	0	0
2< z <3	0	0	0	0
Failure Rate %*		0.	.0	

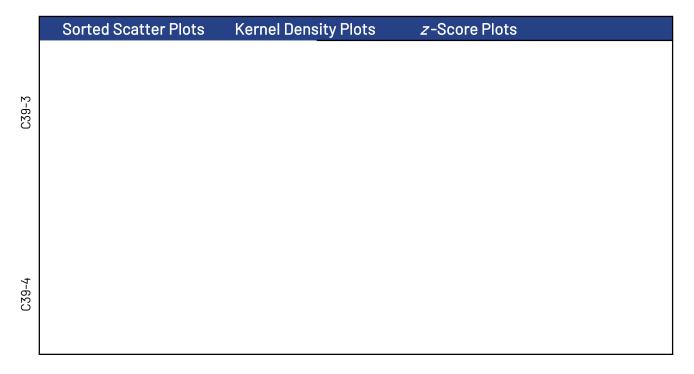
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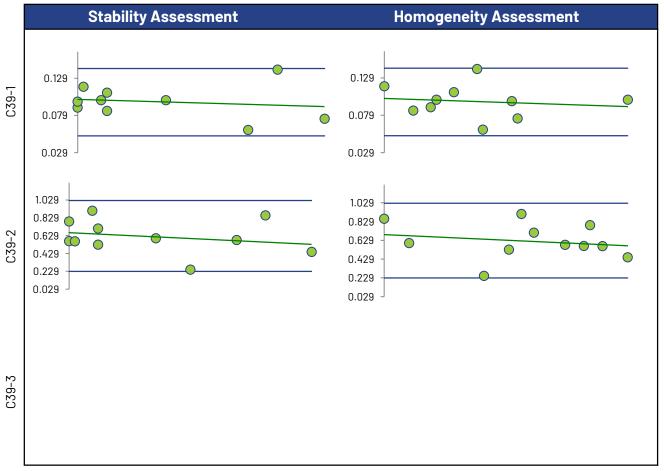
Method	C39-1	C39-2	C39-3	C39-4
AUTO COLOR (Blue)	5	6	0	0
COLORIMETRIC (Red)	4	4	0	0
SELECTIVE ION ELECTRODE (Green)	1	1	0	0



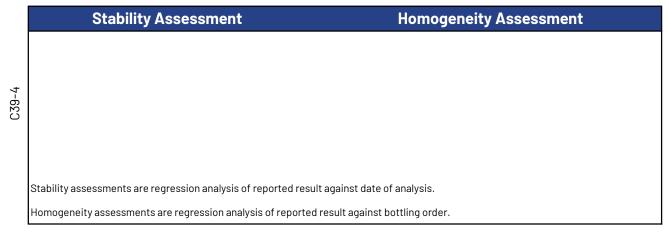
^{*} Displayed failure rate does not account for the RDL modified z-Scores or inaccurately reported non-detects.

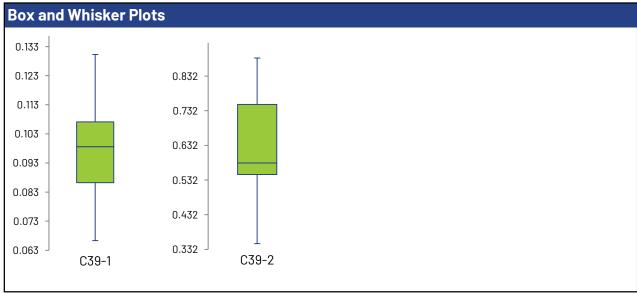
Cyanide (WAD)

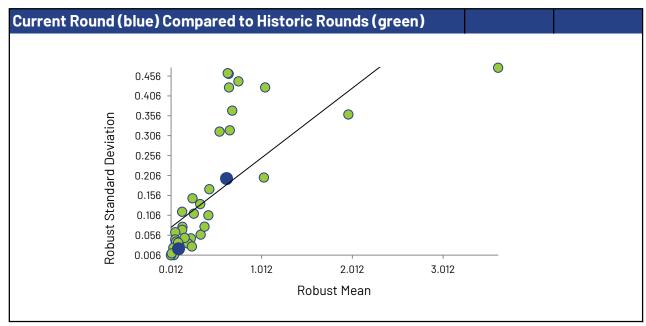




Cyanide (WAD)







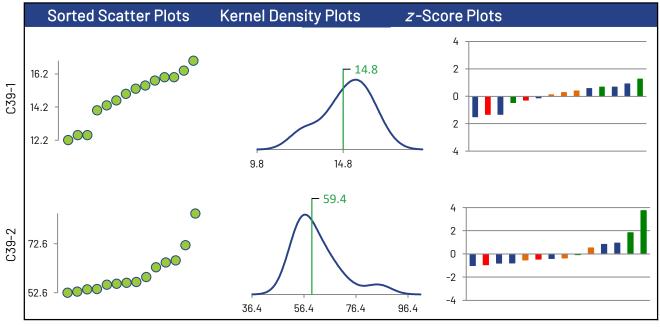
Fluoride

Summary Statistics

Statistic	C39-1	C39-2	C39-3	C39-4
No. of results used for summary statistics	14	14	0	0
Median mg/L	15.2	56.9		
Robust Mean mg/L	14.8	59.4		
Uncdrtainty of the Assigned Value mg/L	0.578	2.30		
Robust Standard Deviation mg/L	1.73	6.87		
Regression Standard Deviation mg/L				
Stability Flag				
Homogeneity Flag				
Standard Deviation Used (SDPA) mg/L	1.73	6.87		
Flagged Outliers	0	0	0	0
z >3.0	0	1	0	0
2< z <3	0	0	0	0
Failure Rate %*		7	.1	

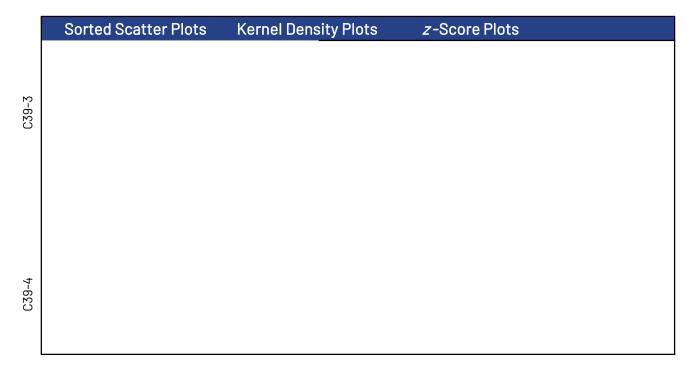
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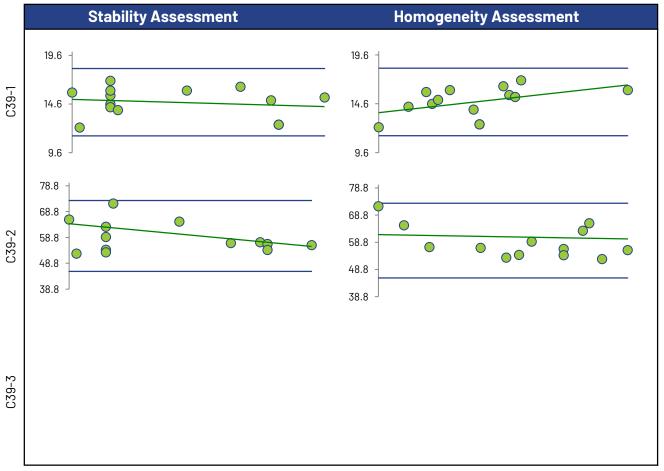
Method	C39-1	C39-2	C39-3	C39-4
SELECTIVE ION ELECTRODE (Blue)	6	6	0	0
TITRIMETRIC (Red)	2	2	0	0
ION CHROMATOGRAPHY (Green)	3	3	0	0
COLORIMETRIC (Orange)	3	3	0	0



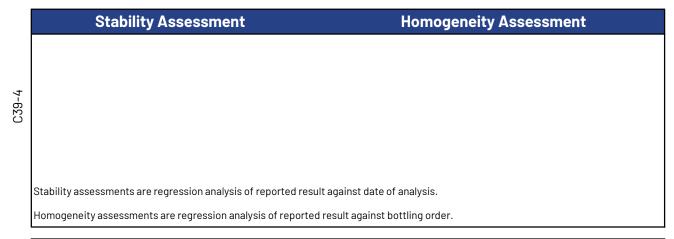
^{*} Displayed failure rate does not account for the RDL modified z-Scores or inaccurately reported non-detects.

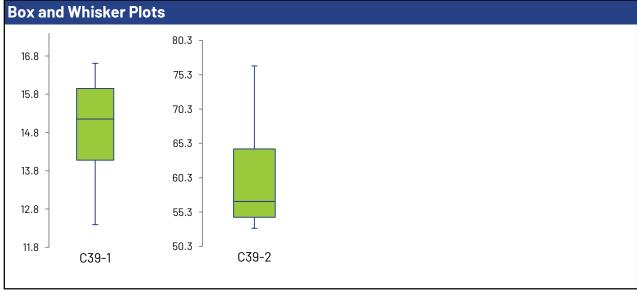
Fluoride

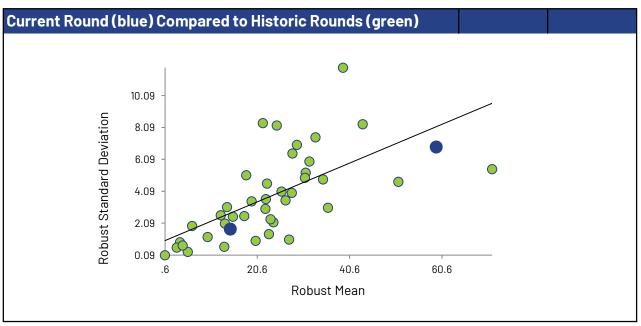




Fluoride







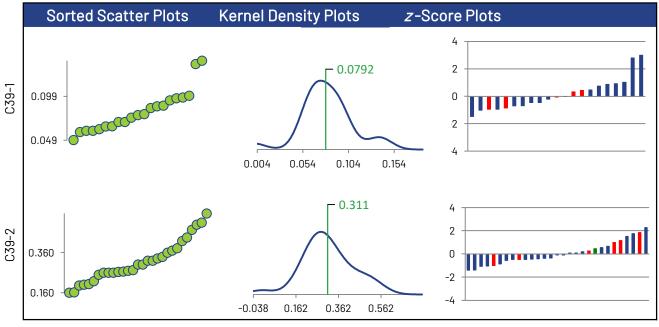
Lead

Summary Statistics

Statistic	C39-1	C39-2	C39-3	C39-4
No. of results used for summary statistics	21	29	0	0
Median mg/L	0.0780	0.301		
Robust Mean mg/L	0.0792	0.311		
Uncdrtainty of the Assigned Value mg/L	0.00551	0.0251		
Robust Standard Deviation mg/L	0.0202	0.108		
Regression Standard Deviation mg/L				
Stability Flag				
Homogeneity Flag				
Standard Deviation Used (SDPA) mg/L	0.0202	0.108		
Flagged Outliers	0	0	0	0
z >3.0	1	0	0	0
2< z <3	1	1	0	0
Failure Rate %*	_	0	.0	

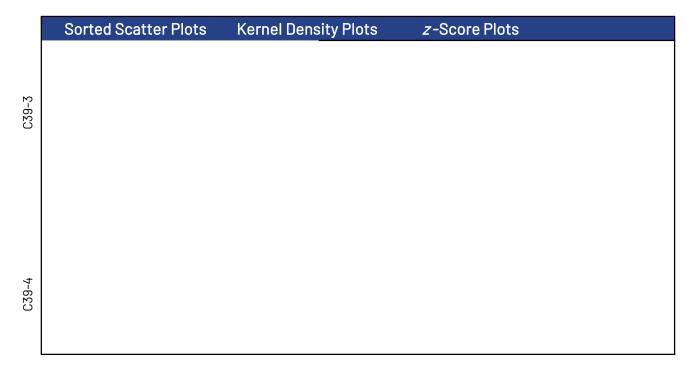
Methods Used

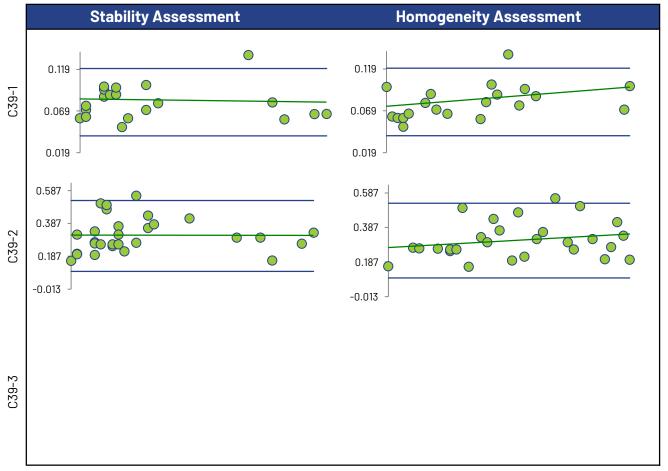
Method	C39-1	C39-2	C39-3	C39-4
ICP/MS (Blue)	16	22	0	0
ICP/0ES(Red)	5	6	0	0
AA FLAME (Green)	0	1	0	0



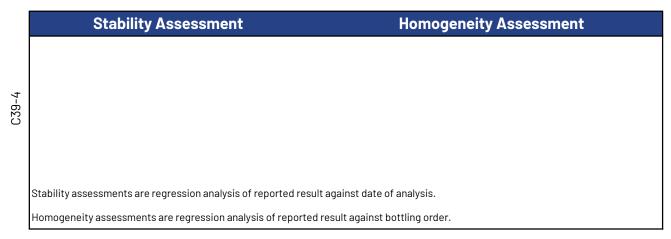
^{*} Displayed failure rate does not account for the RDL modified z-Scores or inaccurately reported non-detects.

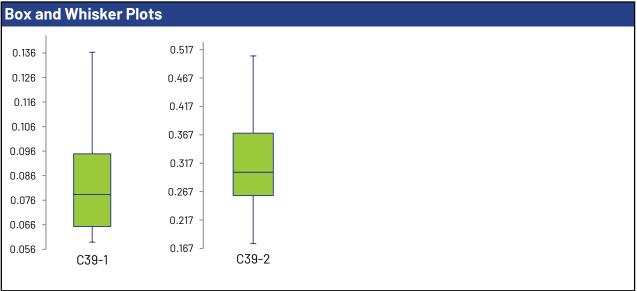
Lead

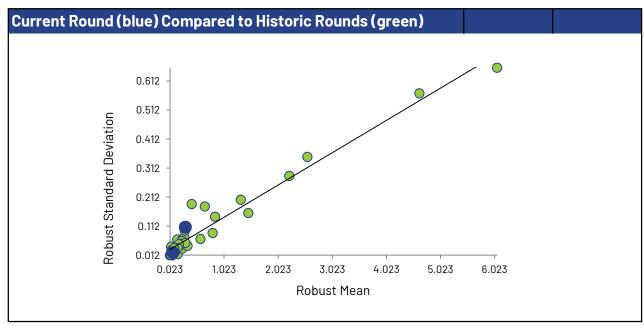




Lead







Mercury

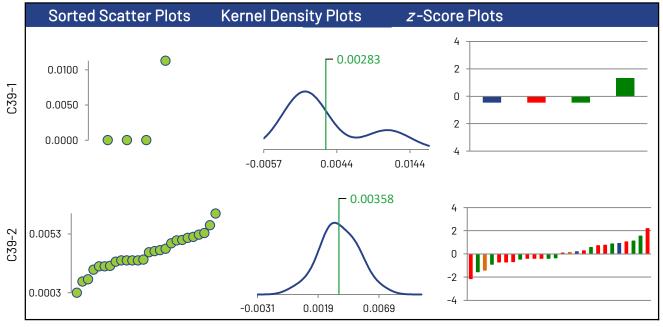
Summary Statistics

Excluded

Statistic	C39-1	C39-2	C39-3	C39-4
No. of results used for summary statistics	4	26	0	0
Median mg/L	0.00000750	0.00339		
Robust Mean mg/L	0.00283	0.00358		
Uncdrtainty of the Assigned Value mg/L	0.00400	0.000382		
Robust Standard Deviation mg/L	0.00640	0.00156		
Regression Standard Deviation mg/L				
Stability Flag				
Homogeneity Flag				
Standard Deviation Used (SDPA) mg/L	0.00640	0.00156		
Flagged Outliers	0	2	0	0
z >3.0	0	0	0	0
2< z <3	0	2	0	0
Failure Rate %*		2	.9	

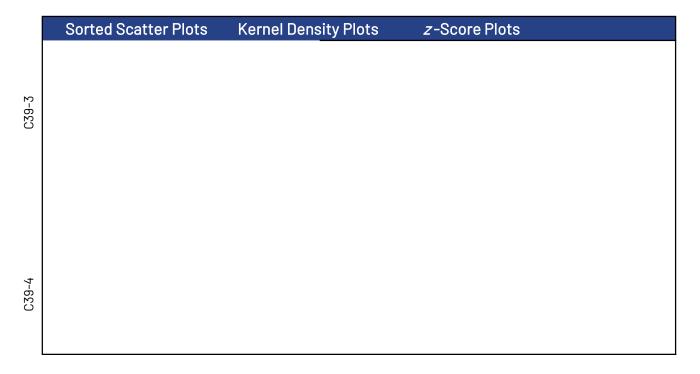
Methods Used

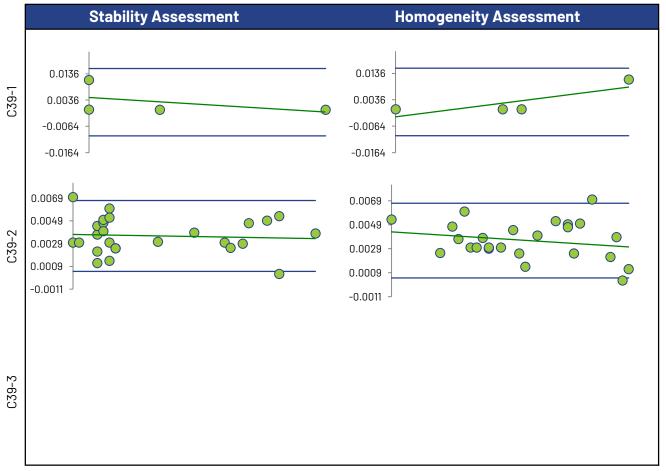
	Method	C39-1	C39-2	C39-3	C39-4
	ICP/0ES (Blue)	1	2	0	0
	COLD VAPOUR AA (Red)	1	13	0	0
	ICP/MS (Green)	2	9	0	0
4TOM	IC FLUORESCENCE SPECTROPHOTOMETRY (Orange)	0	2	0	0



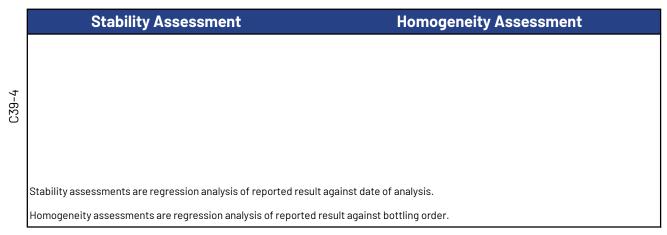
^{*} Displayed failure rate does not account for the RDL modified z-Scores or inaccurately reported non-detects.

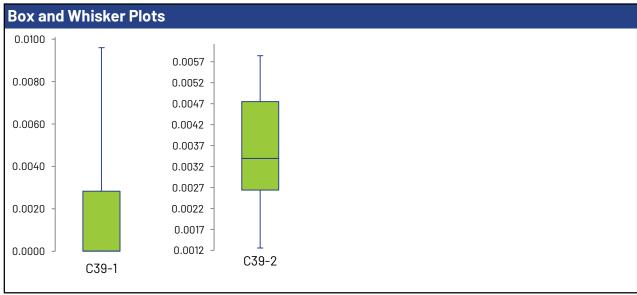
Mercury

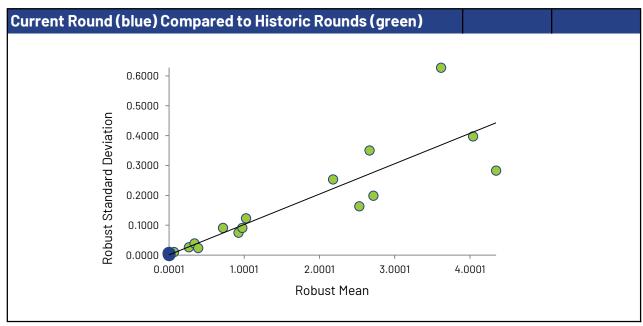




Mercury







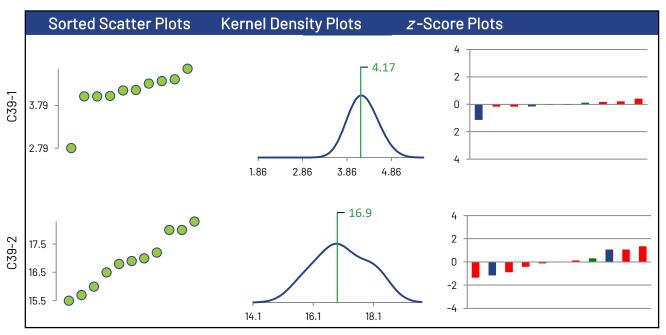
Nitrate

Summary Statistics

Statistic	C39-1	C39-2	C39-3	C39-4
No. of results used for summary statistics	10	11	0	0
Median mg/L	4.15	16.9		
Robust Mean mg/L	4.17	16.9		
Uncdrtainty of the Assigned Value mg/L	0.104	0.403		
Robust Standard Deviation mg/L	0.263	1.07		
Regression Standard Deviation mg/L				
Stability Flag	Stability			
Homogeneity Flag				
Standard Deviation Used (SDPA) mg/L	1.24	1.07		
Flagged Outliers	0	0	0	0
z >3.0	0	0	0	0
2< z <3	0	0	0	0
Failure Rate %*		0	.0	

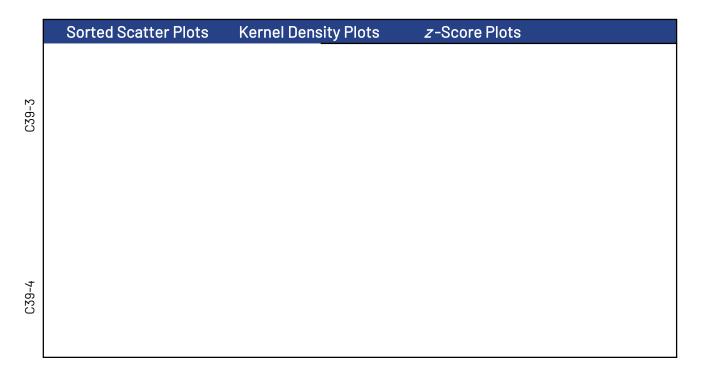
Methods Used

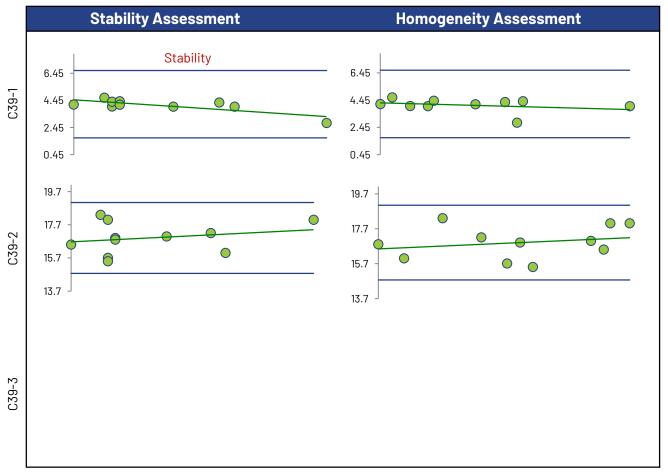
Method	C39-1	C39-2	C39-3	C39-4
COLORIMETRIC (Blue)	2	2	0	0
ION CHROMATOGRAPHY (Red)	7	8	0	0
AUTO COLOR (Green)	1	1	0	0



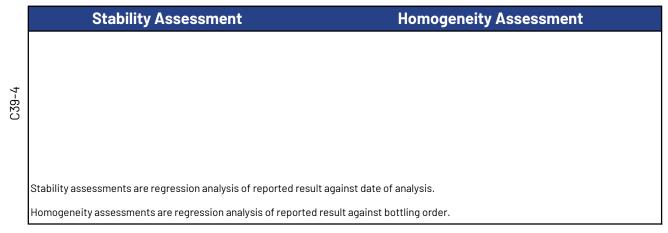
^{*} Displayed failure rate does not account for the RDL modified z-Scores or inaccurately reported non-detects.

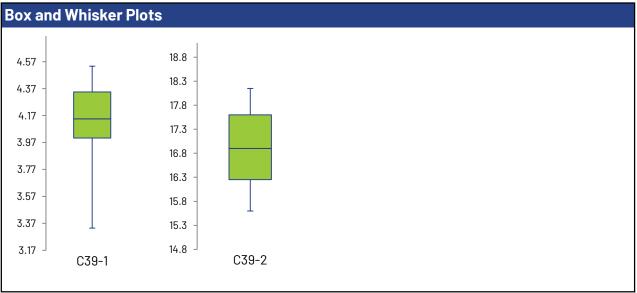
Nitrate

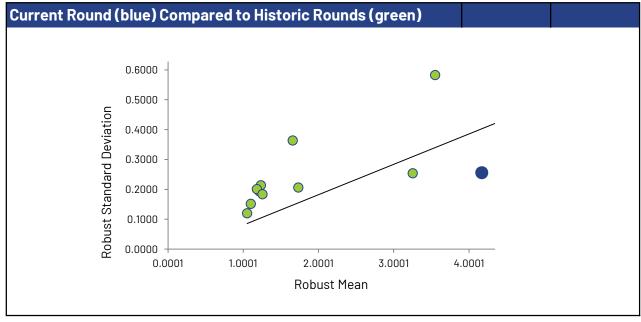




Nitrate







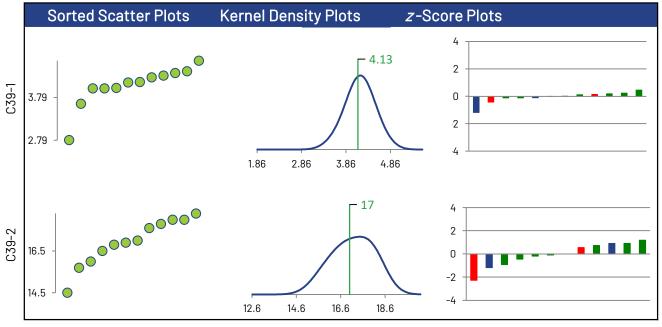
Nitrate plus Nitrite

Summary Statistics

Statistic	C39-1	C39-2	C39-3	C39-4
No. of results used for summary statistics	12	12	0	0
Median mg/L	4.15	17.0		
Robust Mean mg/L	4.13	17.0		
Uncdrtainty of the Assigned Value mg/L	0.122	0.397		
Robust Standard Deviation mg/L	0.337	1.10		
Regression Standard Deviation mg/L				
Stability Flag	Stability			
Homogeneity Flag				
Standard Deviation Used (SDPA) mg/L	1.13	1.10		
Flagged Outliers	0	0	0	0
z >3.0	0	0	0	0
2< z <3	0	1	0	0
Failure Rate %*		0	.0	

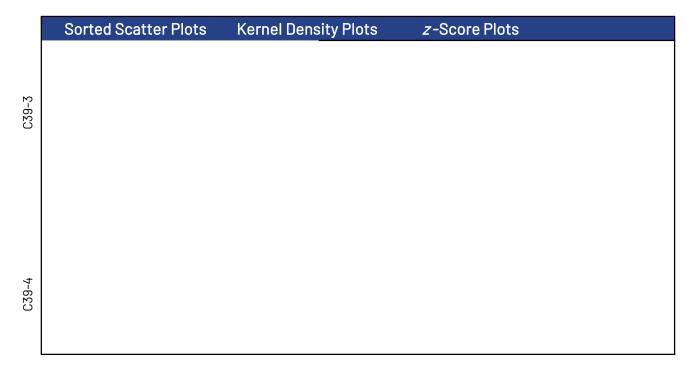
Methods Used

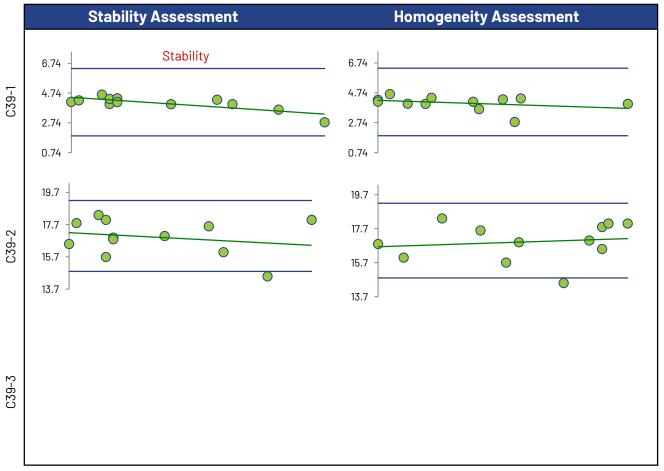
Method	C39-1	C39-2	C39-3	C39-4
COLORIMETRIC (Blue)	2	2	0	0
AUTO COLOR (Red)	2	2	0	0
ION CHROMATOGRAPHY (Green)	8	8	0	0



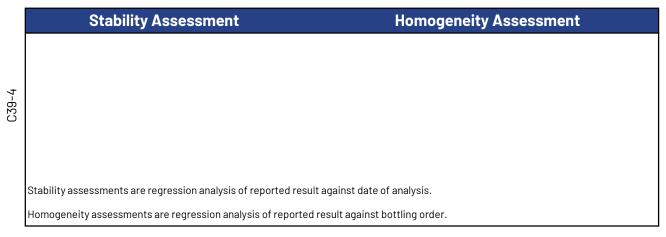
^{*} Displayed failure rate does not account for the RDL modified z-Scores or inaccurately reported non-detects.

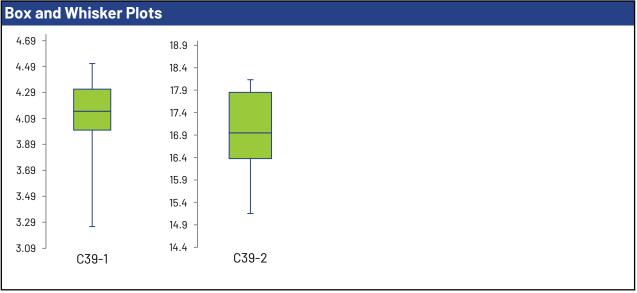
Nitrate plus Nitrite

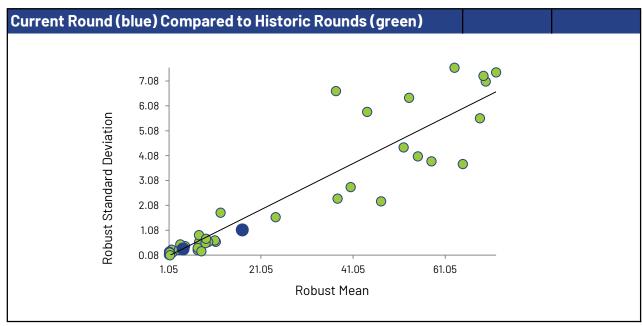




Nitrate plus Nitrite







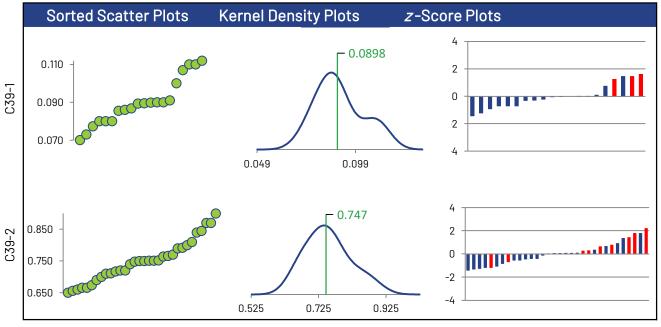
Selenium

Summary Statistics

Statistic	C39-1	C39-2	C39-3	C39-4
No. of results used for summary statistics	20	32	0	0
Median mg/L	0.0894	0.750		
Robust Mean mg/L	0.0898	0.747		
Uncdrtainty of the Assigned Value mg/L	0.00386	0.0154		
Robust Standard Deviation mg/L	0.0138	0.0698		
Regression Standard Deviation mg/L				
Stability Flag				
Homogeneity Flag				
Standard Deviation Used (SDPA) mg/L	0.0138	0.0698		
Flagged Outliers	0	0	0	0
z >3.0	0	0	0	0
2< z <3	0	1	0	0
Failure Rate %*		3.	.0	

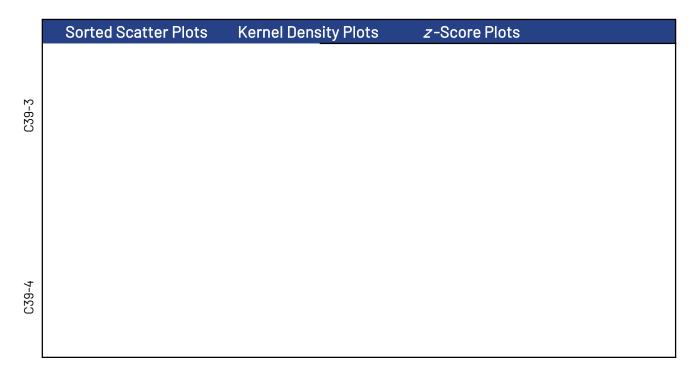
Methods Used

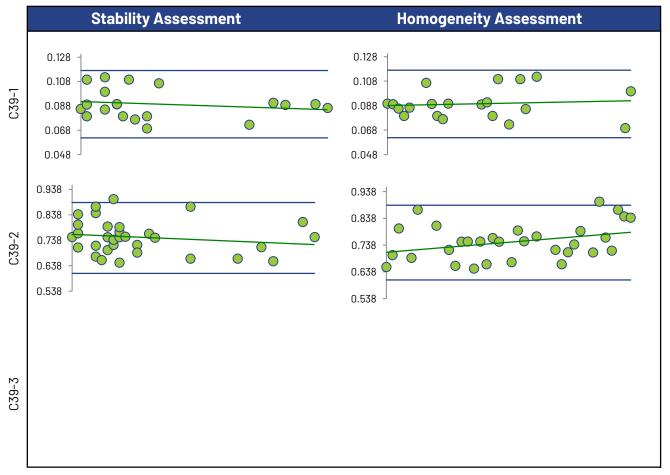
Method	C39-1	C39-2	C39-3	C39-4
ICP/MS (Blue)	16	23	0	0
ICP/0ES(Red)	4	9	0	0



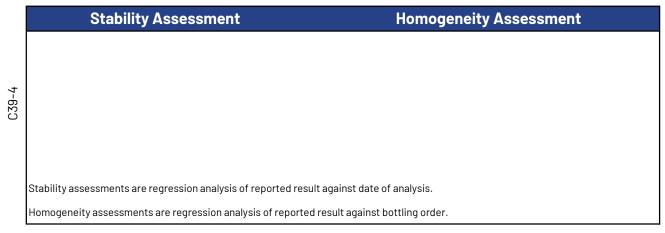
^{*} Displayed failure rate does not account for the RDL modified z-Scores or inaccurately reported non-detects.

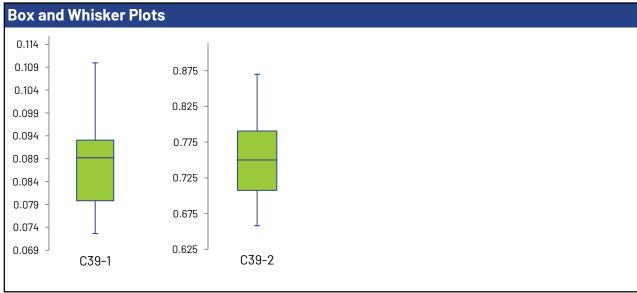
Selenium

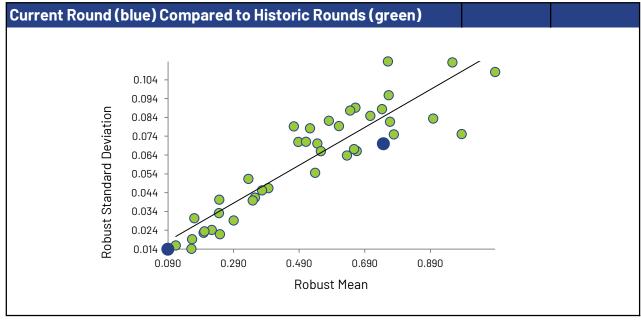




Selenium







Silver

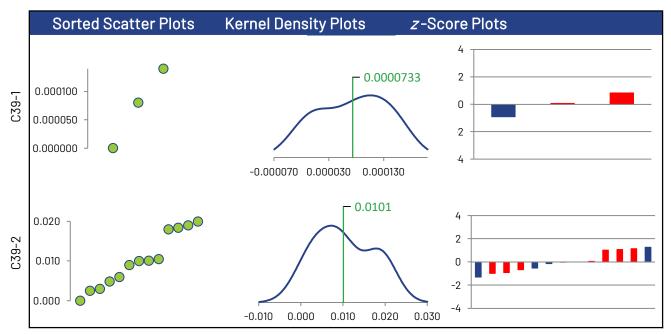
Summary Statistics

Excluded

•				
Statistic	C39-1	C39-2	C39-3	C39-4
No. of results used for summary statistics	3	13	0	0
Median mg/L	0.0000800	0.0100		
Robust Mean mg/L	0.0000733	0.0101		
Uncdrtainty of the Assigned Value mg/L	0.0000574	0.00270		
Robust Standard Deviation mg/L	0.0000796	0.00778		
Regression Standard Deviation mg/L				
Stability Flag				
Homogeneity Flag				
Standard Deviation Used (SDPA) mg/L	0.0000796	0.00778		
Flagged Outliers	0	0	0	0
z >3.0	0	0	0	0
2< z <3	0	0	0	0
Failure Rate %*	0.0			

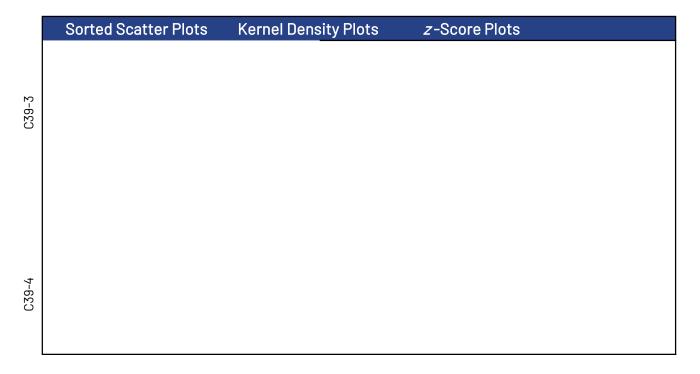
Methods Used

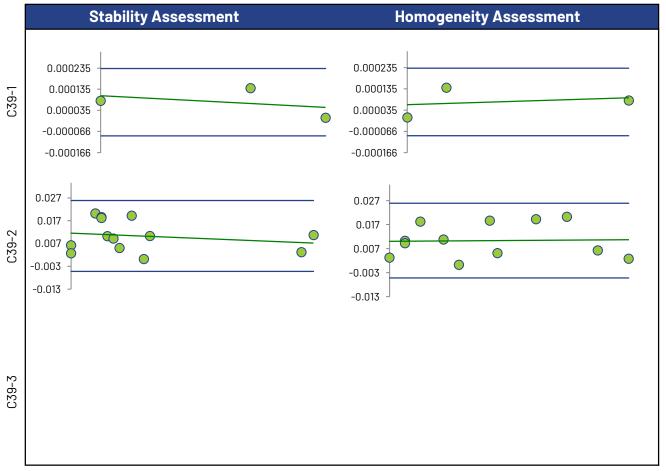
Method	C39-1	C39-2	C39-3	C39-4
ICP/0ES (Blue)	1	4	0	0
ICP/MS(Red)	2	9	0	0



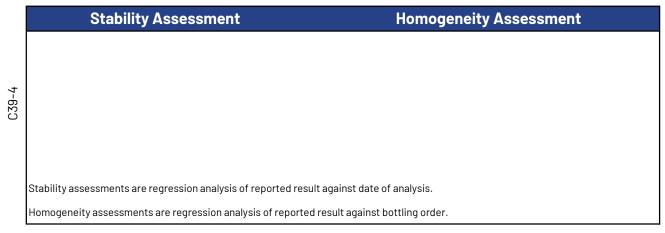
^{*} Displayed failure rate does not account for the RDL modified z-Scores or inaccurately reported non-detects.

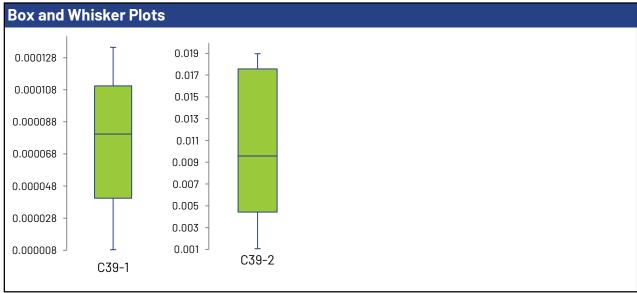
Silver

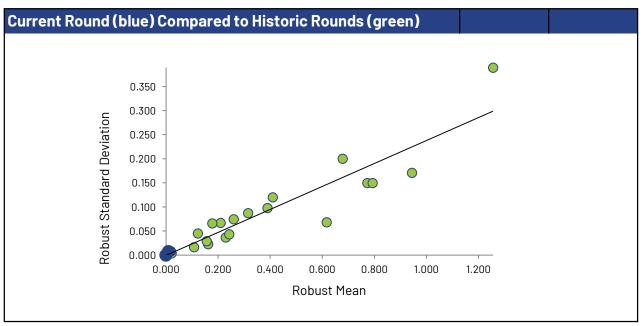




Silver







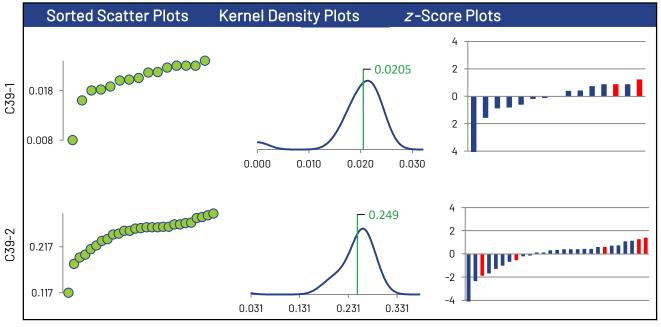
Uranium

Summary Statistics

Statistic	C39-1	C39-2	C39-3	C39-4
No. of results used for summary statistics	15	27	0	0
Median mg/L	0.0205	0.258		
Robust Mean mg/L	0.0205	0.249		
Uncdrtainty of the Assigned Value mg/L	0.000936	0.00719		
Robust Standard Deviation mg/L	0.00290	0.0299		
Regression Standard Deviation mg/L				
Stability Flag				
Homogeneity Flag				
Standard Deviation Used (SDPA) mg/L	0.00290	0.0299		
Flagged Outliers	1	0	0	0
z >3.0	1	1	0	0
2< z <3	0	1	0	0
Failure Rate %*	3.2			

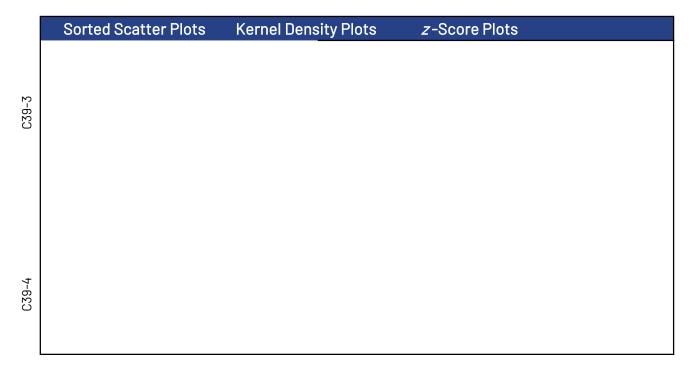
Methods Used

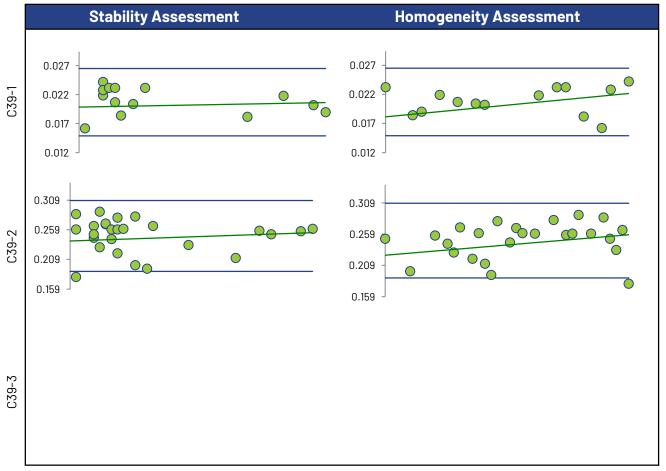
Method	C39-1	C39-2	C39-3	C39-4
ICP/MS(Blue)	13	22	0	0
ICP/0ES(Red)	2	5	0	0



^{*} Displayed failure rate does not account for the RDL modified z-Scores or inaccurately reported non-detects.

Uranium





Uranium

