Analyte

Summary Statistics

Statistical reports have been updated to a new organizational format.

Statistical analysis remains the same. The Minerals scheme now includes method reports like the other schemes in our PT program. Report types are shown below.

Results from all labs…

…sorted by analyte (Analyte All Labs PT Report)

…sorted by method (Method All Labs PT Report)

Summary statistics…

…for each analyte (**Analyte Summary Statistics**)

…for each method (Method Summary Statistics)

Report cards evaluating individual lab performance…

…for an analyte regardless of method (Analyte Laboratory Report Card)

…for a specific method (Method Laboratory Report Card).

Detailed description on the content of the Analyte Summary Statistics is provided in the Appendix

Issue Date: 4/30/2026

Code	Analyte	[1] Trueness (Lab Value) Robust Mean	n used	Robust Uncert.	ffp StDev	ffp %RSD	[2] Robust %RSD	[3] Precision (range) Robust Mean	n used
015	Aluminum (ppm)	**928**	**16**	**38.09**	**53.08**	**5.72**	**13.1**	**17.93**	**16**
017	Boron (ppm)	**68.52**	**9**	**3.399**	**5.802**	**8.47**	**11.9**	**2.272**	**9**
021	Cobalt (ppm)	**14.28**	**25**	**0.3679**	**1.531**	**10.7**	**10.3**	**0.5726**	**24**
022	Copper (ppm)	**216.9**	**27**	**7.37**	**15.44**	**7.12**	**14.1**	**6.625**	**25**
023	Fluorine (ppm)	36.33	1					0.34	1
024	Iodine (ppm)	380.9	2					32.625	2
034	Selenium (ppm)	**1.327**	**21**	**0.0766**	**0.2034**	**15.3**	**21.2**	**0.0757**	**19**
036	Sulfur (%)	**0.4924**	**14**	**0.0118**	**0.0219**	**4.45**	**7.15**	**0.0208**	**13**
038	Molybdenum (ppm)	**2.883**	**20**	**0.1968**	**0.3933**	**13.6**	**24.4**	**0.2235**	**19**
041	Vanadium (46ppm)	**38.74**	**8**	**1.604**	**3.574**	**9.23**	**9.37**	**1.096**	**8**
516	Arsenic, Total (ppm)	**8.631**	**25**	**0.28**	**0.9982**	**11.6**	**13**	**0.2381**	**22**
518	Cadmium (ppm)	**9.35**	**28**	**0.2728**	**1.068**	**11.4**	**12.4**	**0.1968**	**23**
520	Chromium (ppm)	**29.49**	**25**	**1.403**	**2.835**	**9.61**	**19**	**2.381**	**23**

Code	Analyte	[1] Trueness (Lab Value) Robust Mean	n used	Robust Uncert.	ffp StDev	ffp %RSD	[2] Robust %RSD	[3] Precision (range) Robust Mean	n used
526	Lead (ppm)	3.401	24	0.116	0.4526	13.3	13.4	0.1092	23
529	Mercury (ppb)	764.4	17	26.4	127.3	16.7	11.4	38.11	17
539	Nickel (ppm)	15.28	18	0.7925	1.622	10.6	17.6	1.625	15

1. Trueness Parameters: Statistical parameters defining the distribution of lab values which are used to evaluate how close a Lab Value is to the mean. Parameters shown for number of observations used (n used) > 2. Analyte All Labs PT report identifies data not used. Robust statistics was employed to determine mean if number of observations used (n used) >=6 (blue background). Classical statistics was employed if number of observations used (n used) = 3, 4, or 5 (no color background). The fit for purpose standard deviation (ffp StDev) used in calculating Z values was from the Thompson-Horwitz standard deviation equation based on analysis of PT data (Thompson, DOI: 10.1039/b000282h). ffp %RSD is the fit for purpose relative standard deviation with respect to the mean (ffp StDev/Mean x 100). Uncertainty (Uncert.) is a measure of where the true population mean lies.

2. Robust %RSD: The observed relative standard deviation (StDev/Mean x 100) of Lab Values where StDev and Mean were determined by Robust statistics (n used >=6) or classical statistics (n used = 3, 4, or 5).

3. Precision Parameters: Lab's precision is estimated by the difference in 2 results reported by a lab (range). Mean of ranges is shown for number of observations used (n used) > 2. Analyte All Tests report identifies data not used. Robust statistics was employed to determine mean if number of observations used (n used) >=6 (green background). Classical statistics was employed if number of observations used (n used) = 3, 4, or 5 (no color background).

Appendix

Content Description of ANALYTE Summary Statistics Report

The Analyte Summary Statistics Report provides trueness and precision parameters from determination of an analyte regardless of method. Determination of summary statistics followed protocols in ISO 13528:2015(E) using Algorithm A robust analysis (Statistical methods for use in proficiency testing by interlaboratory comparison). Robust statistics was used to determine statistical parameters for sets with 6 or more observations. Classical statistics was used for sets with 3, 4, or 5 observations. Robust statistics has an advantage of removing undesired influence of outlying data on the mean and standard deviation without removing data from the statistical analysis.

For trueness, the mean is presented for the number of observations (n used). The uncertainty (Uncert.) is a measure of where the "real" value for the concentration lies around the mean with a 68% certainty (Mean ± Uncert.). As the number of observations (n used) increases, uncertainty decreases. The fit-for-purpose standard deviation (ffp StDev) was used to calculate Z values and is a Revised Horwitz standard deviation based on historical data for mycotoxins in this PT program (0.21 x C^-0.0271 x Mean where C is massless concentration). The relative Revised Horwitz standard deviation with respect to the mean is also shown (ffp %RSD = Revised Horwitz standard deviation / Mean x 100). The Robust relative standard deviation (Robust %RSD) is a percentage of the observed standard deviation based on robust or classical statistics divided by the mean. The Thompson-Horwitz %RSD is a standard benchmark on variability developed by Thompson and Horwitz (Thompson, DOI: 10.1039/b000282h).

Precision in the data populations is estimated by the range of duplicate results reported. The robust or classical mean is presented along with the number of observations. Any duplicate results that are exactly the same are removed in the determination of the mean to remove undo influence of entries that may be from labs reporting one result twice.