GLI Method Summary

Atomic Absorption Spectrophotometry

Governing SOP: ME-71 Rev 0 **Analyte:** 39 Elements **Range:** *HGAA* - 0.5-80 ppb extended by dilution
Effective Date: 04/04 **Superseded:** *FLAA* **-** 0.1-100 ppm extended by dilution

Summary

Metals in solution following acid digestion or fusion may be readily determined by atomic absorption spectroscopy. The method is simple, rapid, and applicable to a large number of metals. Detection limits vary with different sample matrices and models of atomic absorption spectrophotometers. For many elements lower detection limits may be achieved using the furnace technique. Each sample matrix is examined for potential interference effects and as necessary is corrected for using successive dilution, matrix modification, or method of standard additions.

Instrument	**PerkinElmer 3300 AAS, SIMAA 6000, AAnalyst 800, or equivalent**
Decomposition	Prior to analysis, samples must be acidified or digested using appropriate Sample Preparation Methods.
Calibration	*FLAA* – 0.1 ppm – 100 ppm, *HGAA* – 0.5 – 80 ppb (minimum 3 points)
Sample Intro	*FLAA* – Nebulizer with impact bead *HGAA* – Direct Furnace Injection, by micropipette auto sampler
Determination	*FLAA* – An aspirated sample is atomized in a flame. A light beam from a hollow cathode lamp or an electrodeless discharge lamp is directed through the flame into a monochromator, and onto a detector that measures the amount of absorbed light. *HGAA* – A monochromator isolates the characteristic radiation from the hollow cathode lamp or electrodeless discharge lamp, and a photosensitive device measures the attenuated transmitted radiation.
Quantitation Limit	Element and calibration specific ranging from 0.5 ppb – 1 ppm
Precision & Accuracy	± 10% RSD, or better, matrix, element and range specific
Interferences	Spectral, chemical, physical, memory
Calculations	wt % = ($fc \times v/10 \times D$)/spl ppm = ($fc \times v \times D$)/SPL Where fc = final concentration in µg/mL; v = sample volume in mL; D = dilution factor; spl = sample mass in mg; SPL = sample mass in g
Equivalent Methods	EPA 200.9, SW846 7000 Series
Elements	Ag, Al, As, Au, Ba, Be, Bi, Cd, Ca, Cs, Cr, Co, Cu, Eu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, Pb, Pd, Pt, Rb, Rh, Ru, Sb, Se, Si, Sn, Sr, Ti, Tl, V, and Zn

References

EPA SW846, *Method 7000 Series*.

PerkinElmer, *Analytical Methods for the Atomic Absorption Spectrophotometry*, January 1982.