GLI Method Summary

Inductively Coupled Plasma Atomic Emission Spectrometry

Governing SOP: ME-70, Rev 8   **Analyte:** 70 Elements   **Range:** 0.01 – 100 ppm extended by dilution

Summary

This method describes multi-elemental determinations by ICP-AES using simultaneous optical systems and axial or radial viewing of the plasma. The instrument measures characteristic emission spectra by optical spectrometry. Samples are nebulized and the resulting aerosol is transported to the plasma torch. Element-specific emission spectra are produced by radio-frequency inductively coupled plasma. The spectra are dispersed by a grating spectrometer, and the intensities of the emission lines are monitored by photosensitive devices. Background correction is required for trace element determination. Background must be measured adjacent to analyte lines on samples during analysis. The position selected for the background-intensity measurement, on either or both sides of the analytical line, will be determined by the complexity of the spectrum adjacent to the analyte line. In one mode of analysis the position used should be as free as possible from spectral interference and should reflect the same change in background intensity as occurs at the analyte wavelength measured. Background correction is not required in cases of line broadening where a background correction measurement would actually degrade the analytical result.

Instrument	**ICP-OES Optima 5300, 3300DV and 4300DV, or equivalent**
Decomposition	Prior to analysis, samples must be acidified or digested using appropriate Sample Preparation Methods.
Calibration	0.01 ppm – 100 ppm plus matrix specific calibrations
Sample Intro	Pesistaltic pump, cross flow nebulizer, gemcone nebulizer, scott ryton spray chamber and quartz cylonic spray chamber
Determination	Atomic emission by radio frequency inductively coupled plasma of element-specific emission spectra through a grating spectrometer monitored by photosensitive devices.
Quantitation Limit	Element and calibration specific ranging from 0.01-2 ppm
Precision & Accuracy	± 10% RSD
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

Reference

SW846 Method 6010B