

TIPS FOR ELEMENTAL ANALYSIS OF BIOLOGICAL SAMPLES

CLINICAL APPLICATIONS OF ICP

- Lead in blood and urine
 - Pica in children
 - Urban poisoning
 - OSHA regulations
- Hg, As, and Cd
 - Insecticides
 - Certain fish
 - Water and air
 - Toys
- Forensic applications
 - Intentional poisoning
 - Weapon ID
- Essential trace nutrients
 - Se as antioxidant
 - Cr for glucose metabolism
 - Co for Vitamin B12

CHALLENGES OF CLINICAL SAMPLES

Challenges:

- Homogeneity
- Complex matrix
- Limited volume
- Speciation

Solutions:

- Digestion; sonication; sample size
- Neb, torch, injector
- Micro nebs, increased transport
- HPLC-ICP-MS

CHOOSING THE RIGHT NEBULIZER

Application

- High dissolved solids
- Particulates and high TDS
- Limited volume
- Very small sample

Nebulizer

- SeaSpray
- VeeSpray
- Low uptake SeaSpray
 - (0.4ml/min)
- MicroMist
 - (0.05ml/min)

TORCH SELECTION

- Injector shape
- Aerosol dilution
- Outer tube material



PATENTED D-TORCH

- Demountable outer tube
- Demountable injector
- Optional ceramic outer tube
- Economical price



QUARTZ VS. CERAMIC

6 HOURS OF RUNNING 10% NaCl



Quartz outer tube



Ceramic outer tube

WHY SPECIATION?

Bad form

- AsIII, AsV
- CrVI
- (CH₃)Hg
- BrO₃⁻

Not so bad

- MMA, DMA
- CrIII
- HgII
- Br⁻

- Increasing requirement of speciation methods for toxicity limits (As, S, Cr).
- Need for reliable HPLC and IC interface to your ICP.

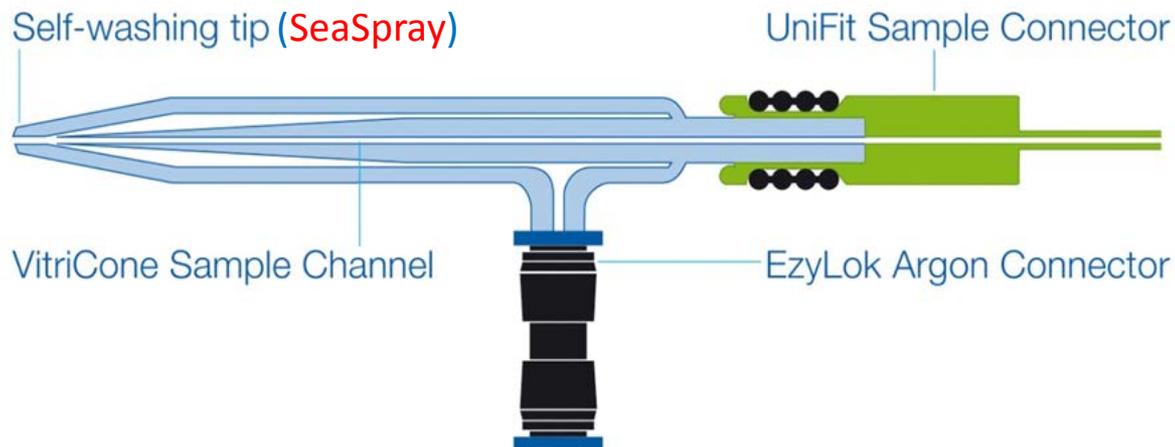
HPLC & IC INTERFACE KIT

The Answer: Glass Expansion LC Fittings Kit

- Quick and easy connection of your HPLC & IC to your ICP.
- Compatible with any GE U-Series nebulizer.
 - Resists blockage
 - Fast washout
 - Zero dead volume
 - Minimizes peak broadening

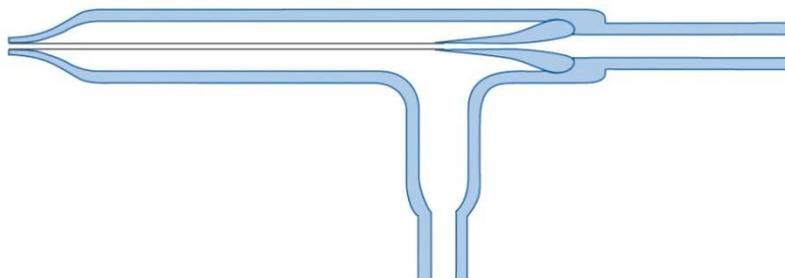


U-SERIES NEBULIZER



- Made from constant bore thick walled tubing
- Machined exterior provides proper aerodynamics

Other brands



- Heated and drawn glass capillary
- Variation in wall thickness
- Variation in bore ID

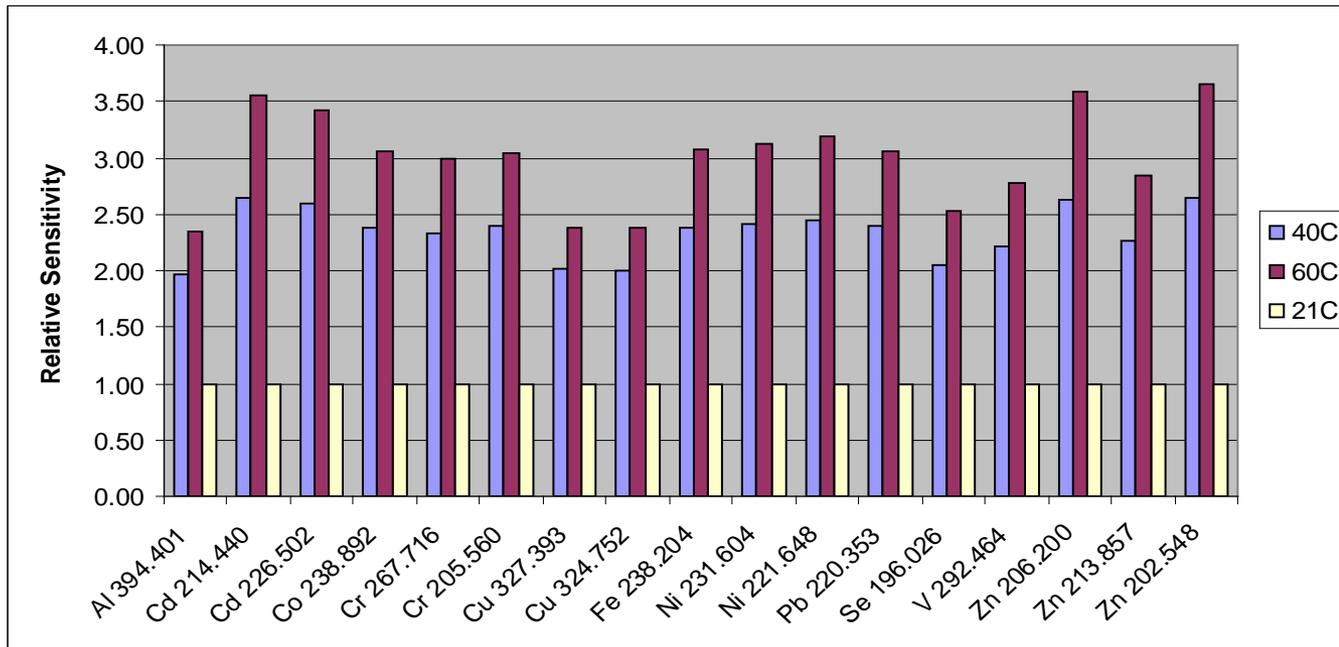
ANALYSIS OF LIMITED SAMPLE VOLUMES

- Biological applications
 - Intracellular fluids
 - Neonatal samples
- Forensic applications
- Waste reduction applications
 - Radioactive samples
 - Toxic samples
- Requires micro-flow nebulization
- Sensitivity and DL's usually sacrificed



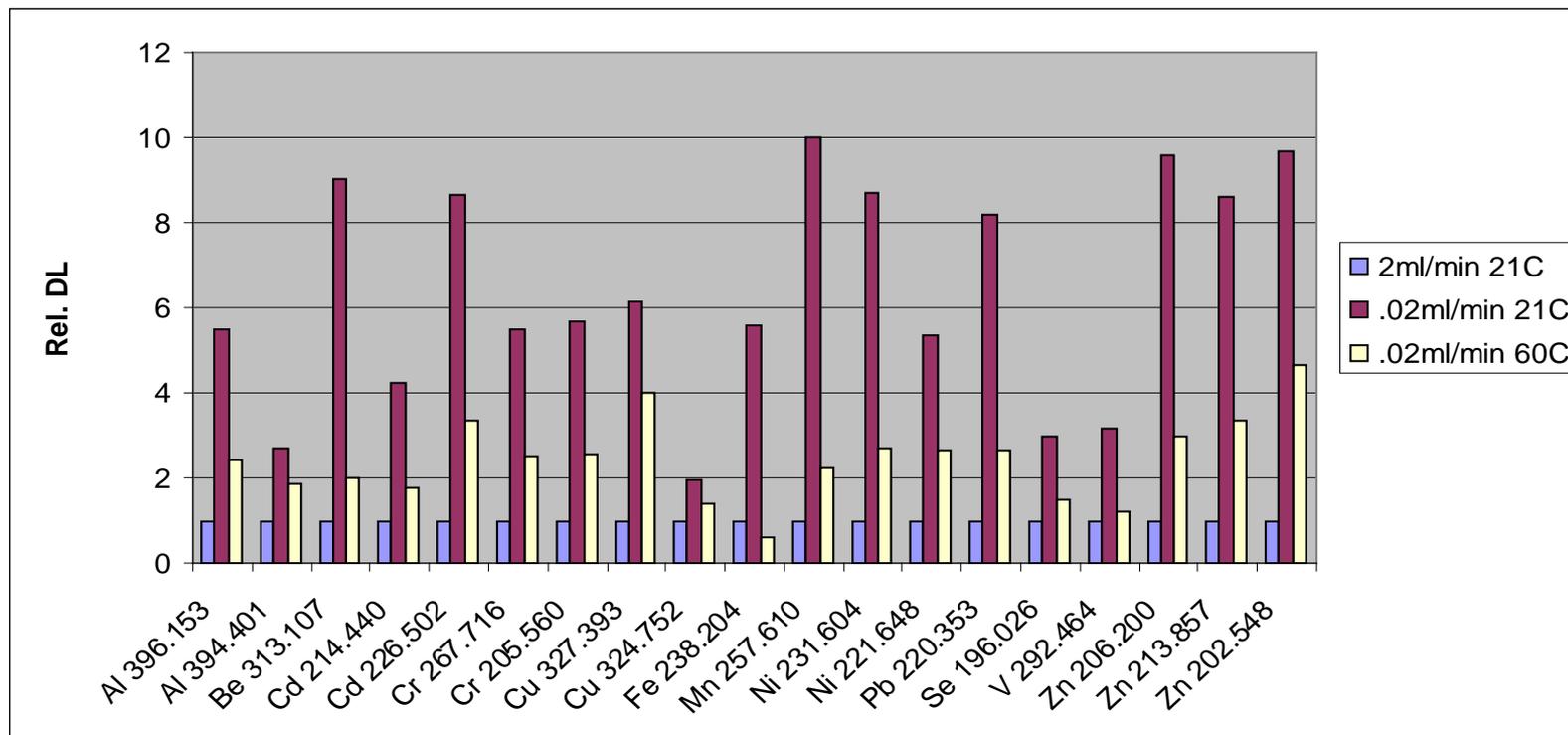
EFFECT OF TEMPERATURE ON SENSITIVITY

(20 μ L/min uptake)



PE Optima 2100DV

EFFECT OF TEMPERATURE ON DL



PE Optima 2100DV

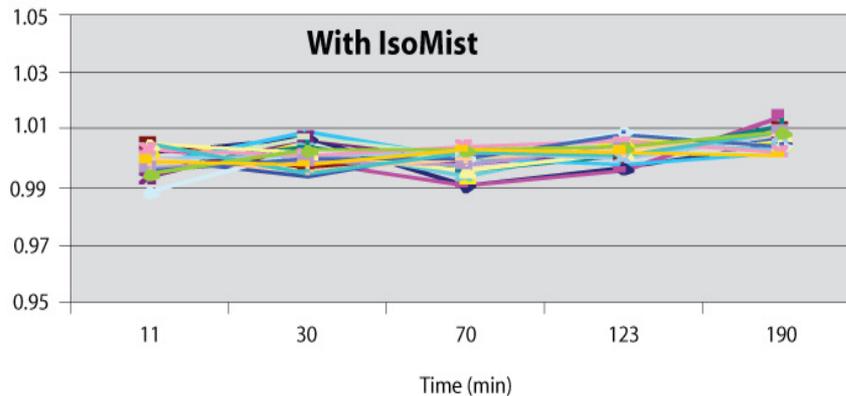
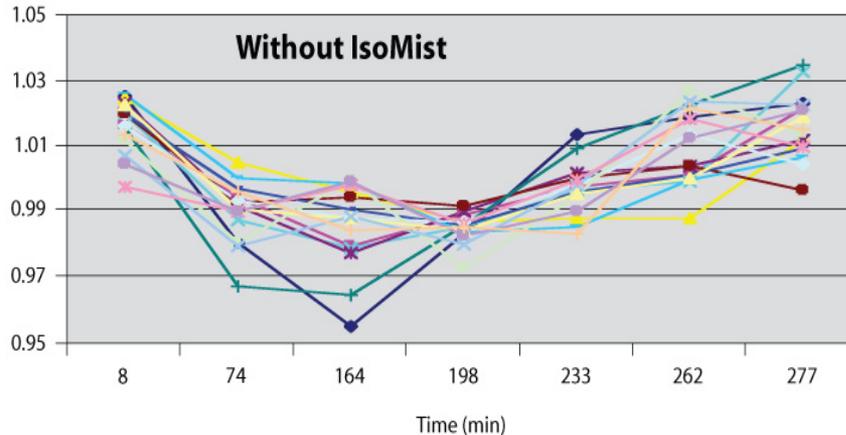
FEATURES OF ISOMIST

- Programmable from -10 to 60°C in 1°C increments
- Maintains temperature to within 0.1°C
- Compact design (7.5x4x4 inches)
- 100% self-contained (no external lines)
- Incorporates Bluetooth® technology for clean wireless control (USB available)
- Compatible with all ICP-OES and ICP-MS models



CONSTANT TEMPERATURE BENEFITS

(1mL/min sample uptake)



- Higher accuracy
- Higher productivity
- Greater reproducibility
- Better experiments