Inductively Coupled Plasma Spectroscopy (ICP)

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Introduction:

Inductively Coupled Plasma Spectroscopy (ICP) is used to detect trace metals from environmental samples. Three concentric tubes make up what is known as the torch. The torch is surrounded by the water cooled coil of a radio frequency (r.f.) generator. As gasses flow through the system the r.f. field is activated which results in the formation of the plasma. Sample is introduced to the plasma through the carrier gas which is commonly Argon. Light emitted by elements in the sample can be detected and used to determine concentrations of unknowns in the sample.

Applications:

- Clinical (Metals in Blood/Urine)
- Environmental (Monitoring rivers, seawater, drinking water, air, petrol, wine, beer, and juice)
- Pharmaceutical (Quantitation of Catalyst)
- Industry (Quantitation of toxic impurities like lead)
- Mining (Quantity of gold in a rock sample)

ICP Sample Preparation with the ML500 diluter:

The ML500 is used to make standards, perform acid digestions, and sample dilutions for ICP. The instrument eliminates the need for glass pipettes and volumetric glassware for large and small ratio dilutions (1:1 to 1:25,000 in a single step). The fluid path is made from Borosilicate Glass and PTFE that resists harsh chemicals and minimizes sample carryover. The low sample carryover makes the ML500 ideal for ICP and ICP-Mass Spectrometry.

Diluter Overview:

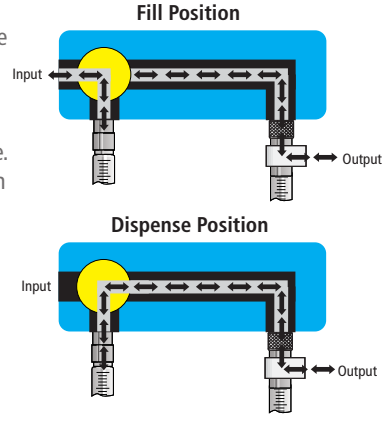
The ML500 Diluter is a semi-automated liquid handling device, ideal for repetitive and precise aspiration and dispensing over a wide range of volumes. The instrument is designed to:

- Eliminate tedious volume changes associated with traditional dispensing techniques
- Reduce user to user variation
- Increase dispense accuracy and precision
- Decrease preparation time per sample
- Record the work performed in an electronic log

General Dilution Method:

The ML500 Diluter is a dual syringe instrument with one active valve above the diluent (left) syringe. The pump is primed by filling the syringe with diluent through the input valve position and then dispensing from the output position. Once air bubbles are removed, the system is ready to prepare samples:

Step 1: The left syringe fills with the appropriate volume of diluent.
Step 2: The probe is positioned in the sample while the sample (right) syringe is triggered to aspirate the desired volume.
Step 3: The probe is positioned over the dilution vial and both syringes are triggered to dispense the sample followed by the diluent.
Note: The dilutent washes the sample from the tubing
Step 4: Repeat steps 1-3 for the remaining samples in the experiment.



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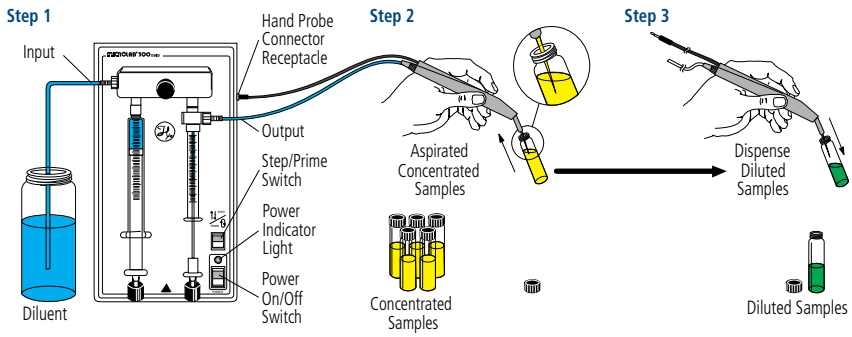

Figure 1. The figure illustrates steps 1-3 from the previous diluter overview section.

Ordering Information:

Hamilton Company offers three different ML500 series for ICP and a variety of additional fluid handling applications.

ML500A Series (p/n ML503115) – Basic Nonprogrammable MICROLAB*. This unit ships complete with an A series controller, diluter valve, tubing, concorde style hand probe, manual, 2.5mL diluent syringe, and a 250µL sample syringe.

ML500B Series (p/n ML530115) – Programmable MICROLAB*. This unit ships complete with a B series controller, diluter valve, tubing, concorde style hand probe, manual, 2.5mL diluent syringe, and a 250µL sample syringe.

ML500C Series (p/n ML531115 or ML560115) – Computer Controlled MICROLAB*. These units ship with the ML500 control software, manual, and a communications cable. A valve and probe package (p/n DILPKG) is available separately and provides the diluter valve, tubing, and concorde style hand probe. Syringes are also sold separately**.

*To learn more about the ML500 part numbers and series above please visit:
www.hamiltoncompany.com/diluters/model-features.asp
**To view replacement parts and accessories visit:
http://www.hamiltoncompany.com/diluters/accessories.asp