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Solving the most Common Nebulizer Inquires

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Booth # 1400

Webinar Outline

- Overview of nebulizer selection – important criteria to consider
- Glass Expansion nebulizer design features
- Steps to identify nebulizer issues
- Tips for nebulizer proper maintenance
- Nebulizer tools and accessories to improve performance

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Nebulizer Selection

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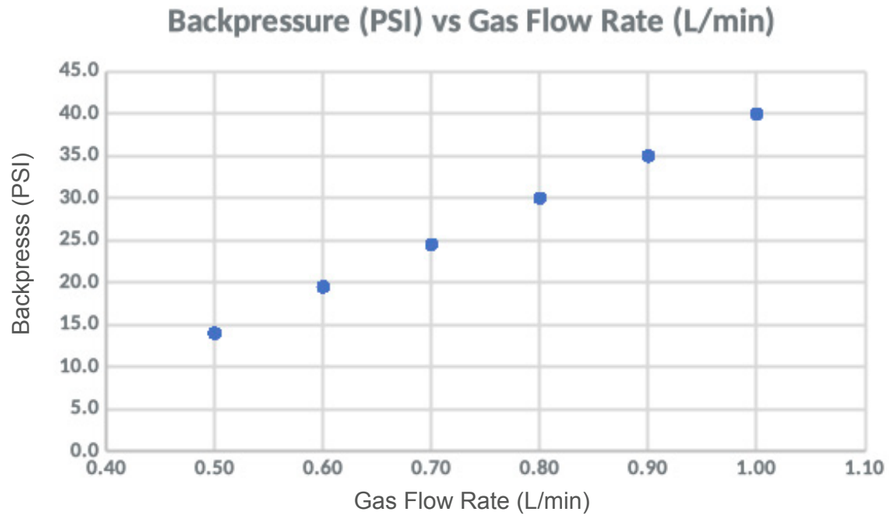
Selecting the right nebulizer requires careful consideration of various factors:

Nebulizer		TDS (%)	Particulates (µm)	HF	Precision	Purity	Material
SeaSpray™		20	75	No	High	Good	Glass
MicroMist™		15	40*	No	High	Good	Glass
Conikal™		5	75	No	High	Good	Glass
Slurry™		1	150	No	High	Good	Glass
Quartz SeaSpray™		20	75	No	High	Excellent	Quartz
OpalMist™		15	75*	Yes	High	Excellent	PFA
DuraMist™		30	75*	Yes	High	Good	PEEK
VeeSpray™		30	300	Yes	Moderate	Good	Ceramic



Important Nebulizer Operating Parameters

Example: GE P/N A13-1-UM04

- Optimum nebulizer gas flow = 1.0 L/min (40 psi)
- Sample uptake rate ≤ 0.4 mL/min

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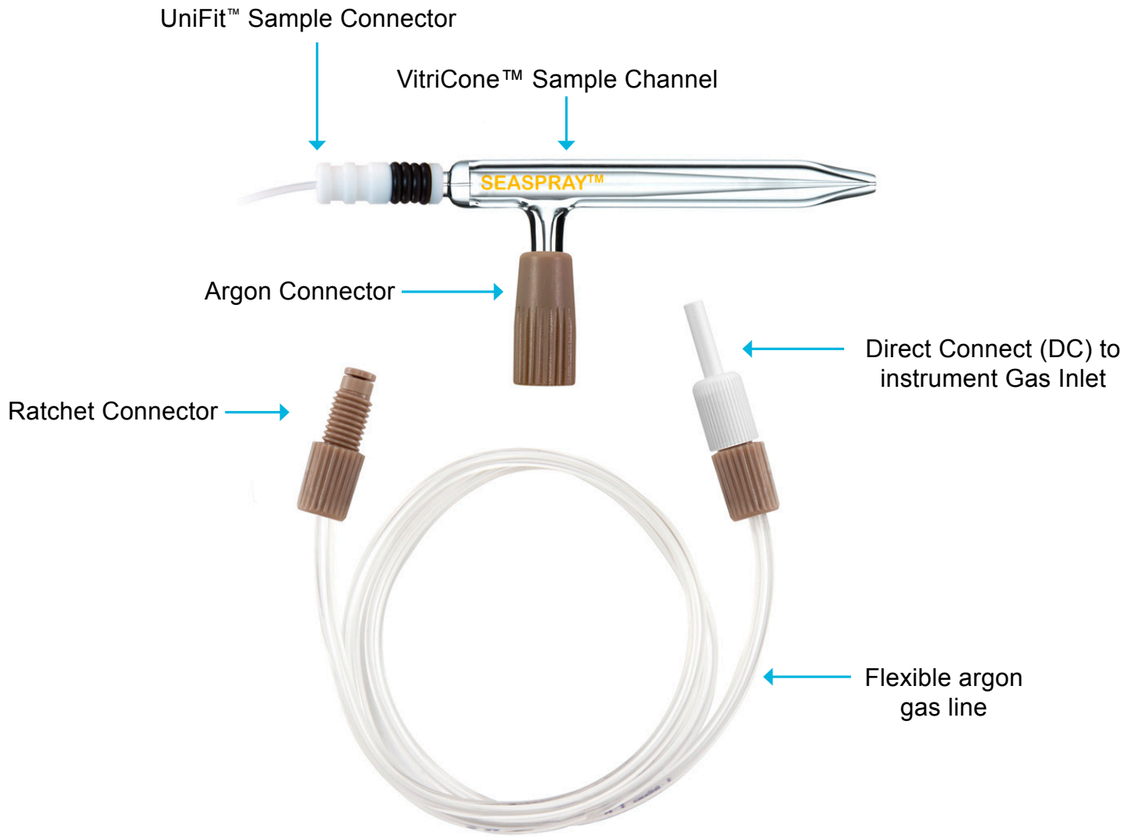
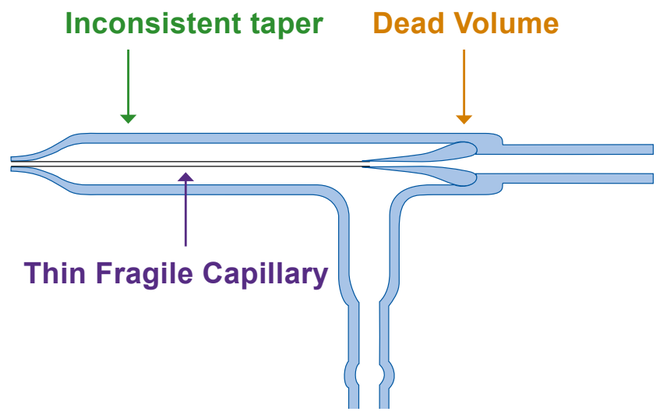
Unique Design Features

GE Nebulizer Design



- **Machined from thick-walled tubing:** Highly reproducible geometry.

Other Nebulizer Design



- **Constructed from drawn-out capillary tubing:** Challenging to replicate consistently.

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Abnormal Nebulizer Backpressure

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How to Identify Nebulizer Issues

Verify the nebulizer back-pressure after instrument warm-up:

1. Low nebulizer back-pressure and a loss in sensitivity can indicate a leak on the supply line:

- Check the Ar nebulizer gas connection at the instrument and at the nebulizer gas arm.
- Inspect for any visible cracks.

2. High nebulizer back-pressure can indicate a partially blocked or clogged nebulizer:

- Clean nebulizer or replace if necessary.

3. Record your normal sample uptake rate

- A change in uptake rate can indicate a blockage, worn pump tubing, or incorrect tension on the pump.

Magnifier Inspection Tool
P/N 70-803-1923

Conikal™
SeaSpray™
MicroMist™
Slurry™

P/N 70-ELUO

DuraMist™

OpalMist™

P/N 70-ELUO-OPD

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Low Backpressure

Typically coupled with a loss in sensitivity, this can indicate a gas leak or nebulizer damage. First, check the tubing and connections at both the instrument and the nebulizer. If the problem persists, closely inspect the nebulizer for signs of breakage or wear.

Direct Connect (DC) fittings, with built-in torque control, are the most secure and easiest to replace. The large, soft-walled tubing prevents kinks and fatiguing often associated with rigid capillary tubing.

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High Backpressure

A high backpressure typically indicates a blocked or clogged nebulizer

1.The nebulizer should be cleaned using appropriate procedures

- The **Eluo** device is recommended for all GE nebulizers

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Nebulizer Cleaning Procedure

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- To maintain your nebulizer, start and finish each run by nebulizing a mildly acidic blank solution, followed by DIW for 5-10 min.
- This prevents sample deposits from forming inside the nebulizer when the solvent dries out.

For Blockages:

1. Initially flush with water using the Eluo.
2. Soak nebulizer tip in 25% Fluka for 24 hours.
   An initial flush of 25% Fluka may be required.
3. Flush 3x with water using the Eluo.
4. *Stubborn deposits may require an additional soaking for 2 hours with 5% HNO_3*
5. Flush 3x with water using the Eluo.
6. *For faster drying, flush with methanol.*

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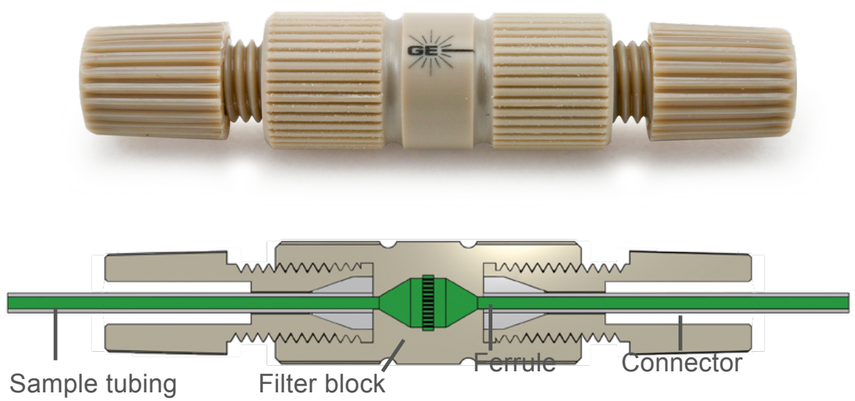
Helpful tools to minimize blockages in sample pathway

Guardian In-line Particle Filter:

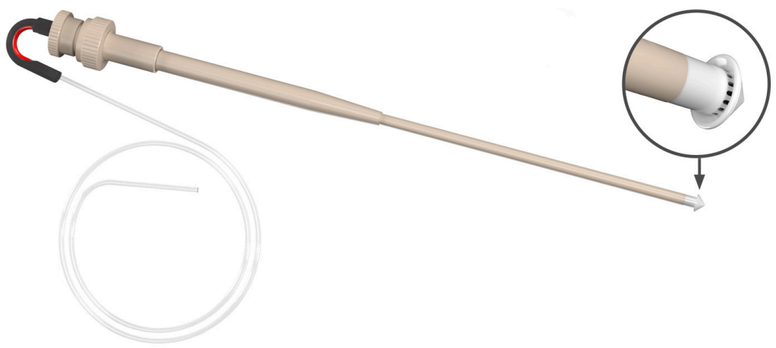
- **Prevent large particles from clogging your nebulizer**
- Insert between probe and nebulizer
- Re-usable PEEK filter (120 µm)
- Easily back flush to remove build up



In-Line particle filter: *"By the way, the particle filters that we have purchased are working out very well with our soil sample analyses on our ICP-OES units, have saved a lot of headaches with blocked nebulisers!"*

Soil & Plant Laboratory - Australia

Guardian Autosampler Probe Features:



1. **Robust tip** (ceramic) eliminates crushed and damaged tips due to misalignment.
2. **Drip-resistant** prevents cross-contamination of samples, especially with oils.
3. **Built-in particle filtering for nebulizer and capillary tubing protection**
4. **PEEK sheath** designed to ensure precise alignment within the middle of the vial every time.
5. **Interchangeable UniFit sample lines** IDs: 0.3, 0.50, 0.75 & 1.0mm.
6. Designed to suit Agilent SPS3/SPS4, PerkinElmer S20, Teledyne Cetac, and Thermo iSC-65 Autosamplers.

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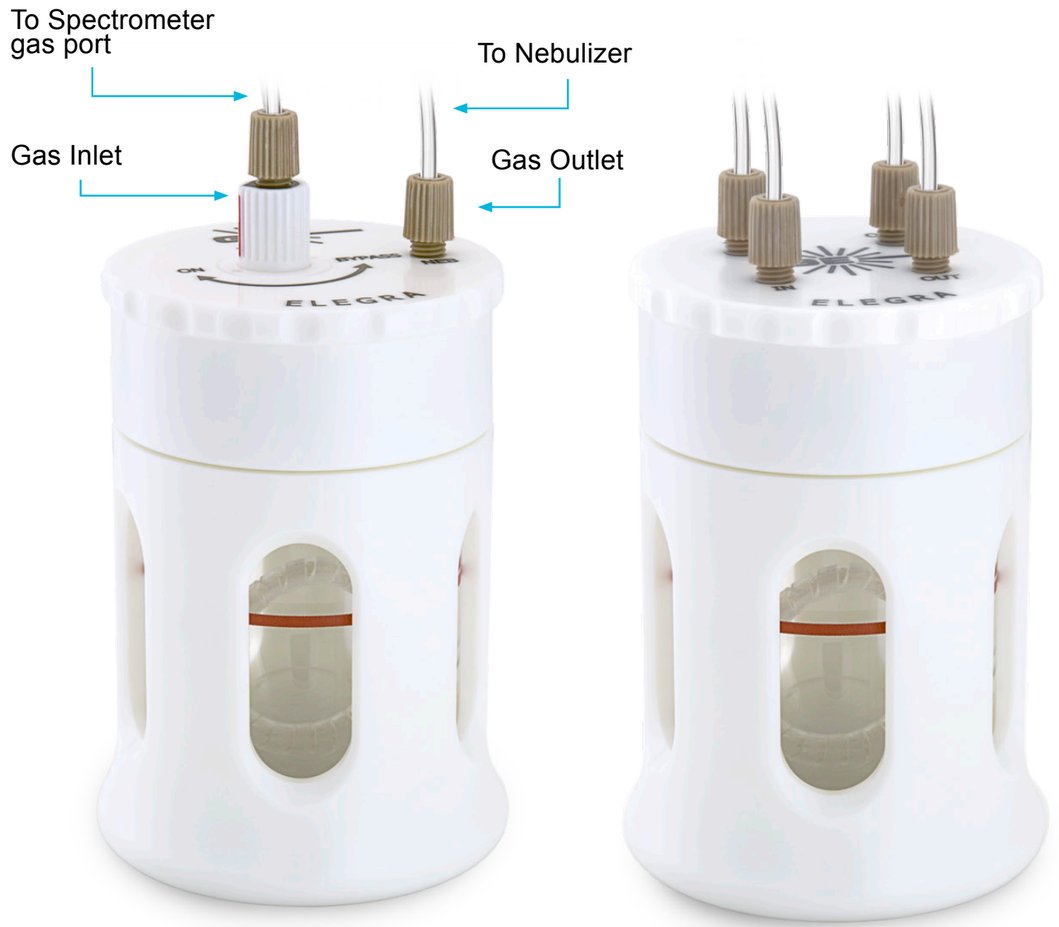
Argon Humidifier

A carrier gas humidifier, such as the **Elegra Argon Humidifier** from Glass Expansion, is recommended for samples containing high amounts of total dissolved solids (TDS), as there is an increased likelihood of salt deposits forming at the tip of the nebulizer and injector which can result in significant analytical drift in or even an extinguished plasma.



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Lubricating Pump Rollers

The **EzyGlide Cloth** another simple but useful product that can be used to lubricate pump rollers. This lubrication reduces pump tubing wear to increase the service life of pump tubing.

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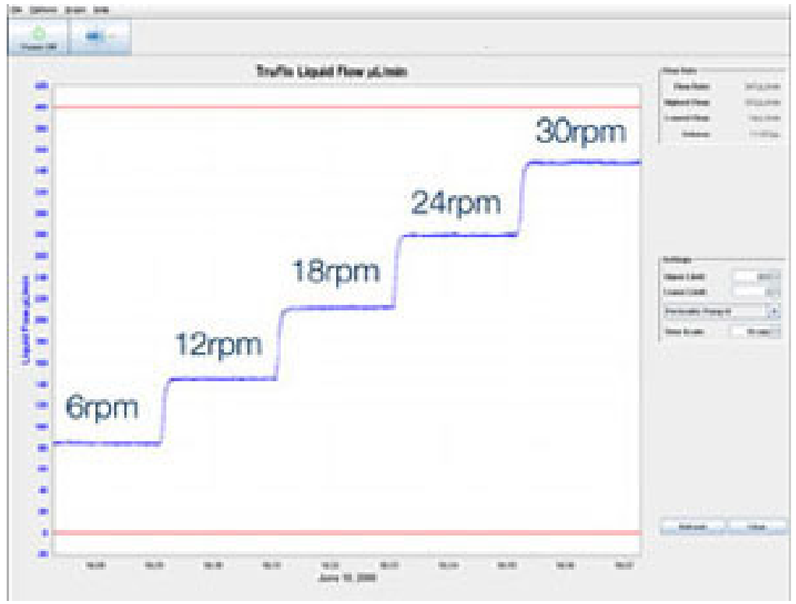
Monitoring Sample Uptake Rate

For precise analyses and complete diagnostic control, the **TruFlo Sample Monitor** actively monitors sample uptake rate, as well as enabling you to set optimal pump tension, allowing you to always know the actual rate of sample uptake to your nebulizer. It provides continuous, real-time flow measurement and will sound an alarm if the uptake rate falls outside of the pre-determined range.



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Summary

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Magnifier Inspection Tool
P/N 70-803-1923

2. High nebulizer back-pressure can indicate a partially blocked or clogged nebulizer:

- Clean nebulizer or replace if necessary.

P/N 70-ELUO

P/N 70-ELUO-OPD

Helpful Accessories: Guardian Sample Probe, Guardian In-line particle filter, TruFlo sample monitor, Elegra Argon Humidifier, Eluo and Magnifier Inspection Tool.

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Glass Expansion ICP Resources

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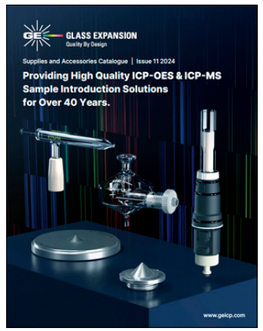
- Fully equipped R&D laboratory
- Expert technical staff
- Application notes
- Newsletters
- Catalogs
- Product flyers
- Product care guides
- Operating instructions
- Videos
- Webinars & installation guides

Flyers

Newsletters

Instructions

Application Notes



Catalogs

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Want a FREE review of your Sample Introduction System?

Please contact me by email (geusa@geicp.com) to:

- Optimize your sample introduction system components.
- Identify other performance enhancing accessories available for your ICP.
- Discuss any sample introduction challenges.
- Explore ways to reduce operating costs.
- Obtain quotes.

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Thank You

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