



# 2025 CAT DSG Global SOS Conference



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Glass Expansion, Inc.



[www.geicp.com](http://www.geicp.com)

# Who are Glass Expansion?

GE has been specializing in sample introduction components—from the probe to the cones—for ICP and ICP-MS instruments since 1985:

- Many ICP and ICP-MS vendors package GE parts as part of the standard configuration
- Support all major ICP and ICP-MS instruments
- Provide sample introduction components for over 50 different ICP and ICP-MS models

# Industry Standard Trademark Designs

For more than 40 years, Glass Expansion has been designing and manufacturing high quality ICP sample introduction components.



**Tracey™ & Twister™**  
Cyclonic Spray Chambers



**SeaSpray™ & MicroMist™**  
Nebulizers



**Helix™** CT Interface



**Guardian™** Inline  
Particle Filter



**D-Torch™**



**IsoMist™ XR**



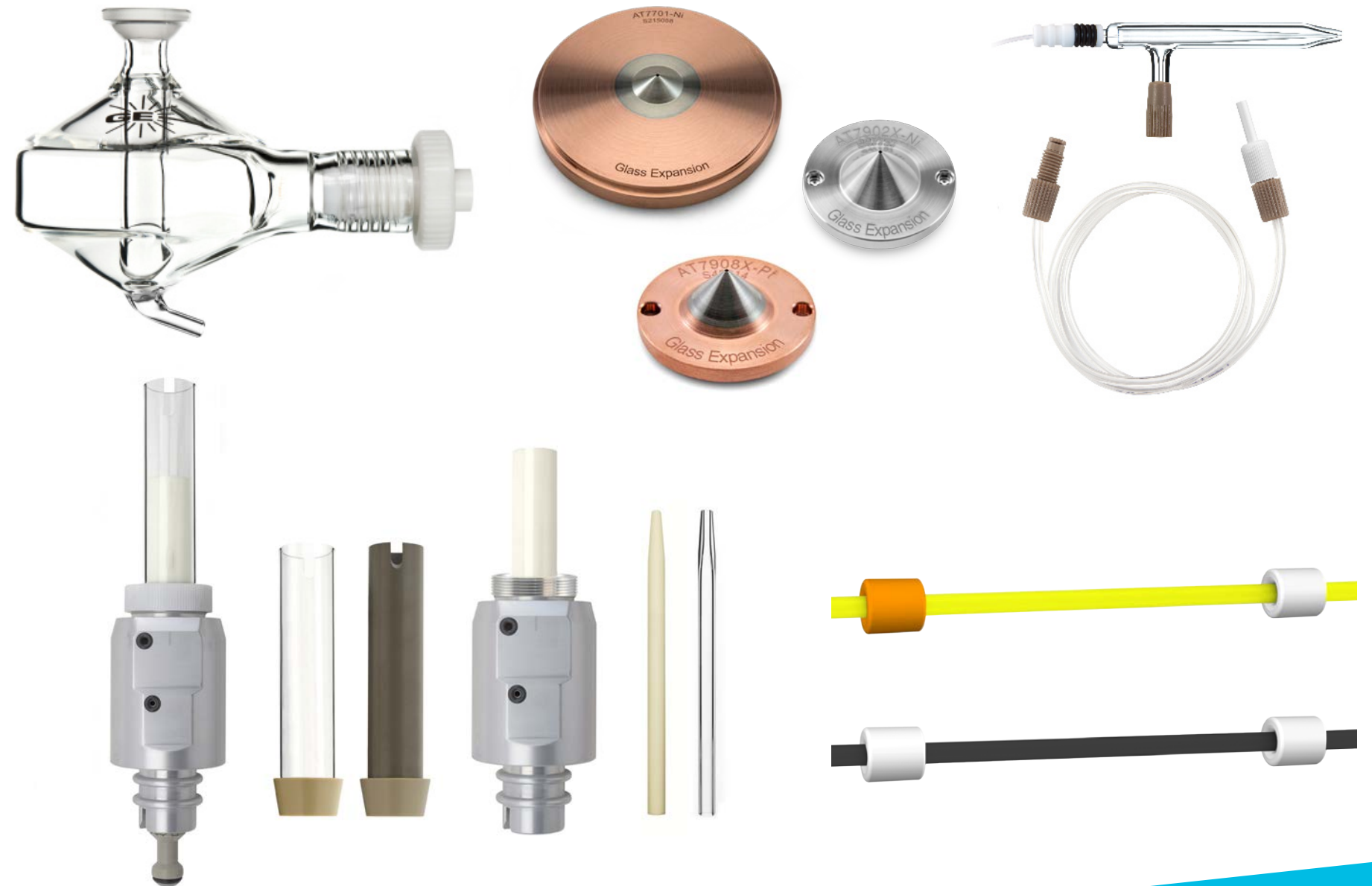
**TruFlo™**

# Manufacturers Supported

- Agilent Technologies®
- Analytik Jena
- GBC Scientific
- Hitachi
- Horiba
- Nu Instruments
- PerkinElmer®
- Shimadzu®
- SPECTRO (Ametek)
- Standard BioTools™ (Fluidigm)
- Teledyne CETAC
- Teledyne Leeman
- Thermo Scientific™

# Products Offered

- Autosampler Probes
- Pump Tubing
- Nebulizers
- Spray Chambers
- Torches
- Cones
- RF Coils
- Fittings, Connectors, & Adaptors
- Performance Enhancing Accessories



# Helpful ICP Resources

## Glass Expansion ICP Resources

As a world leader in research, design and manufacturing of high quality ICP sample introduction components, Glass Expansion places the same value on customer support, with [www.geicp.com](http://www.geicp.com) offering you a wealth of resources.



Webinars, covering tips & tricks, product selection & product highlights.



Library of Application Notes & Newsletter Application Spotlights.



Instructional videos to aid in product assembly.



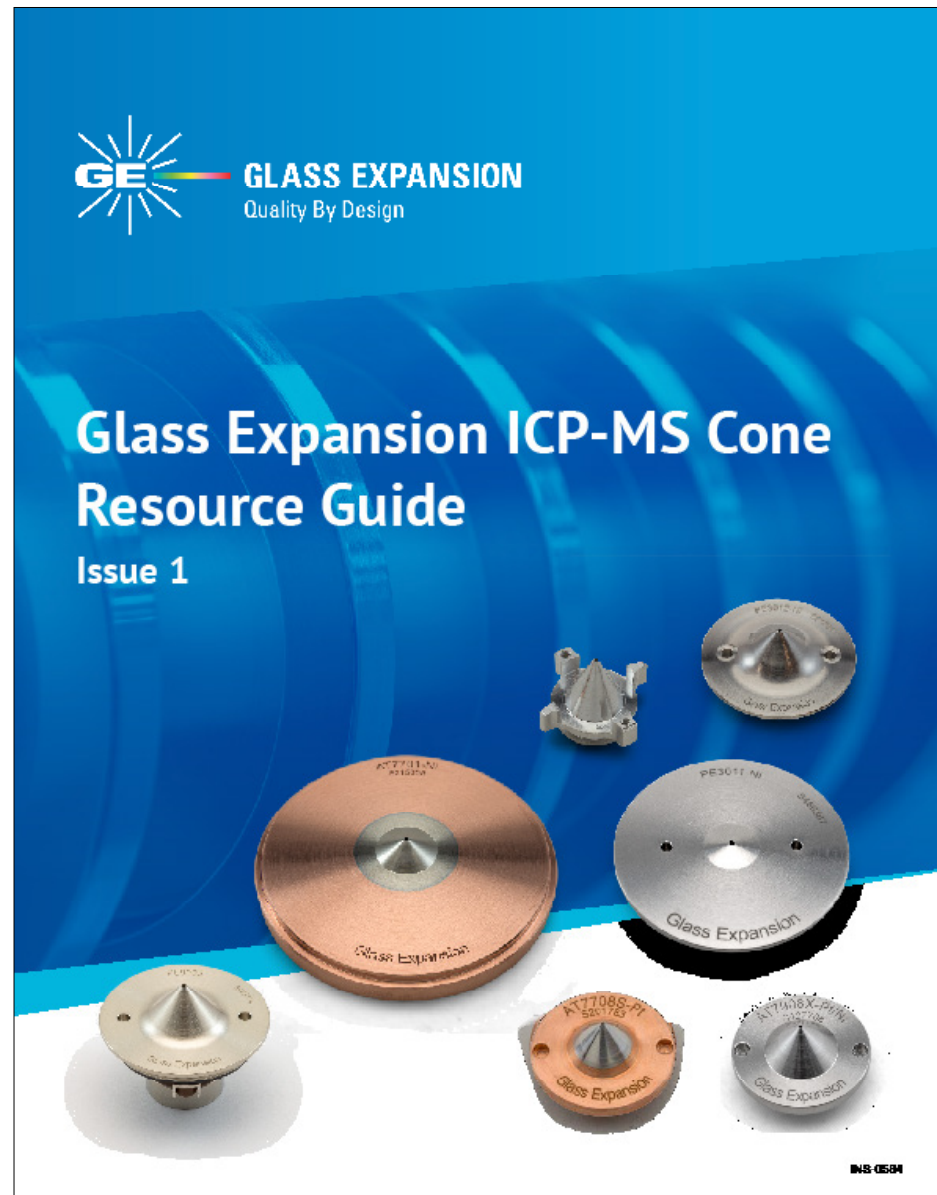
Full-color Catalogue organized by ICP-OES and ICP-MS models.

Click on the buttons above to take you to our ICP resources.

- Webinars
- Application and Technical Notes
- Product Assembly Guides
- Full Color Catalog Organized by ICP Model



# Cone Resource Guide



- **Guidance on cone selection**
  - Advantages of different cone raw materials
  - Selection based on matrix and performance
- **Tips on Care and Maintenance**
- **Organized by ICP-MS Model**
  - Cross-reference OEM product numbers
  - [\*\*\*Click here to view the Cone Resource Guide\*\*\*](#)

# Helpful ICP Accessories for Used Oil Analysis



**Guardian™**  
Autosampler Probe



**Slurry™** DC Nebulizer



**Twister™** Spray Chamber



**D-Torch™** and  
Ceramic Outer Tube



**Guardian™** Inline  
Particle Filter



**Eluo™** Nebulizer  
Cleaning Tool



# Customer Pain Points with traditional pump tubing:

## 1. Premature Tab Failure:

- **Description:** Tabs on the tubing can become loose or break off prematurely, especially if they are not properly bonded or are of poor quality.
- **Impact:** This can lead to detachment of the tubing from the connectors, causing interruptions in sample flow and requiring tubing replacement.

## 2. Tubing Slippage/Displacement:

- **Description:** Tubing can slip from the connectors or the pump rollers, particularly if the tubing is not properly fitted or if the connectors are worn.
- **Impact:** This can cause interruptions in the sample flow, inconsistent sample delivery and analysis interruptions.

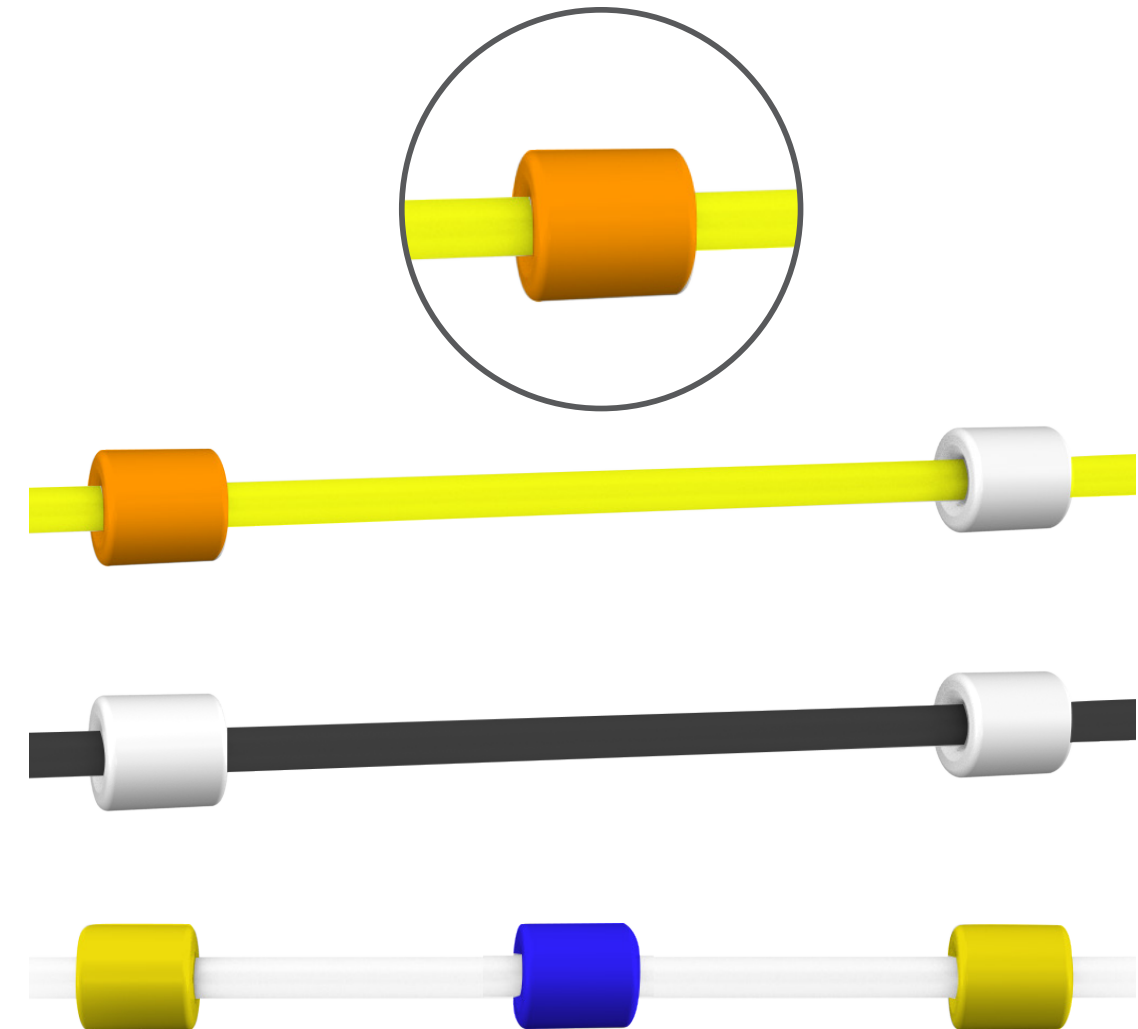


Traditional Pump Tubing

# ProLok™ Peristaltic Pump Tubing

## Features & Benefits:

- 1. Enhanced Bonding Strength:** The color tab now features twice the surface area, ensuring a stronger and more secure attachment to the pump tubing.
- 2. Durability:** Designed to prevent premature failure, the reinforced tabs eliminate issues with loose tubing connections.
- 3. Superior Material Quality:** Crafted from high-quality Tygon® material, this product delivers premium performance and exceptional consistency.
- 4. Consistent Compatibility:** Maintains the same GE part numbers for seamless integration.
- 5. Precisely controlled tab spacing** designed to meet and exceed industry standards for ICP-OES and ICP-MS peristaltic pumps.

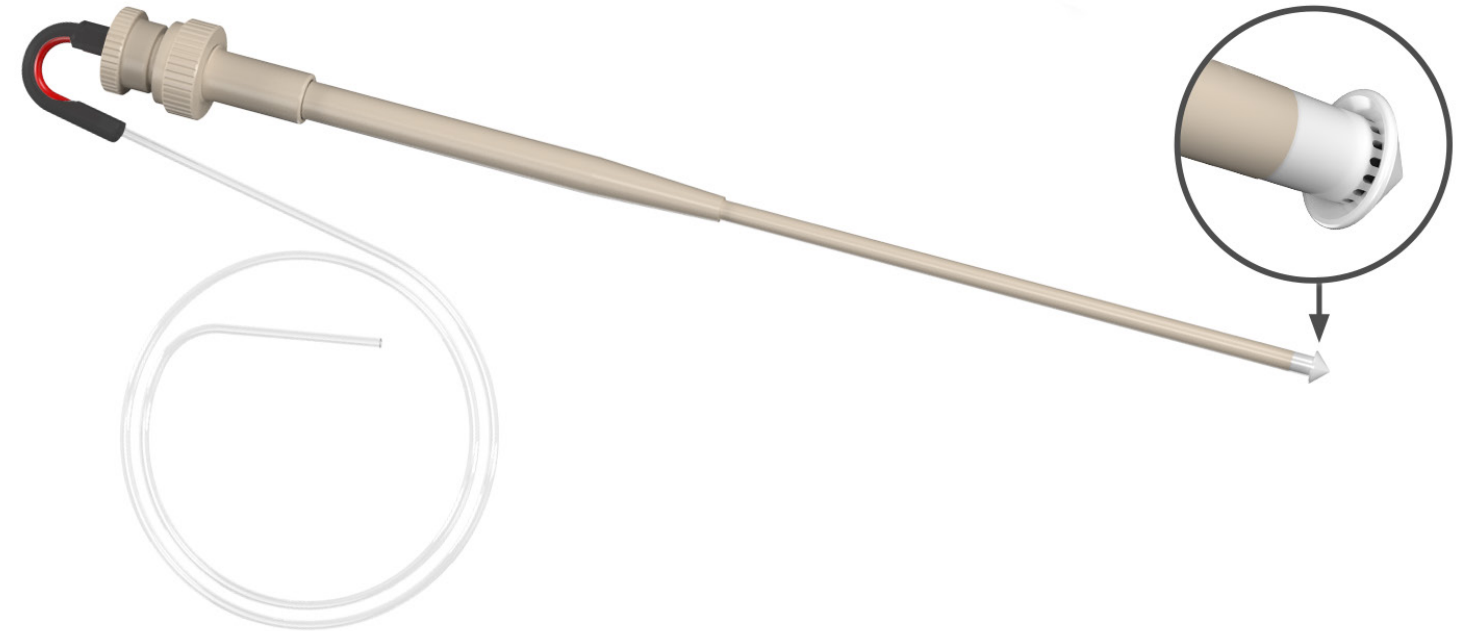


ProLok™ Peristaltic Pump Tubing

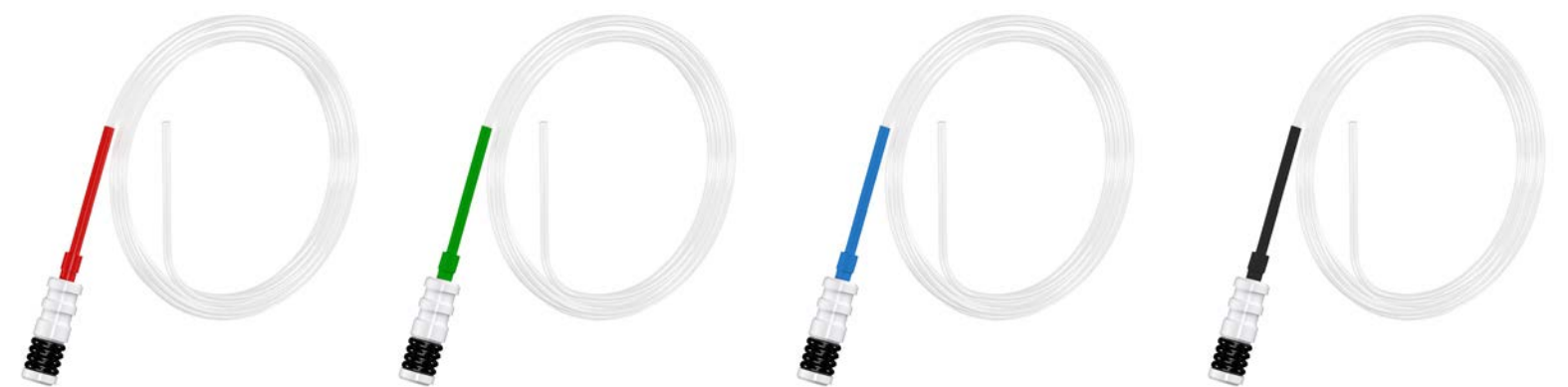
# Guardian™ Autosampler Probe

## Key Features:

- **Robust tip design** eliminates crushed and damaged tips due to misalignment
- **Drip-resistant** to minimize cross-contamination, especially with oils
- **Built-in particle filter** prevents blockages in nebulizer and tubing
- **Chemically inert construction** made from **Ceramic, PEEK, and PTFE** for strong acid/solvent resistance
- **PEEK sheath** designed to ensure precise alignment within the middle of the vial every time
- **Interchangeable UniFit™ sample lines** available in various IDs (e.g. 0.3, 0.50, 0.75 & 1.0mm)
- Available for Cetac, Agilent, PerkinElmer, Shimadzu, Aim Lab, and Thermo Scientific™ Autosamplers



Guardian™ Autosampler Probe  
Suited for Aim Lab and Agilent SPS4 Series Autosamplers



# Guardian™ Probe Performance Comparison Video

Below is a performance comparison of the Guardian Autosampler Probe against a regular carbon fibre probe for oil applications.



# Guardian™ Autosampler Probe

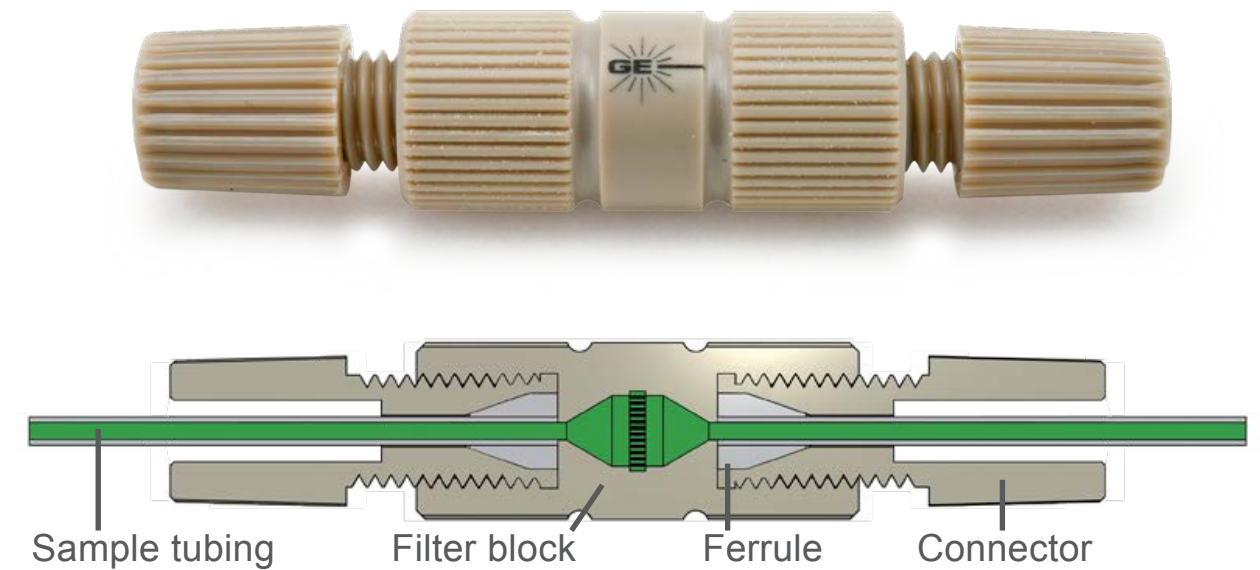
## Customer Testimonials:

- *(In response to a using the Guardian Probe) With less downstream particulate and fewer cross-contamination events, I would opine that this probe does present an advantage. It is also easy to install, remove, and maintain. The quick-connect is convenient. **Environmental Laboratory - USA***
- *We are absolutely in love with this probe. The filter in the top works perfect. **Environmental Laboratory - Denmark***
- *We have been utilising the Guardian Probe in our operations for more than six months, and it is with pleasure that we report its remarkable performance. The probe has demonstrated robustness and reliability in handling various sample types. Notably, we have found that it remains unclogged, even during the analysis of samples containing particulates, which we typically allow to settle before initiating the analytical process. To further safeguard the integrity of our nebulizers, we have adopted the use of the Guardian In-Line Particle Filters, effectively preventing any obstruction to the nebulizer. As a result of this precaution, it seems we have fewer nebulizer failures compared to previous experiences. **Contract laboratory - Australia***

# Guardian™

## In-Line Particle Filter

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



Guardian In-Line Particle Filter P/N [70-803-1108](#)

Eluo Nebulizer Cleaning Tool P/N [70-ELUO](#)

Eluo adapter to clean filter  
P/N [70-803-1160](#)





# Eluo™

## Nebulizer Maintenance Made Easy



Conikal™  
SeaSpray™  
MicroMist™  
Slurry™



P/N 70-ELUO



DuraMist™



P/N 70-ELUO-OPD



OpalMist™

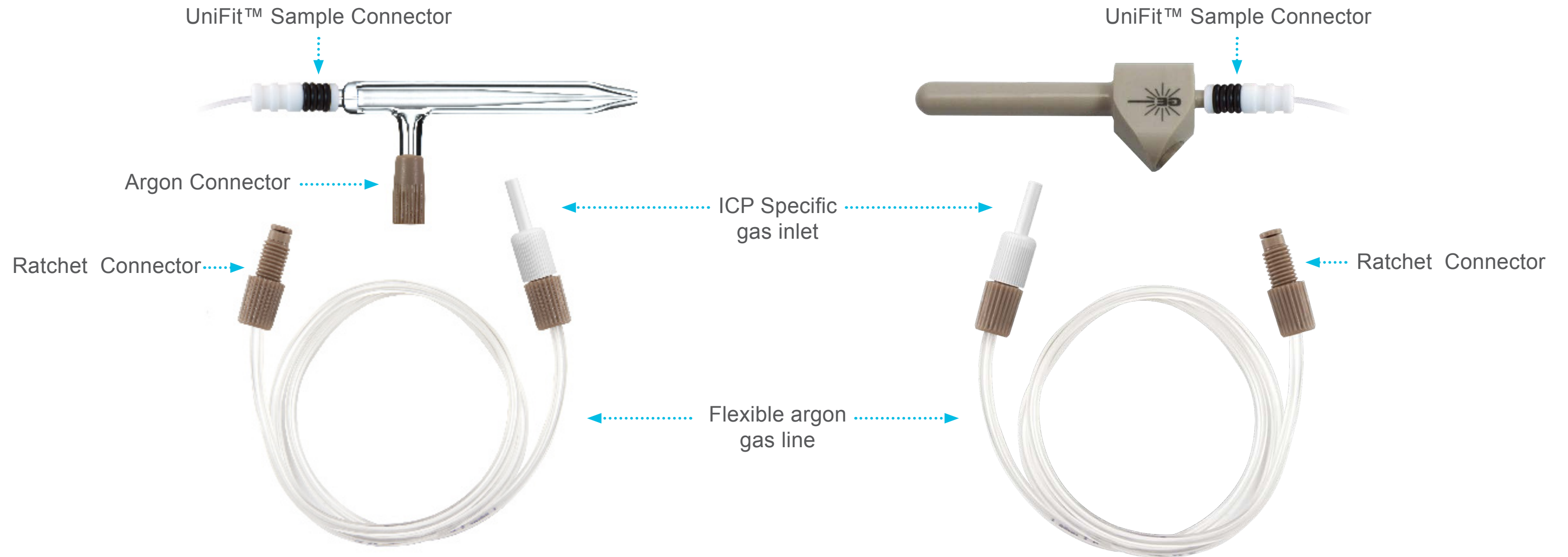
# Slurry™ DC Nebulizer - Ideal for Used Oil Analysis

The Slurry nebulizer excels at exactly what it sounds like, the analysis of slurries. One common slurry application is the analysis of used engine oils for wear metals, and the Slurry nebulizer is the ideal choice.

- **High tolerance to particulates, typically up to 150  $\mu\text{m}$**
- Material: Borosilicate glass
- High physical reproducibility  $\sim 1\%$ .
- TDS tolerance, typically  $\sim 1\%$ .
- Slurry nebulizers have a natural liquid uptake of 4.0 mL/min but operate best between 1.5 - 2.5 mL/min
- Designed for 40psi, 0.7 L/min argon flow



# DC Nebulizer - Direct Connect

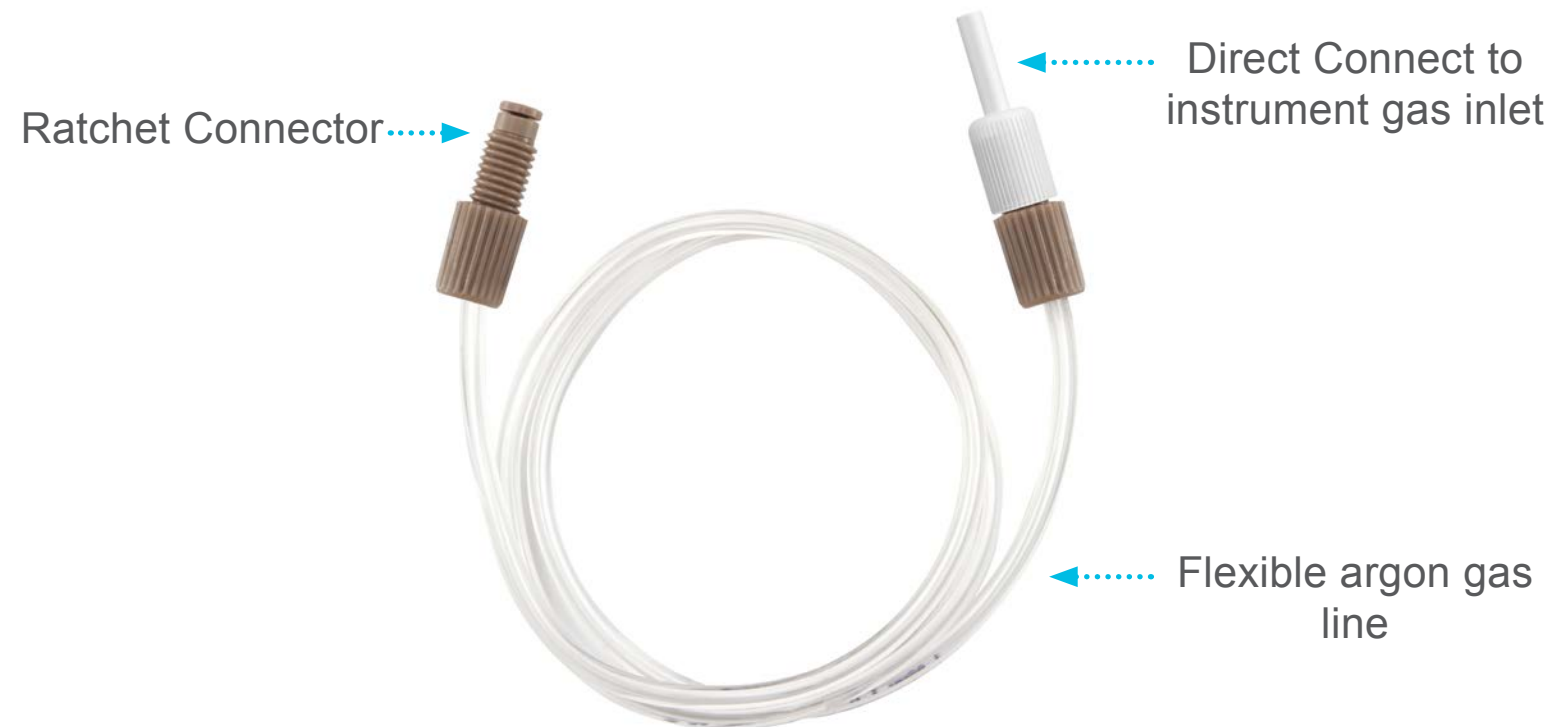


# DC Nebulizer - Benefits

- Inert, metal-free argon connector
- Ratchet fitting ensures leak-free gas connection
- Direct plug-in gas line connection to instrument



Thermo Fisher Scientific® PRO ICP-OES



# Glass Expansion DC Gas Lines

Manufacturer	Model	P/N Prefix	Gas Line Included
Agilent®	4100, 4200	MP-11	70-803-0969
Agilent®	Vista, 700-ES	A11-	70-803-0969
Agilent®	7700, 7800, 7900, 8800, 8900	A13-	70-803-1105
Agilent®	5100, 5110, 5800, 5900	A13-	70-803-1105
Analytik Jena®	ICP-MS	A61-	70-803-2002
Analytik Jena®	ICP-OES	A13-	70-803-1105
Horiba® Jobin Yvon	All Models	A13-	70-803-1105
Leeman	All Models	A11-	70-803-0969
Nu Instruments	ICP-MS	A51-	70-803-1858
Nu Instruments	TOF-ICP-MS	A52-	70-803-2044
PerkinElmer®	Optima, PE Avio	A21-	70-803-1070
PerkinElmer®	Elan/NexION 300/350	A22-	70-803-1049
PerkinElmer®	NexION 1000, 1100, 2000, 2200, 5000	A23-	70-803-1449
Radom	MICAP – OES™ 1000	A70-	70-803-2054
Shimadzu®	All Models	A41-	70-803-1311
Spectro™	All Models	A21-	70-803-1070
Standard BioTools™ (Fluidigm)	Helios	A21-	70-803-1070
Thermo Fisher Scientific®	PRO, 6000/7000, Q/RQ/TQ, X-Series & Neoma	A31-	70-803-1105
Thermo Fisher Scientific®	Neptune	A11-	70-803-1468



P/N 70-803-0969



P/N 70-803-2002



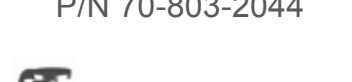
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P/N 70-803-2044



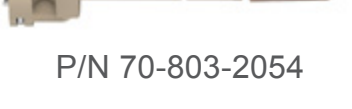
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P/N 70-803-2054



P/N 70-803-1049



P/N 70-803-1468



P/N 70-803-1449



P/N 70-803-1858



P/N 70-803-1311



# Glass Expansion Cyclonic Spray Chambers



**Cinnabar™**



**Tracey™**



**Twister™**



**Twinnabar™**



**PTFE (Tracey™  
& Twister™)**



**IsoMist™ XR**



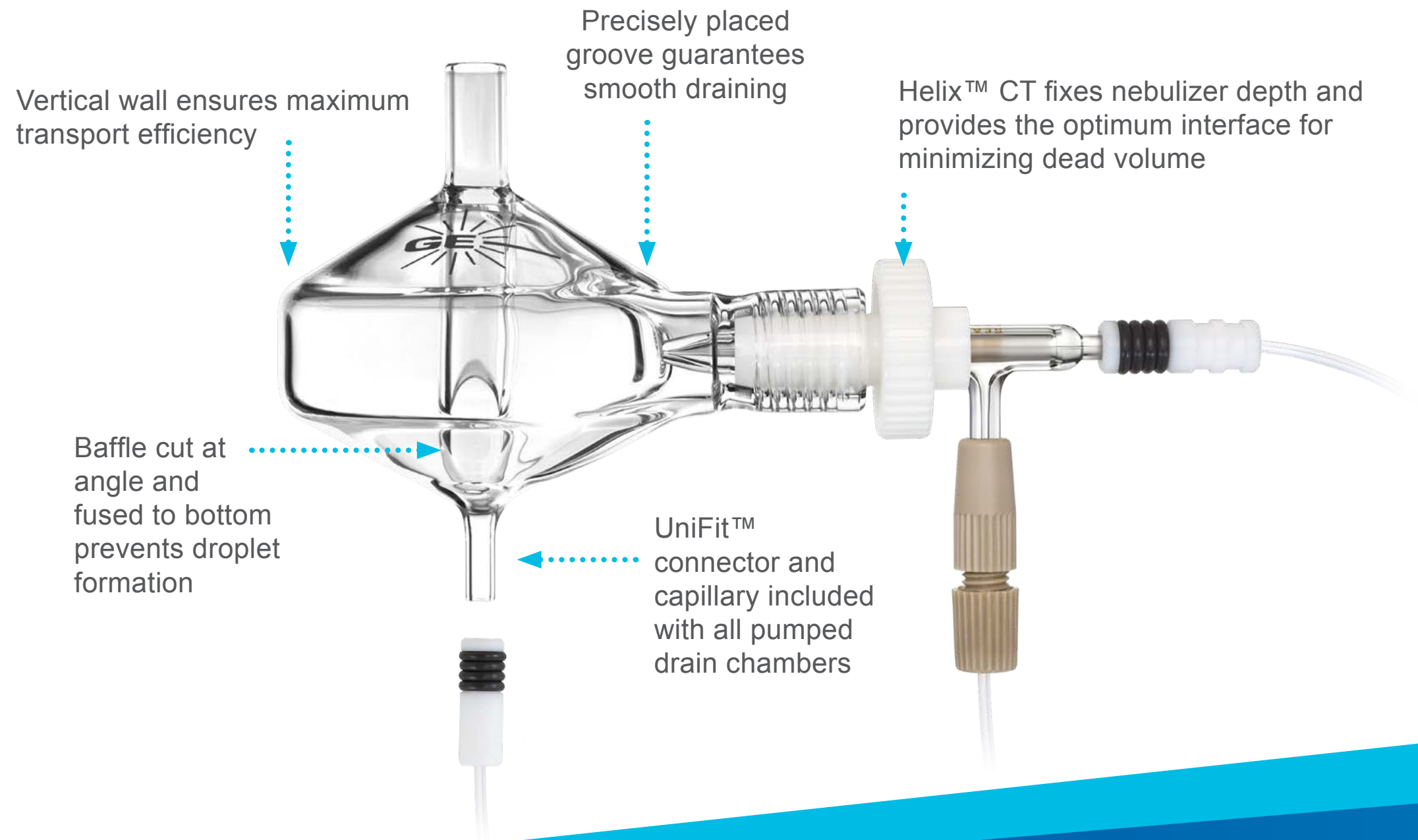
**PCC™**



**PFA Tracey™**



# Spray Chambers



# Helix™ CT Interface

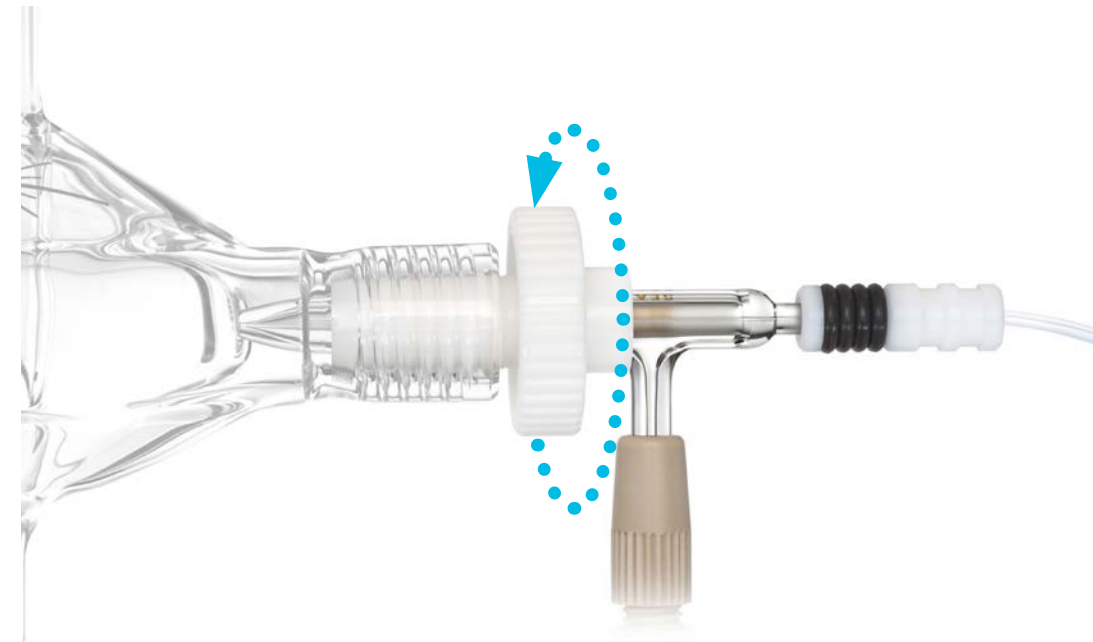
The new Helix locking screw with built-in torque control mechanism allows for a consistent seal of the PTFE ferrule against the nebulizer - making it impossible to overtighten or undertighten while ensuring a gas-tight seal each and every time.



Helix CT Locking Screw

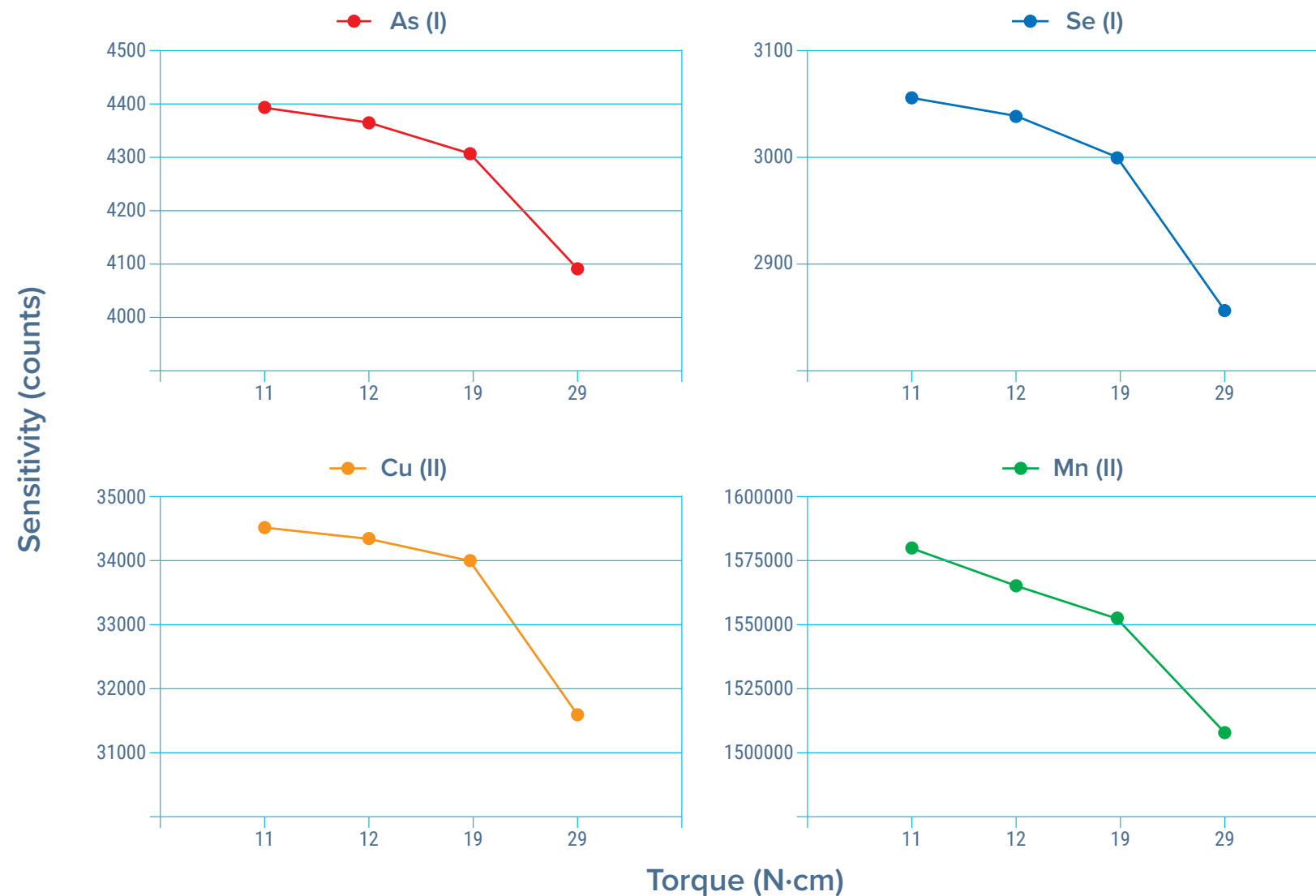


Helix CT Seal



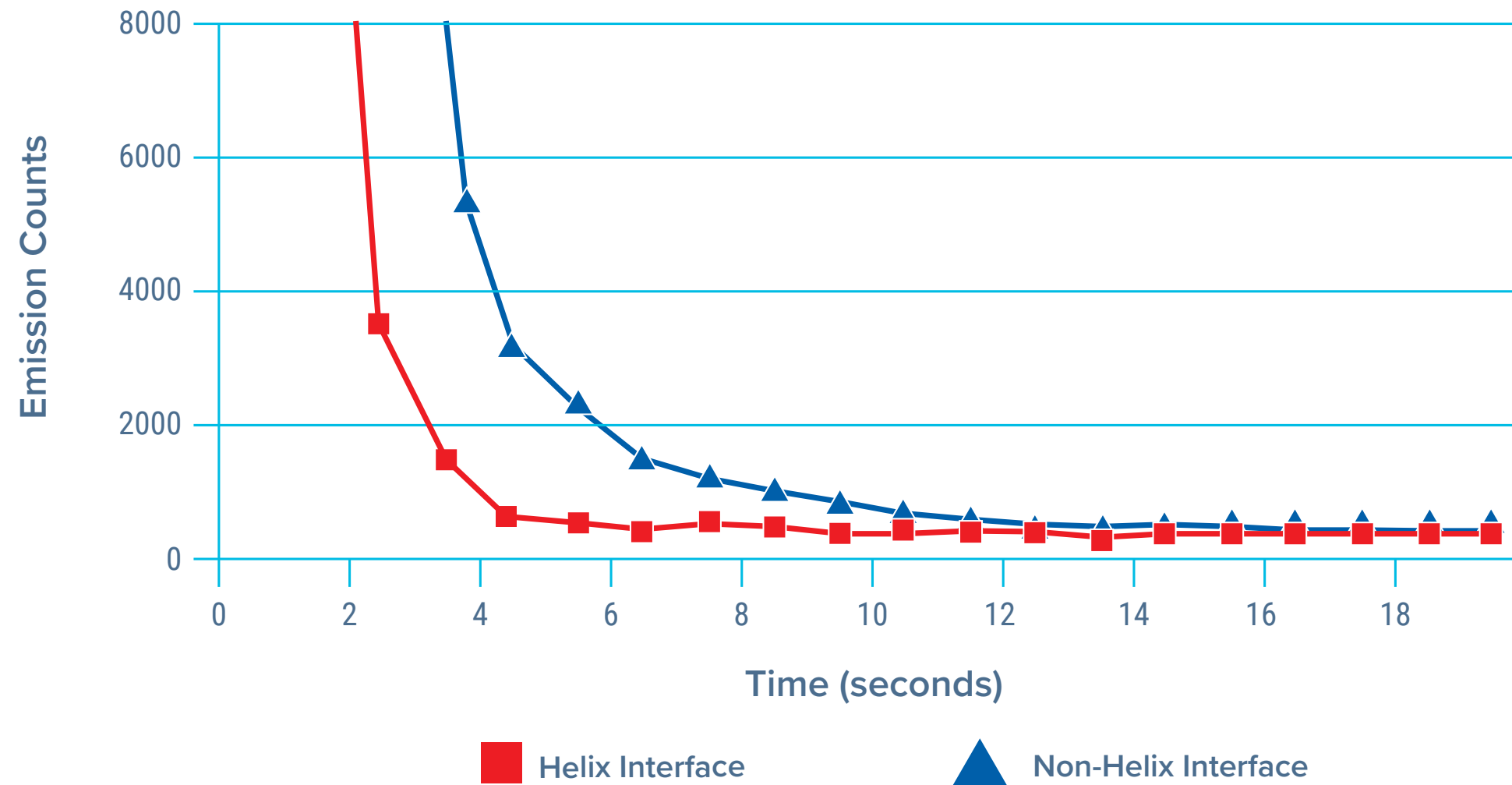
Tighten the nebulizer in place and seal the spray chamber by turning the knurled knob of the Helix CT further clockwise by hand until the ratchet mechanism clicks.

# Helix™ CT – Constant Torque



- ConstantTorque control
- Provides unparalleled, reproducible day-to-day ICP performance

# Helix™ CT – Washout Comparison



Non-Helix Interface

# Twister™ vs Tracey™

- Tracey™ provides approximately 15% increase in counts (on average)
- Twister™ provides improved signal to noise ratio (SNR)
- Negligible difference in signal-to-root background ratio (SRBR)
- Baffle of Twister provides narrower droplet distribution and smaller particle size
- **Twister more suitable for high matrix samples, improved short-term precision and solvents**



Twister™



Tracey™

# Spray Chambers

## Limitations of Room Temperature Spray Chambers

- Sensitivity drift as temperature changes
- **Excessive plasma loading (volatile solvents)**
- Excessive oxide formation (ICP-MS)
- Insufficient control of analyte transport



# IsoMist XR™



IsoMist™ XR



Glass



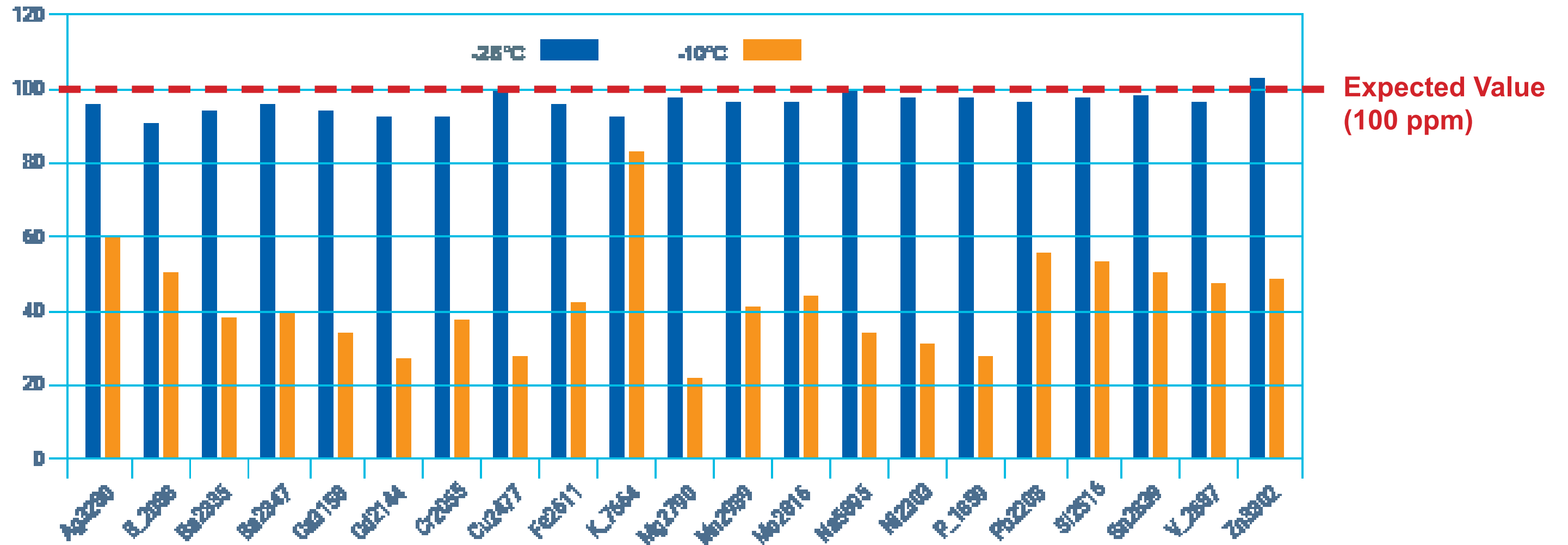
Quartz



PFA

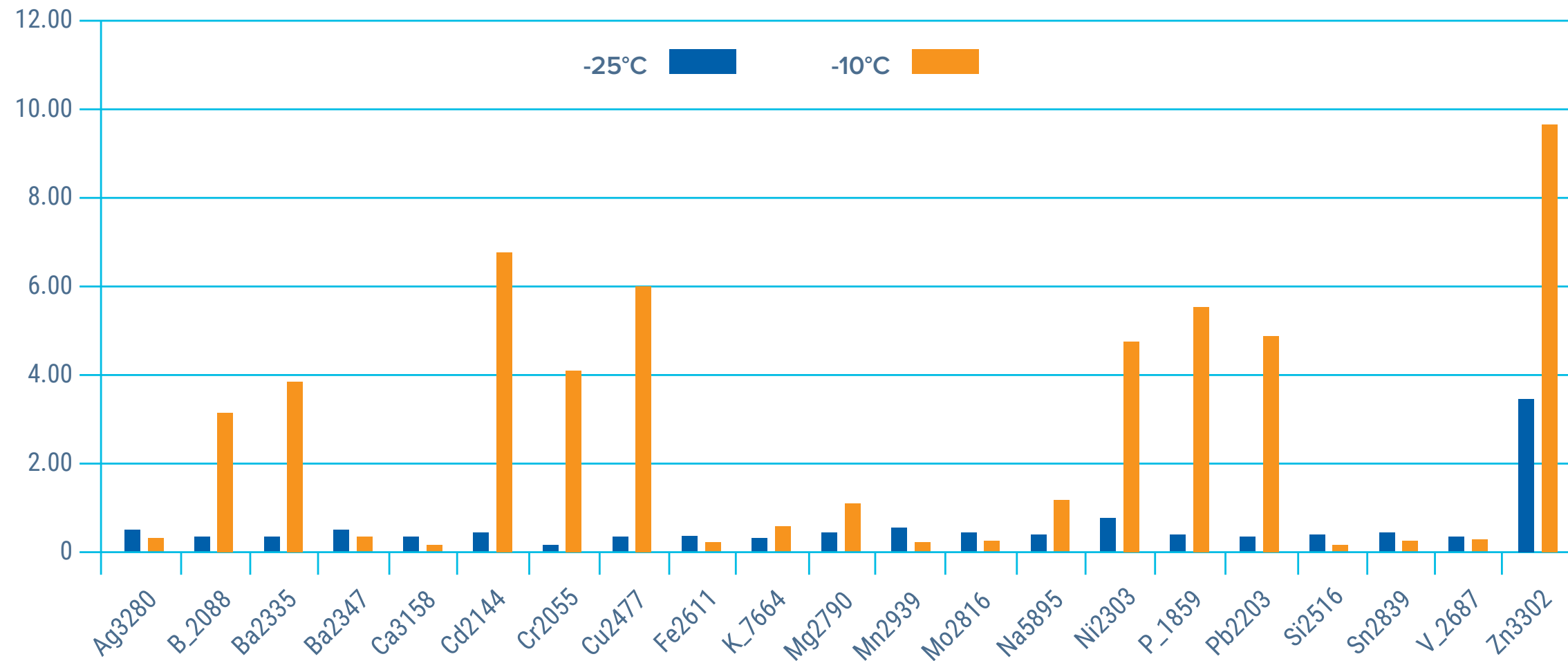
# IsoMist™ XR and Naphtha

Effect of Spray Chamber Temperature on Accuracy (100 ppm Standard)

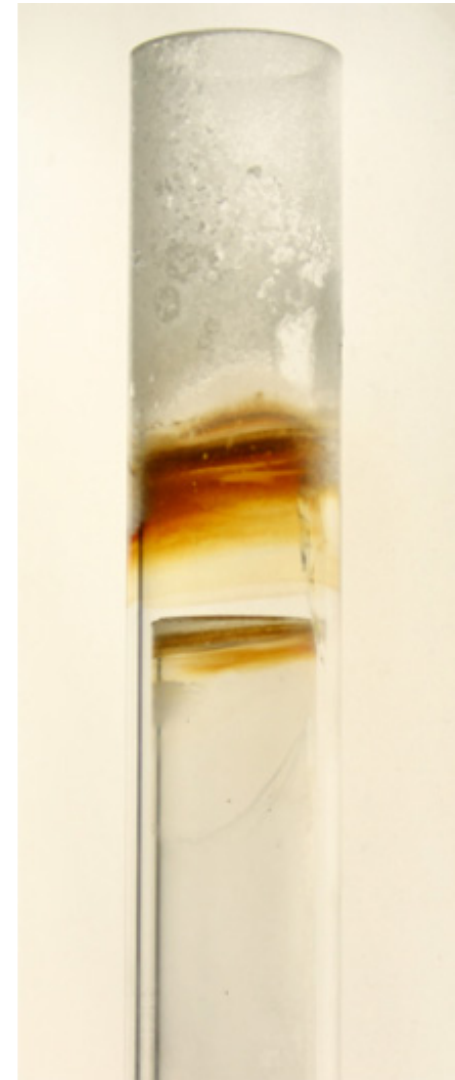


# IsoMist™ XR and Naphtha

## Effect of Spray Chamber Temperature on Precision



# Torches



# D-Torch™

The D-Torch is a cost-effective alternative for any laboratory with a moderate workload.

- Replace just outer tube (fastest to degrade)
- Alumina intermediate tube, which resists wear and is tolerant to high temperatures, high TDS and acid attack
- Easy to switch injector from HF-resistant, to large-bore quartz (high TDS), to small-bore quartz (organics)
- **Optional ceramic outer tube which does not devitrify or suffer from premature fractures like quartz**
- Economical price as you only replace the outer tube



D-Torch Thermo Fisher Scientific® PRO ICP-OES

# D-Torch™

- **D-Torch™ with ceramic outer tube is ideal for:**
- Analyses at the detection limit as the hotter plasma increases sensitivity
- **Monitoring of wear metals in engine oils, as quartz outer tubes often suffer cracking and shortened lifetimes due to thermal shock**
- Analysis of fusion samples where the lithium salts rapidly attack quartz
- Measuring high TDS samples that will quickly devitrify the quartz outer tube



D-Torch™ Thermo Fisher Scientific® PRO ICP-OES

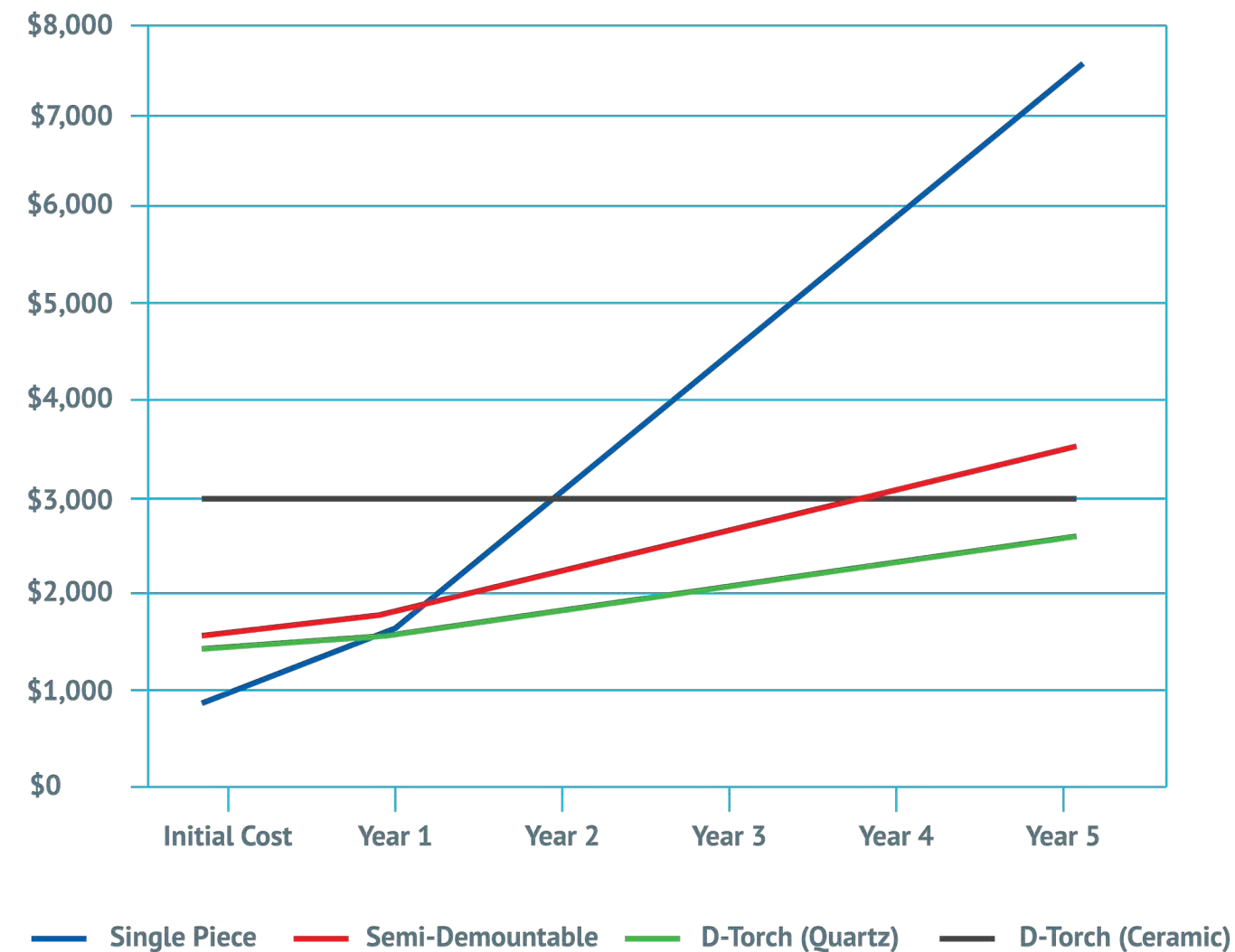


# Comparative Torch Ownership Costs

Agilent® 5000 Series D-Torch



Comparative torch ownership costs versus the D-Torch



# Latest Design: E-Torch

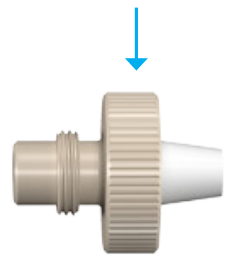
## Benefits

- Made from PEEK, PTFE & Quartz
- Shipped with P/N [31-808-2836](#), Capillary Quartz Injector 2.0mm (EMT)
- Interchangeable injectors, (Quartz, Ceramic, Sapphire)
- Compatible with Tracey™ DC spray chamber which eliminates ball joint clamps
- Performance equivalent to the D-Torch
- Ceramic tube set available on request for HF and high TDS applications
- **Low cost Inner and Outer tube assembly which simplifies deposit removal maintenance and allows for oven cleaning of Carbon deposits**
- Compatible with the Jet Vortex Interface (JVI)

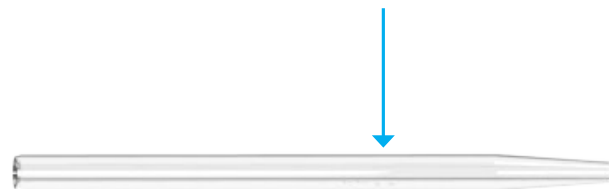


P/N 30-808-4388  
E-Torch for Thermo® PRO

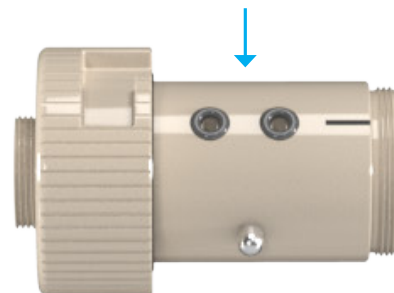
Torch DC Adaptor and Ferrule  
P/N 31-808-4499



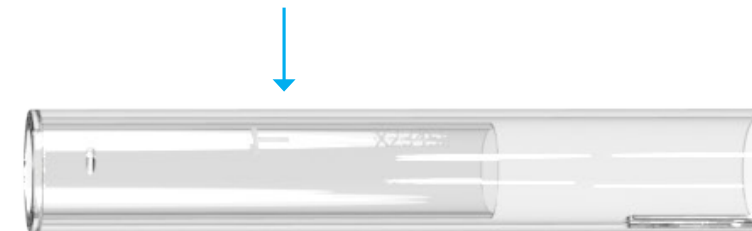
Quartz Injector 2.0mm  
P/N 31-808-2836



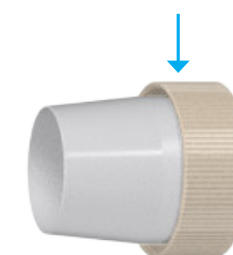
E-Torch Body  
P/N 31-808-4425



Torch Tube Set  
P/N 31-808-4390



E-Torch Retainer and Ferrule  
P/N 31-808-4498



# Thank You

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