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  - From Bruker
  - From Spectro
  - From Thermo

## APPLICATION SPOTLIGHT

### FINDING TECHNICAL SUPPORT FOR ICP-OES AND ICP-MS

The operation of ICP and ICP-MS instruments can be a challenge at times, especially when dealing with complex samples. You may have run into a sudden change in analyte sensitivity or received an odd error message. Many ICP and ICP-MS users rely on their co-workers for help, but there are also a number of helpful resources available to the ICP community.

#### Glass Expansion web site, [www.geicp.com](http://www.geicp.com)

Our web site has a number of very useful facilities to help the ICP analyst choose the best components and operating conditions.

#### Selection Guides

Under PRODUCTS>NEBULIZERS, there is a link to a nebulizer selection guide (shown in Figure 1). This has recently been updated to include new nebulizers. It gives the analyst a step by step approach to narrowing down the best nebulizer for the application. Similarly, under PRODUCTS>SPRAY CHAMBERS, a guide to selecting the best spray chamber is available (Figure 2).

Figure 1: Nebulizer Selection Guide at [www.geicp.com](http://www.geicp.com)

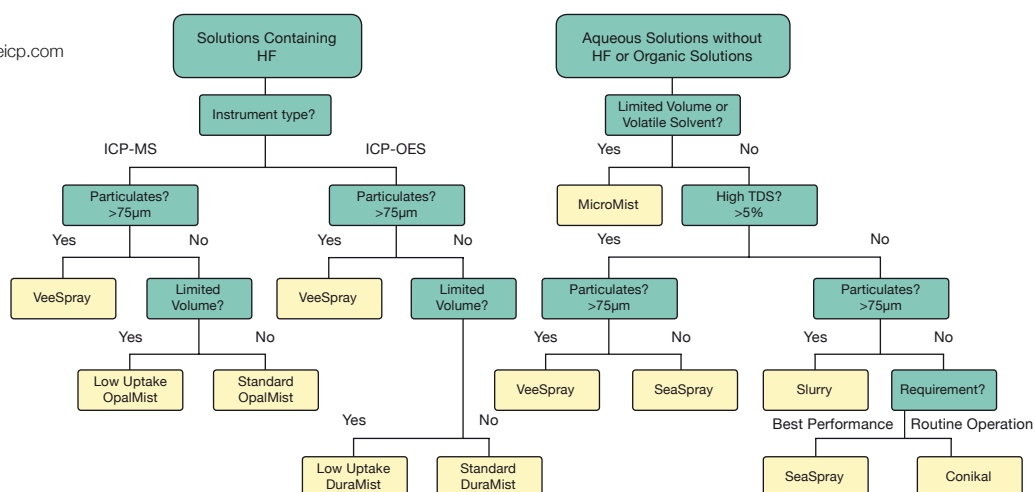
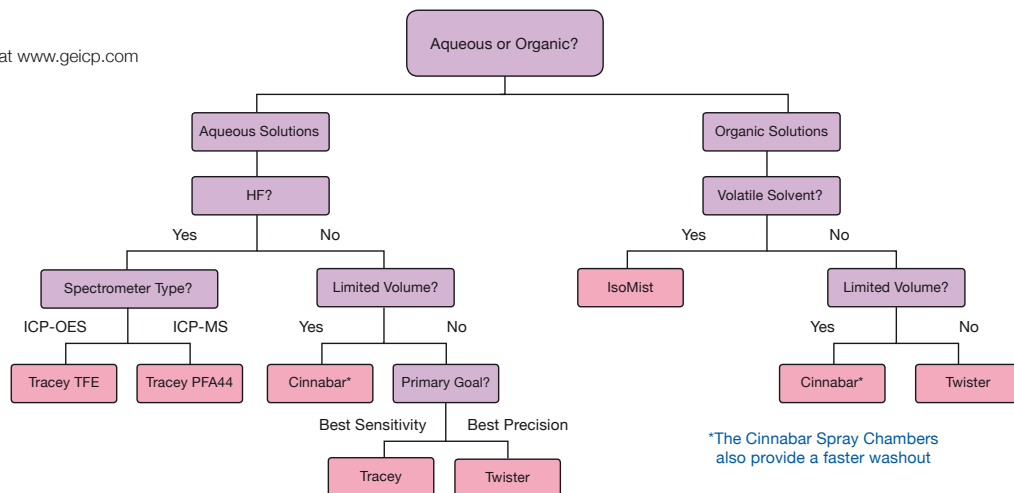


Figure 2: Spray Chamber Selection Guide at [www.geicp.com](http://www.geicp.com)



\*The Cinnabar Spray Chambers also provide a faster washout

**Component Selection**

Under SEARCH>SEARCH FOR A PRODUCT BY INSTRUMENT TYPE, you can choose from only those products that are compatible with your particular instrument model and configuration. Furthermore, for most models, you can drill down further to the specific application as shown in Figure 3. In that case, only the recommended components for the instrument and application will be displayed, facilitating the selection process.

**Perkin Elmer: Optima 8000/8300 DV Series**

**Instrument Applications**

- [Animal feed](#)
- [Brines and salts](#)
- [Chemicals and fertilizers](#)
- [Clinical and forensic materials](#)
- [Drinking, ground and surface water](#)
- [Food and drink](#)
- [Geological with HF](#)
- [Geological without HF](#)
- [Metals](#)
- [Petrochemicals](#)
- [Plants](#)
- [Soil and sediment with HF](#)
- [Soil and sediment without HF](#)
- [Waste water and sludge](#)
- [Wear Metals in oil](#)

**All Products**

Figure 3: Application specific search categories at www.geicp.com

**Online Calculators**

From the homepage, you can access two calculators as follows:

- **Pump Speed and Sample Uptake Calculator:** As shown in Figure 4, you can enter the ID of the pump tubing, the ICP model, and the Pump speed and the calculator will give the sample uptake rate. If your particular ICP model is not listed, you can enter the pump diameter, number of rollers, and roller diameter to achieve an accurate result.
- **Trident Dilution Factor Calculator:** As shown in Figure 5, this facility tells you by how much you are diluting your sample and internal standard depending upon your selection of pump tubing when using on-line addition of internal standard solution.

**Pump Speed and Sample Uptake Calculator**

- Choose the right pump tubing to give you the required sample uptake
- Select the pump speed to give you the required sample uptake
- Find out what the sample uptake is with the pump tubing and pump speed you are currently using

**Step 1. Select pump configuration**

Choose ICP model

Pump diameter (to outside of rollers)  mm

Number of rollers

Roller diameter  mm

**Step 2. Select pump tubing**

Select pump tubing

**Step 3. Calculate pump speed or sample uptake**

Sample uptake  (µl/min)      Pump speed  RPM

Enter your required sample uptake to calculate the pump speed OR your actual pump speed to calculate the sample uptake.

This calculation should be used as a guide only. Variations between pump tubes and roller pressures mean that the accuracy of the calculation cannot be guaranteed.

Figure 4: Uptake rate calculator at www.geicp.com

**Trident Dilution Factor Calculator**

Do you need to know how much your sample and internal standard are diluted?  
Simply select your peristaltic pump tubing and our Dilution Factor Calculator will show you.

Sample pump tubing

Internal standard pump tubing

---

Sample is diluted by **10.5%**  
ie Final conc. of sample is **0.895** times initial concentration

---

Internal standard is diluted by **89.5%**  
ie Final conc. of internal standard is **0.105** times initial concentration  
or Internal standard is diluted by a factor of **9.5**

This calculation should be used as a guide only. Variations between pump tubes and roller pressures mean that the accuracy of the calculation cannot be guaranteed.

Figure 5: Trident In-line internal standard addition dilution calculator

**Technical Resources**

Under the NEWS tab, you can select from several valuable resources as follow:

- **Glass Expansion Newsletter:** Here is the archive of all of the thrice yearly newsletters generated since its inception in 2003.
- **References:** an abridged list of books and articles related to ICP spectrometry
- **Exhibitions and Conferences:** All of the conference presentations made by Glass Expansion technical staff are available for download from this page.
- **Applications Notes:** Here is a list of applications notes focused on specific Glass Expansion products.

## ICP Manufacturers' Websites

Many of the instrument companies release application notes featuring their newest products or address the newest regulations enforced by organizations such as the FDA, EPA, and USP. You can also use their search field to find lists of related technical information or topics such as, "Lead in Toys." In addition to application notes they also feature a number of informative webinars. Below is a sampling of some of the major OEM web sites and their technical resources.

### Agilent, [www.agilent.com](http://www.agilent.com)

Agilent recently enhanced their website. It features an online application library; you can begin a search by entering in your element of interest or phrase and then narrow your search by measurement technique. Below is a link to the ICP applications page.

<http://www.chem.agilent.com/en-US/search/library/Pages/LibrarySearchResult.aspx?k=icp>

A video library has helpful how-to tools for ICP.

[http://www.chem.agilent.com/en-US/search/library/Pages/VideoSearchResult.aspx?k=icp&a=LngContentType:"MultimediaST"](http://www.chem.agilent.com/en-US/search/library/Pages/VideoSearchResult.aspx?k=icp&a=LngContentType:)

You can also search their library of e-Seminars at the following link:

<http://www.chem.agilent.com/en-US/Training-Events/eSeminars/Pages/default.aspx>

### HORIBA Scientific, [www.horiba.com](http://www.horiba.com)

HORIBA Scientific offers online training registration for many instruments, including ICP-OES:

<https://www.horiba.com/scientific/products/atomic-emission-spectroscopy/training/online-training-registration/>

An online service and support request form is also available. Just fill in the form and get answers on your technical or analytical questions:

<https://www.horiba.com/scientific/products/atomic-emission-spectroscopy/service-request/>

The HORIBA Scientific website has an improved application note library. Finding the right application note is now faster using the link below:

<http://www.horiba.com/scientific/products/atomic-emission-spectroscopy/application-notes/>

### PerkinElmer, [www.perkinelmer.com](http://www.perkinelmer.com)

If you search the Perkin Elmer web site by going first to RESOURCES > TECHNICAL SUPPORT and search on "ICP", a list of applications articles relating to ICP is displayed. Perkin Elmer also has an "Application E-Zine" featuring their latest application notes. You can subscribe and receive a quarterly compendium consisting of a broad range of applications within various industries. Go to the following link to subscribe: <http://www.perkinelmerapplications.com/subscribe/>

### Shimadzu, [www.ssi.shimadzu.com/](http://www.ssi.shimadzu.com/)

Shimadzu offers a number of application specific PDF notes in relation to ICP-OES.

<http://www.ssi.shimadzu.com/search/searchresults.cfm?searchitem=icp>

### Spectro Ametek, [www.spectro.com](http://www.spectro.com)

Spectro's web site offers an E-Learning Module (SUPPORT>E-LEARNING) that provides instructions for varying levels of analytical expertise. For example, there is a training module on OES Fundamentals.

### Teledyne Leeman Labs, [www.teledyneleemanlabs.com](http://www.teledyneleemanlabs.com)

Under Information Resources, you can access a list of applications notes for ICP spectrometry, as well as product brochures and published papers. There is also a tool to help the analyst determine the best ICP configuration for his application at

[http://www.teledyneleemanlabs.com/ICP\\_selector/icp.aspx](http://www.teledyneleemanlabs.com/ICP_selector/icp.aspx).

### Thermo Scientific, [www.thermoscientific.com](http://www.thermoscientific.com)

Thermo has a convenient search facility that allows you to search ICP within the Applications subset and take you to the following page.

<http://www.thermoscientific.com/ecommerce/servlet/search?keyword=icp&frmSearchType=5&searchType=5&searchSubType=-1&storeId=11152>

## Other Web Sites

**European Virtual Institute for Speciation Analysis (EVISA),**  
[www.speciation.net](http://www.speciation.net)

This web site focuses primarily on elemental speciation by ICP-MS coupled to Liquid Chromatography. The site also targets isotopic speciation. You can subscribe to their newsletter, view upcoming pertinent conferences, or register for the on-line forum.

**Inorganic Ventures, [www.inorganicventures.com](http://www.inorganicventures.com)**

From the TECH CENTER on the home page you can access an interactive periodic table which gives common wavelengths and masses along with detection limits and interferences. There are also a number of tutorials listed under GUIDES AND PAPERS.

## PlasmaChem Listserv

This international list server organized and maintained by Michael Cheatham at Syracuse University in New York is an excellent source of expertise in ICP optical and mass spectrometry. Analysts can pose specific questions to the group and get valuable replies from some of the industry's most knowledgeable scientists. Go to the following link to subscribe.

<https://listserv.syr.edu/scripts/wa.exe?A0=PLASMACHEM-L>

## Books

A number of excellent books are available on the subject. A sampling of these is listed below.

- **Practical Guide to ICP-MS: A Tutorial for Beginners**, Second Edition, by R. Thomas, published by CRC Press, 2008.
- **ICP Emission Spectrometry – A Practical Guide**, by J. Noelte, published by Wiley-VCH, 2003.
- **Inorganic Mass Spectrometry, Principles and Applications**, by J.S. Becker, published by John Wiley and Sons, Ltd., 2007.
- **Inductively Coupled Plasma Mass Spectrometry**, edited by Akbar Montaser, published by Wiley-VCH, 1998.
- **ICP Mass Spectrometry Handbook**, by Simon Nelms, published by CRC Press, 2005.
- **Handbook of Inductively Coupled Plasma Mass Spectrometry**, by K. Jarvis, A. Gray, S. Houk, published by Blackie Press, 1991.
- **Liquid Sample Introduction in ICP Spectrometry. A Practical Guide**, by J-L. Todoli and J-M. Mermet, published by Elsevier, 2008.
- **Microwave Induced Plasma Analytical Spectroscopy**, K.J. Jankowski and E. Reske, published by RSC, 2010.

## Journals

There are several good refereed journals that should be consulted for articles on ICP optical or mass spectrometry as follows:

- *Spectrochimica Acta, B.*, published by Elsevier
- *Applied Spectroscopy*, published by SAS
- *Journal of Analytical Atomic Spectrometry (JAAS)*, published by RSC
- *Talanta*, published by Elsevier

Other non-refereed journals which may have pertinent information include Spectroscopy Magazine (Advanstar), American Laboratory (LabCompare), Laboratory Equipment (Advantage Business Media), Lab Manager Magazine (LabX), and ICP Information Newsletter (Dr. Ramon Barnes). The ICP Information Newsletter gives an unabridged listing of all conferences and papers related to ICP.

## Conferences

Although there are too many conferences that touch upon this field to list them all, we will list below the most significant events.

- **Pittcon** in the US in March of each year (next on March 17-21, 2013, in Philadelphia). Pittcon is noted for its large exhibition of analytical products as well as a varied technical program.
- **Analytica** in Germany in April every other year (next on April 1-4, 2014, Munich). This has become one of the largest analytical trade shows in the world and has sister conferences in Asia and South America.
- **Winter Conference on Plasma Spectrochemistry** (alternates between US and Europe each year). Next European conference is in Krakow, Poland, February 10-15, 2013. Next US conference is in Amelia Island, FL, January 6-11, 2014. This is a very focused conference which also has a small but all-ICP exhibition.
- **SCIX** (formerly FACSS) held annually in the US, just held in Kansas City, MO from September 30-October 5, 2012. SCIX covers many areas of analytical chemistry and allied sciences and houses a broad based exhibition.
- **Eastern Analytical Symposium (EAS)**, held in Somerset, NJ annually. Next date is November 12-15, 2012. EAS addresses all areas of analysis but has a strong focus on chromatography. A broad based analytical product exhibition is on display.
- **Canadian Mineral Analysts (CMA)**, held in Canada in September annually, just held from September 9-13, 2012. CMA attracts an international group of analysts primarily involved in analytical geoscience.
- **Colloquium Spectroscopicum Internationale (CSI)**, moves all over the globe (next held in Tromsø, Norway from June 16-21, 2013). CSI addresses all areas of spectroscopy and has a pertinent product exhibition.

## People

Sometimes the most valuable technical resource is a conversation with an experienced analyst. All of the instrument manufacturers have applications scientist who work with the instrumentation on a daily basis and are familiar with many applications. Glass Expansion has a staff of scientists who are experienced in all aspects of ICP optical and mass spectrometry and particularly fluent in sample introduction technology. Between our US and Australian offices, there is someone available to talk with real time 18 out of each 24 hour weekday.

## Summary

We hope you find the above listings helpful. If we missed some, please let us know so we can pass that information along to your colleagues.

# NEW PRODUCTS

## D-Torch for Agilent (Varian) 700-ES/Vista Axial and PerkinElmer Optima 8x00 DV

The D-Torch is a new demountable torch design that provides the benefits of a fully demountable torch at a significantly lower cost. We have previously released the D-Torch for several ICP-OES and ICP-MS models. D-Torches are now available for the Agilent (Varian) 700-ES/Vista Axial and PerkinElmer Optima 8000/8300 DV models.

The D-Torch is a cost-effective alternative to the standard fixed torch or semi-demountable torch. It will save money for any laboratory with a moderate workload. In most cases, when the torch wears, you will only need to replace the outer tube instead of replacing the entire torch. You will realize a saving after replacing the outer tube three to five times. In addition, interchangeable quartz and alumina injectors are available for the 700-ES/Vista torch. The Optima 8000/8300 D-Torch is compatible with the full range of standard injectors.

The optional ceramic outer tube is much more robust than quartz and provides extended torch life, particularly with samples that cause rapid deterioration of a quartz torch, such as fusions, high salt solutions or oils.

Part No.	Description
<b>30-808-2919</b>	D-Torch for 700-ES or Vista Axial
<b>31-808-3027</b>	Ceramic Outer Tube for 700-ES/Vista Axial D-Torch
<b>31-808-3043</b>	Tapered Quartz Injector 2.4mm for 700-ES/Vista Axial D-Torch
<b>31-808-3133</b>	Tapered Alumina Injector 2.4mm for 700-ES/Vista Axial D-Torch
<b>30-808-3300</b>	D-Torch for Optima 8000/8300 DV
<b>31-808-2990</b>	Ceramic Outer Tube for Optima 8000/8300 DV D-Torch

Click [here](#) to see the full D-Torch range.



## ConeGuard Thread Protector for Thermo Micro-Skimmer

We recently released ConeGuards for a range of ICP-MS cones. The range has now been extended to include the Thermo micro-skimmer cone.

### Thermo X Series and PlasmaQuad

ConeGuard Thread Protector Part No.	Cone Part No.	OEM Cone Part No.	Cone Description
<b>70-803-1028</b>	<b>TG1004-Ni</b>	3200860	Nickel Micro-Skimmer
	<b>TG1004-Al</b>	3201101	Aluminium Micro-Skimmer
	<b>TG1008-Pt</b>		Platinum Micro-Skimmer



When cleaning cones which have a screw thread, it is important that the thread is not contacted by any corrosive solution. If the thread gets corroded, the cone may not seal correctly or it may bond to the base and be difficult to remove. And with Pt cones, the thread is likely to wear out before the Pt insert. The Glass Expansion ConeGuard Thread Protector seals the thread and protects it from corrosion during the cleaning process.

Click [here](#) to see the full ConeGuard range.

## HF Resistant Niagara Plus and Assist Kits

The Niagara Plus is well established as the most effective way to reduce analysis time, increase sample throughput and reduce operating costs. And the Assist syringe-driven sample introduction system improves accuracy and precision as well as reducing the analysis time. Both of these systems use a positive displacement pump to rapidly fill a sample loop. The only disadvantage of this system is that the pump is not compatible with hydrofluoric acid (HF). To overcome this problem, we have now released new Niagara Plus and Assist systems that use a syringe drive in place of the positive displacement pump. Since no sample comes in contact with the syringe, these systems are compatible with all ICP samples, including those containing HF. The ordering details are as follows:

Part No.	Description
<b>KT-1110</b>	Niagara Plus for HF with uptake syringe
<b>KT-1111</b>	Assist Basic Package for HF with uptake syringe
<b>KT-1112</b>	Assist Premium Package for HF with uptake syringe

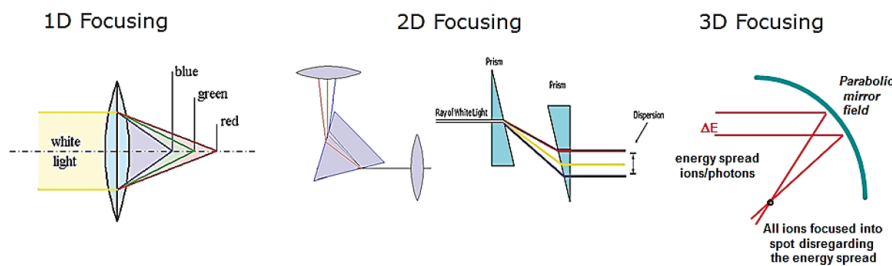
# INSTRUMENT NEWS

## From Bruker – Ion Optics Design Trends in ICP-MS

A critical part of ICP-MS design is its ion optics. Today most manufactures of ICP-qMS have now turned to the 90° Ion Optics design. Historically one dimensional (1D) and two dimensional (2D) ion optics systems have been used however Bruker utilizes a unique three dimensional (3D) 90 degree ion optics system. Ultimately with ICP-MS the more ions collected the better the sensitivity. The principles can best be described using photon optics.

In one dimensional (1D) and two dimensional (2D) optics light is focused onto a given plain, (be it in line or offset) however energy dispersion still occurs as a result of the ‘deflection’ process. However with Bruker’s three dimensional (3D) optics, the entire beam is both ‘reflected’ and ‘focused’ irrespective of the individual energy levels associated with its makeup.

The patented 90 degree 3D reflecting ion optics system in Bruker’s aurora M90 ICP-MS delivers market leading sensitivity – more than 1Gcps per mg/L (1000 million cps per mg/L) for In<sup>115</sup>. This extreme sensitivity is achieved without sacrificing oxide interferences (CeO<sup>+</sup>/Ce<sup>+</sup> <3%). The aurora M90 also allows flexibility to choose the sensitivity mode that is most useful for the sample type, or application, at hand.



For more information go to: <http://www.bdal.de/products/icp-ms/aurora-m90/learn-more.html> or visit us at: <http://www.bdal.de/products/icp-ms>

## From SPECTRO – SPECTROBLUE ICP-OES Spectrometer brings home Innovation Award from ACHEMA Trade Fair

At the ACHEMA Trade Show (June 17-22), SPECTRO Analytical Instruments received the Innovation Award for its breakthrough SPECTROBLUE ICP-OES spectrometer. SPECTRO was selected for the award by four top trade magazines (*Process*, *Process Worldwide*, *PharmaTEC*, and *Laborpraxis*) from among 110 nominees, who competed for awards in eleven categories. Criteria for the award included the degree of innovation, product quality and economic feasibility for end users.

“With the SPECTROBLUE, we scored points in every category,” explains Olaf Schulz, who has responsibility for the SPECTRO ICP spectrometer product line. Introduced in 2011, the SPECTROBLUE ICP-OES spectrometer targets mainly environmental laboratories that need quick and accurate analysis of water, wastewater, sewage sludge and soil samples for toxic heavy metals.

SPECTRO, a global leader in spectrometry instrumentation, has received frequent recognition for its industry innovations. In June 2011, the SPECTRO MS ICP spectrometer received an R&D 100 award from R&D magazine for its Array Detection Technology. That same instrument also received an ACCSI award from the Chinese Analytical Industry in May 2011 and the PITTCON Editors’ Silver Award in March 2010.

Please contact Tom Milner for additional information, E-Mail: [spectro.info@ametec.com](mailto:spectro.info@ametec.com).



# INSTRUMENT NEWS

## From Thermo Scientific – Getting the Most From Your ICP-MS Instrument

### Live Webcast:

Thursday, October 18, 2012 at 8:00 am PST, 11:00 am EST, and 15:00 GMT

Register Free at [www.spectroscopyonline.com/icpms-software](http://www.spectroscopyonline.com/icpms-software)

### Event Overview:

Sample analysis is not just about having good technology. Software is the most user-interactive feature of an instrument package and as such greatly influences staff morale, performance, and throughput capabilities. This complimentary webinar will demonstrate how new software for ICP-MS can improve laboratory performance by enabling simple operation and fast start up, full workflow solutions via seamless integration with different inlet systems, rapid evaluation of results from clear and flexible presentation of the analytical data, and reduced operational costs.

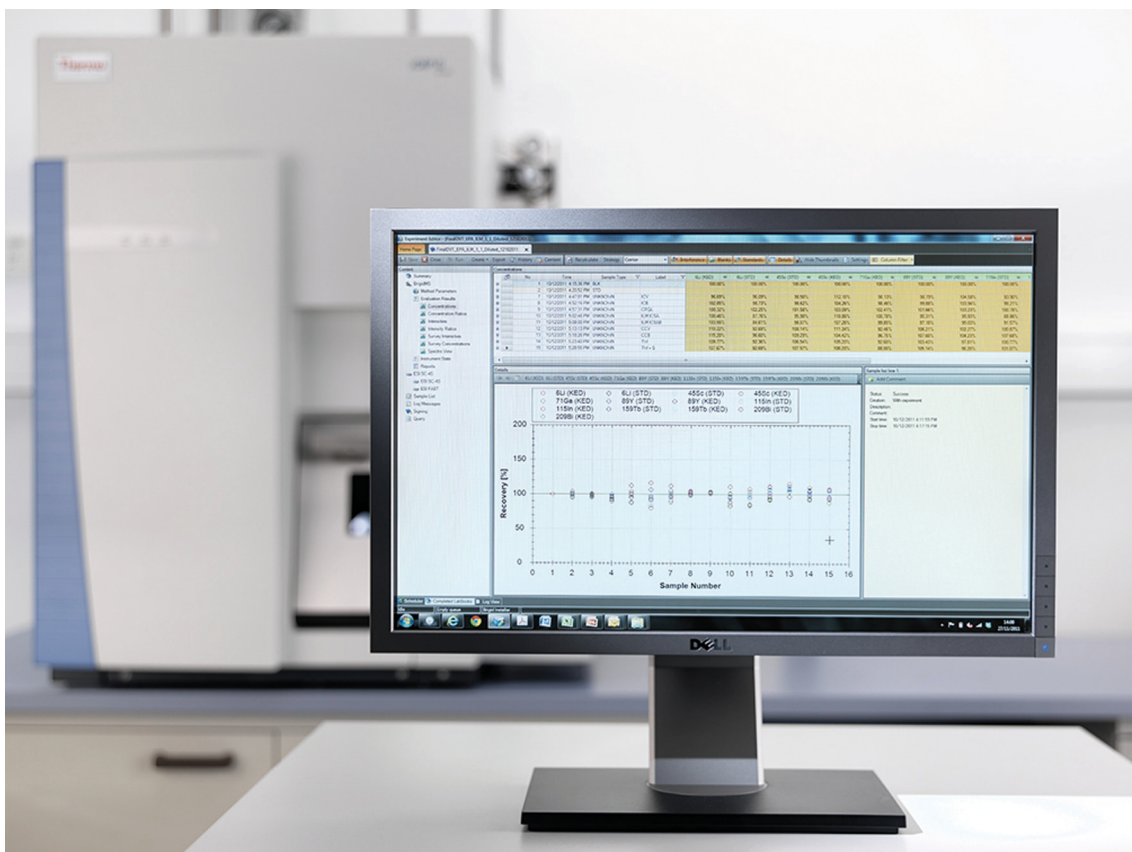
### Learn how to:

- Achieve rapid start up and intuitive method development
- Simplify workflow control and analytical reporting for all levels of users
- Integrate control of different inlet systems and peripherals, including laser ablation and chromatographic systems
- Build an approval workflow for compliance with regulations such as 21CFR11

There will also be a 15 minute Q&A session where our Thermo Scientific ICP-MS and software experts will answer your questions and queries.

**Don't worry if you miss the live event – register at [www.spectroscopyonline.com/icpms-software](http://www.spectroscopyonline.com/icpms-software) to watch the recording!**

Presented by Thermo Scientific. Hosted by Spectroscopy magazine.



# CONEGUARD™ THREAD PROTECTOR

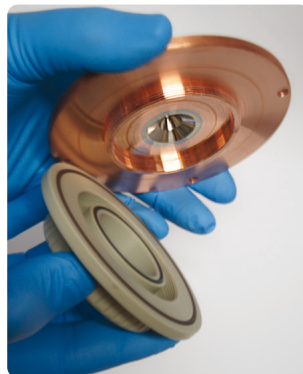
Extend the life of your ICP-MS cones



When cleaning cones which have a screw thread, it is important that the thread does not come in contact with any corrosive solution. If the thread gets corroded, the cone may not seal correctly or it may bond to the base and be difficult to remove. And with Pt cones, the thread is likely to wear out before the Pt insert.

It is also important to keep the thread in good condition to prevent cross-threading and potential damage to the cone housing.

The Glass Expansion ConeGuard™ Thread Protector seals the thread and protects it from corrosion during the cleaning process. The ConeGuard is available for a range of ICP-MS models. Please visit our website or contact us for details.



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Quality By Design