



The following documentation is an electronically-submitted vendor response to an advertised solicitation from the *West Virginia Purchasing Bulletin* within the Vendor Self-Service portal at ***wvOASIS.gov***. As part of the State of West Virginia's procurement process, and to maintain the transparency of the bid-opening process, this documentation submitted online is publicly posted by the West Virginia Purchasing Division at ***WVPurchasing.gov*** with any other vendor responses to this solicitation submitted to the Purchasing Division in hard copy format.

Header 4

List View

General Information

Contact

Default Values

Discount

Document Information

Procurement Folder: 317430

SO Doc Code: CRFQ

Procurement Type: Central Purchase Order

SO Dept: 1400

Vendor ID: 000000186851

SO Doc ID: AGR1700000016

Legal Name: THERMO ELECTRON NORTH AM LLC

Published Date: 5/1/17

Alias/DBA:

Close Date: 5/18/17

Total Bid: \$123,887.11

Close Time: 13:30

Response Date: 05/16/2017

Status: Closed

Response Time: 15:56

Solicitation Description: Inductively Coupled Plasma Mass Spectrometry (ICP-MS)

Total of Header Attachments: 4

Total of All Attachments: 4



Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Solicitation Response

Proc Folder : 317430

Solicitation Description : Inductively Coupled Plasma Mass Spectrometry (ICP-MS)

Proc Type : Central Purchase Order

Date issued	Solicitation Closes	Solicitation Response	Version
	2017-05-18 13:30:00	SR 1400 ESR05161700000005613	1

VENDOR

000000186851

THERMO ELECTRON NORTH AM LLC

Solicitation Number: CRFQ 1400 AGR1700000016

Total Bid : \$123,887.11

Response Date: 2017-05-16

Response Time: 15:56:31

Comments: N/A

FOR INFORMATION CONTACT THE BUYER

Tara Lyle
(304) 558-2544
tara.l.lyle@wv.gov

Signature on File

FEIN #

DATE

All offers subject to all terms and conditions contained in this solicitation

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
1	ICP-MS Autosampler, computer, software	1.00000	EA	\$121,787.110000	\$121,787.11

Comm Code	Manufacturer	Specification	Model #
41000000			

Extended Description :	ICP-MS Autosampler, computer, software
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Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
2	Shipping Charges & Inside Delivery	1.00000	EA	\$2,100.000000	\$2,100.00

Comm Code	Manufacturer	Specification	Model #
78121603			

Extended Description :	Shipping Charges & Inside Delivery
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Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
3	Installation/Validation	1.00000	EA	\$0.000000	\$0.00

Comm Code	Manufacturer	Specification	Model #
73171605			

Extended Description :	Installation/Validation
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Comments: Included in Item 1

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
4	Training/Warranty	1.00000	EA	\$0.000000	\$0.00

Comm Code	Manufacturer	Specification	Model #
73171605			

Extended Description :	Training/Warranty
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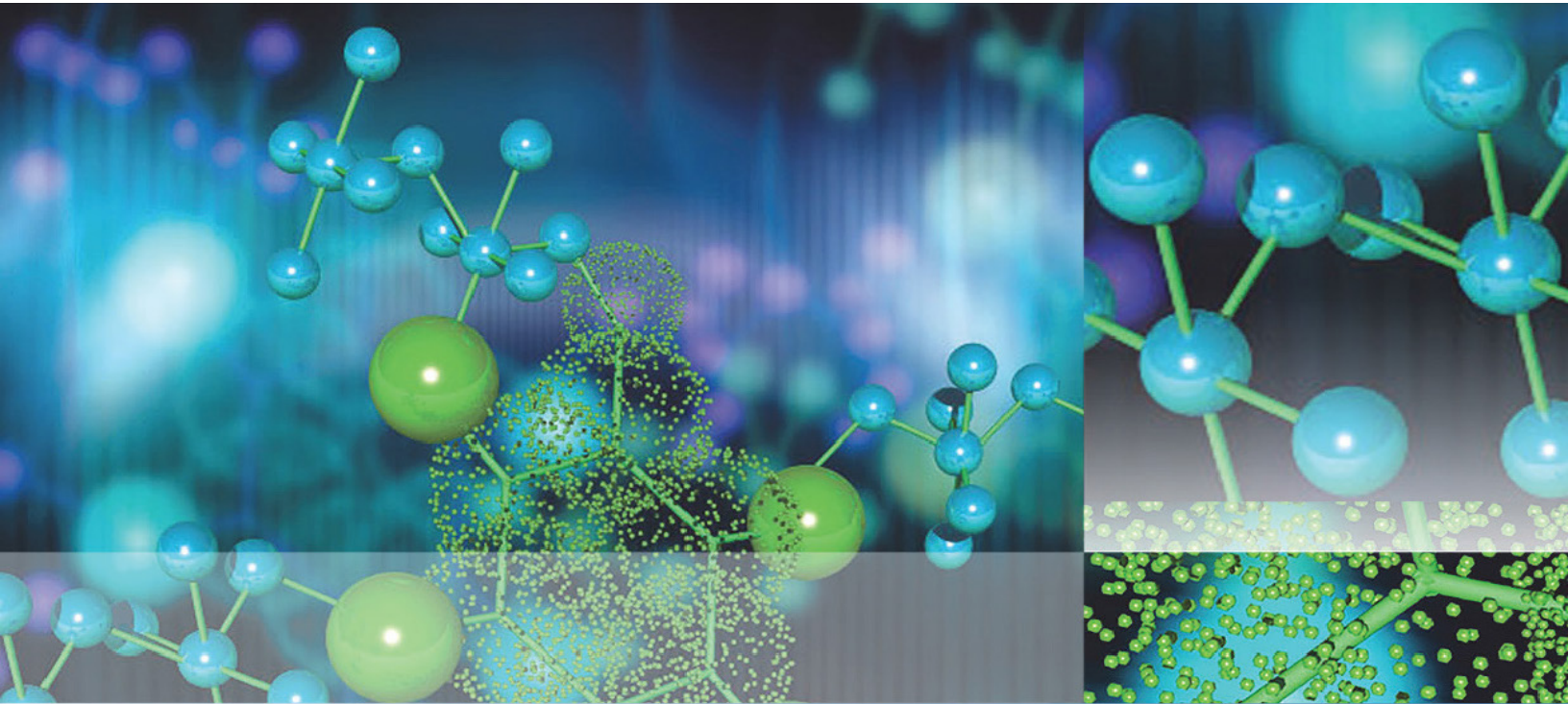
Comments: Included in Item 1

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
5	Preventative maintenance	1.00000	EA	\$0.000000	\$0.00

Comm Code	Manufacturer	Specification	Model #
81101706			

Extended Description :	Preventative maintenance
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Comments: Included in Item 1



iCAP RQ ICP-MS

CPQ-00067097

May 16, 2017

State of West Virginia

Tara Lyle

2019 Washington Street, East
Charleston West Virginia 25305
United States

ThermoFisher
SCIENTIFIC

Sales Quotation

Quote Number	Quotation Date	Expiration Date	Page
CPQ-00067097	May 16, 2017	August 18, 2017	2
Lead Time	Payment Terms	Freight Terms	PO Submission
6-8 weeks	NET 30 DAYS UPON INVOICE DATE	Origin - Prepay And Add	See the end page
Company Name		Customer Name	
State of West Virginia		Tara Lyle	

Thermo Electron North America LLC
5225 Verona Road
Madison WI 53711

1400 Northpoint Parkway
West Palm Beach FL 33407

The Thermo Fisher iCAP RQ ICP-MS Spectrometer meets the requirements set fourth in Section 3.1.1.6. The instrument specifications are adequate to achieve the results in that section. Attached is the application note on EPA Method 200.8.

Customer Information:

Customer Name: Tara Lyle
Company Name: State of West Virginia
Address: 2019 Washington Street, East
Charleston West Virginia 25305
United States
Phone:
Email: tara.l.lyle@wv.gov

Sales Contact Information:

Contact Name: Gwyneth Trojan
Phone: +1 (724) 331-1919
Email:
gwyn.trojan@thermofisher.com

iCAP RQ ICP-MS

Item	Description	Unit Price	Qty	Total Price
1.1	0731297 iCAP RQ (C2) ICAP RQ Quadrupole ICP-MS Spectrometer with 2 QCell MFCs	\$144,073.04	1	\$144,073.04

Complete ICP-MS analysis system to include:

- ~ Digital, solid state RF-generator with dynamic frequency impedance matching to the plasma at ~27 MHz. Full PC control giving continuously variable power from 380 W to 1600 W.
- ~ Computer controlled gas control for all plasma gases.
- ~ Option to add a maximum of two additional MFC's to the system.
- ~ Bench height, open architecture sample introduction system consisting of :
 - ~ Borosilicate glass concentric nebulizer with 400µL/min flow rate at default peristaltic pump rate
 - ~ Software controlled Peltier cooling (-10 °C to +20 °C) of the quartz cyclonic spray chamber for optimum stability during the analysis of aqueous and organic sample types
 - ~ Close-coupled, compact, low pulsation, 12 roller, 4 channel mini-pump with metal free rollers and bubble sensor to protect from unnecessary loss of sample
 - ~ Push-in, unshielded, single piece quartz torch with automatic gas connectivity. Supplied with high purity 2.5 mm ID quartz self-aligning injector as standard. Compatible with a range of application specific injectors (different materials, internal diameters).

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1400 Northpoint Parkway
West Palm Beach FL 33407

Item	Description	Unit Price	Qty	Total Price
	<ul style="list-style-type: none"> ~ Computer controlled plasma positioning in all three dimensions, x, y and z. ~ Plasma TV – for simplified plasma optimization ~ Unique, front opening spectrometer interface cassette for easy access to all user maintainable components. Houses the sample and skimmer cones plus the extraction lens. ~ Ni sample and skimmer cones, featuring: ~ Proprietary 'insert technology' on the skimmer cone for low backgrounds, high matrix tolerance and high ion transmission. ~ Fixed voltage, 3D focusing, maintenance free RAPID lens deflects ions by 90°, removing neutrals from the ion beam while maintaining high ion transmission. ~ Proprietary QCell with Flatapole technology to ensure high ion transmission and low backgrounds to deliver enhanced analytical performance. ~ Collision/reaction cell technology (CRC) with TWO CCT gas MFCs. Optimized interference reduction using He as collision gas ensures efficient interference removal. Unique design transmits light mass elements such as Li, Be & B allowing for full mass range He KED measurements. Compatible with additional CCT gases, e.g. O2 and mixtures of H2 in He and NH3 in He for analytical flexibility. ~ High performance, full size, quadrupole mass analyzer, covering the mass range 2-290 amu. Design delivers low abundance sensitivity and ultra-fast scanning. ~ 'Plug & Play' user replaceable, discrete dynode electron multiplier detector providing greater than 9 orders of dynamic range via simultaneous analogue/pulse counting detection. ~ Windows 7, Dell OptiPlex 9020 Mini Tower PC consisting of: ~ Minitower casing ~ Intel(R) Core(TM) i5-4570 Quad Core Processor (3.2GHz) ~ 16GB (2 x 8GB) 1600MHz DDR3 Non-ECC RAM ~ 1TB 3.5inch Serial ATA (7.200 Rpm) Hard Drive ~ 16X Half Height DVD+/-RW Drive ~ Full Height 2nd Serial Port card ~ DisplayPort to DV Adaptor ~ On board 10/100/1000 PCIe network card ~ Full height additional network card ~ Dell(TM) USB Optical Mouse ~ Dell Keyboard: US/European (QWERTY) USB Keyboard ~ Windows 7 Professional (64Bit Windows 8.1 License, Media) English ~ Windows 8.1 (64Bit) English Resource DVD ~ Microsoft Office Home & Business 2013 ~ 23" TFT LCD Monitor ~ Qtegra Control software platform. ~ Full remote access to the software and instrument for remote monitoring of the system. 			

1.2	BRE0006798	\$56.96	1	\$56.96
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Sales Quotation

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CPQ-00067097	May 16, 2017	August 18, 2017	4
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State of West Virginia		Tara Lyle	

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5225 Verona Road
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1400 Northpoint Parkway
West Palm Beach FL 33407

Item	Description	Unit Price	Qty	Total Price
	iCAPQnova CountKit NA_Type K			
1.3	BRE0004797 Pre-Inst. Kit iCAP Qnova Series - HazMat	\$489.13	1	\$489.13
1.4	121123010000008 TF25 B A 208/60 T1 IPR 35micron SPCLFTG Water recirculator TF25 B A 208/60 T1 IPR 35micron SPCLFTG Power: 208-230V/60Hz. Uses air to cool the recirculator.	\$5,643.00	1	\$5,643.00
1.5	BRE0003260 CETAC Model ASX560 Autosampler ASX-560 Autosampler is a four-rack sample system for automated liquid sample introduction into a variety of analysis instrumentation.	\$5,717.00	1	\$5,717.00
1.6	M3813-580-S 3813-580 REGULATOR WITH FITTING	\$1,275.43	1	\$1,275.43
1.7	702-027300 2-day ICP-MS trng course at cust site	\$4,500.00	1	\$4,500.00
1.8	701-845500 2ND YR SPECIAL EXT EXT WARR ICAP Q	\$7,498.00	1	\$7,498.00
1.9	840-051300 PRNTR/HP DJ COLOR HI-QUALITY L ..	\$373.00	1	\$373.00

Quote Subtotal: \$169,625.56
Promotions / Discounts: - \$47,838.45
Quote total less discounts: \$121,787.11

Sales Quotation

Quote Number	Quotation Date	Expiration Date	Page
CPQ-00067097	May 16, 2017	August 18, 2017	5
Lead Time	Payment Terms	Freight Terms	PO Submission
6-8 weeks	NET 30 DAYS UPON INVOICE DATE	Origin - Prepay And Add	See the end page
Company Name		Customer Name	
State of West Virginia		Tara Lyle	

Thermo Electron North America LLC
5225 Verona Road
Madison WI 53711

1400 Northpoint Parkway
West Palm Beach FL 33407

Shipping: \$2,100.00

Quotation Totals: \$123,887.11

Sales tax exemption/resale certificates or direct pay permits must be provided with the order documents, if applicable. If valid sales tax exemption documentation is not provided, buyer shall pay all applicable federal, state & local taxes in addition to the price stated on this quotation.

TERMS AND CONDITIONS OF SALE FOR PRODUCTS AND SERVICES

1. **GENERAL.** Thermo Electron North America LLC ("**Seller**") hereby offers for sale to the buyer named on the face hereof ("**Buyer**") the products ("**Products**") and/or annual support plans ("**Support Plan(s)**") and billable services ("**Technical Support**") [Support Plans and Technical Support may be referred to collectively as "**Services**"] as listed on the face hereof on the express condition that Buyer agrees to accept and be bound by the terms and conditions set forth herein ("**Agreement**"). Any new or different provisions contained in any document issued by Buyer in response to this offer are expressly rejected; and if Buyer's response is deemed to be an offer, this document is a rejection of Buyer's offer and a counter offer by Seller and shall not constitute acceptance of any proposal by Buyer. Buyer's receipt of Products or Seller's commencement of Services hereunder will constitute Buyer's acceptance of this Agreement. This is the final, complete and exclusive statement of the contract between Seller and Buyer with respect to Buyer's purchase of Products and Services specified herein, which terms may not be altered in any way by Buyer's purchase order terms. No waiver, consent, modification, amendment or change of the terms contained herein shall be binding upon Seller unless agreed in writing and signed by Seller. Seller's failure to object to additional or different terms contained in any subsequent communication from Buyer will not be a waiver or modification of the terms set forth herein and all such proposals contained in Buyer's order are subject to acceptance in writing by an authorized representative of Seller.
2. **PRICE.** All prices published by Seller or Seller's representatives may be changed at any time without notice. All prices quoted by Seller or Seller's representatives are valid for thirty (30) days, unless otherwise stated in writing. All prices for the Products or Services will be as specified by Seller or, if no price has been specified or quoted, will be Seller's standard prices in effect at the time of shipment of Products or delivery of Services. All prices are subject to adjustment on account of specifications, quantities, raw materials, cost of production, shipment arrangements or other terms or conditions that are not part of Seller's original quotation. Unless otherwise stated in the quotation, the quoted rate for Technical Support includes Work Time, Travel Time and Standby Time in accordance with the following schedule and conditions; except that Technical Support requested without at least seven (7) days advanced notification shall be subject to airfare charges in addition to the Standard Rate.
- (a) **Work Time** – shall include all hours that Seller's service personnel are on the Buyer's job site, either working or ready for work and shall be payable at the applicable specified rates.
- (b) **Travel Time** – shall include the time spent by Seller's service personnel in traveling between their customary headquarters and the Buyer's job site and in returning (including travel occurring on Saturdays, Sundays and holidays). Except as otherwise stated in the Services quotation, Travel Time will be invoiced per diem at the applicable Travel Zone rates in Seller's standard service list prices. Air travel and car hire related expenses will be charged in addition to the daily rate at cost plus a 10% administration fee.
- (c) **Standby Time** – shall include the time that Seller agrees in writing, at its sole discretion, to reserve its service personnel to be ready to perform work for the Buyer, whether on the job site or not, up to a maximum of 8 hours a day, between the hours of 8:00 a.m. and 5:00 p.m., local standard time on Saturdays, Sundays and holidays. Standby Time shall be paid for at the special rates quoted by Seller at the time of Buyer's request or, if none, at the current Double Time Rate; and Standby Time preceded and/or followed by Work Time is cumulative in determining Overtime.
- (d) **Standard Rate** – the Service rate quoted by Seller that shall be paid for time worked on a regular schedule of eight (8) hours per day, Monday through Friday (excluding Seller's holidays), between 8:00 a.m. and 5:00 p.m. local standard time.
- (e) **Overtime Rate** – if applicable for the quoted Services, the rate of one and a half times the Standard Rate shall be paid for any time worked in excess of eight (8) hours or between the hours of 5:00 p.m. and 8:00 a.m. local standard time; but not exceeding sixteen (16) hours per day, Monday through Friday, and for any time on Saturdays, not to exceed sixteen (16) hours. Overtime shall be billed in 30 minute blocks; or longer time blocks, if quoted by the Supplier.
- (f) **Double Time Rate** – the rate of twice the Standard Rate shall be paid for time worked in excess of sixteen (16) hours per day, without a six (6) hour break, Monday through Friday, and for all time on Saturdays, Sundays and holidays. Holidays shall be those observed by Seller.
3. **TAXES AND OTHER CHARGES.** Prices for the Products and Services exclude all sales, use, value added and other taxes and duties imposed with respect to the sale, delivery, or use of any Products or Services covered hereby, all of which taxes and duties must be paid by Buyer. If Buyer claims any exemption, Buyer must provide a valid, signed certificate or letter of exemption for each respective jurisdiction.
4. **TERMS OF PAYMENT.** Seller may invoice Buyer immediately for the single lump sum amount equal to the total charges for the initial Term of a Support Plan, upon shipment of Products or upon completion of Technical Support for the price and all other charges payable by Buyer in accordance with the terms on the face hereof. If no payment terms are stated on the face hereof, payment shall be net thirty (30) days from the date of invoice. International Technical Support may require payment in advance. Buyer will grant a security interest in the Products sold under this Agreement until payment of the full purchase price to Seller in accordance with Article 9-103 of Uniform Commercial Code-Secured Transactions. If Buyer fails to pay any amounts when due, Buyer shall pay Seller interest thereon at the greater of a periodic rate of one and one-half percent (1.5%) per month or the highest rate stipulated by applicable law, together with all costs and expenses (including without limitation reasonable attorneys' fees and disbursements and court costs) incurred by Seller in collecting such overdue amounts or otherwise enforcing Seller's rights hereunder. Seller reserves the right to require from Buyer full or partial payment in advance, or other security that is satisfactory to Seller, at any time that Seller believes in good faith that Buyer's financial condition does not justify the terms of payment specified. All payments shall be made in U.S. Dollars unless otherwise specified in Seller's invoice.
- 5.A. **PRODUCT DELIVERY.** All Products will be shipped to the destination specified by Buyer, FCA (INCOTERMS 2010) at OEM shipping point or Seller's distribution facility, as applicable, which will vary depending on Product type and availability and may include points outside the United States (U.S.) (inquire for specific shipping point information). Notwithstanding specified INCOTERMS, Seller shall select carrier on Buyer's behalf and Seller agrees to arrange transportation of Products to Buyer's destination, and to act as the importer of record on behalf of Buyer to clear the Products through U.S. customs. All freight, taxes, duties and insurance, if any, charges shall be prepaid and added to Buyer's invoice. Seller may, at its election, make partial shipments of the Products and invoice each shipment separately. Seller reserves the right to withhold shipments in whole or in part and/or terminate any Services, if Buyer fails to make any payment to Seller when due or otherwise fails to perform its obligations hereunder. Seller's termination of Services will not relieve Buyer's obligation to pay all amounts due for Services provided by Seller prior to the termination date. All shipping dates are approximate only, and Seller will not be liable for any loss or damage resulting from any delay in delivery or failure to deliver which is due to any cause beyond Seller's reasonable control. In the event of a delay due to any cause beyond Seller's reasonable control, Seller reserves the right to terminate the order or to reschedule the shipment within a reasonable period of time, and Buyer will not be entitled to refuse delivery or otherwise be relieved of any obligations as

TERMS AND CONDITIONS OF SALE FOR PRODUCTS AND SERVICES

the result of such delay.

5. B. CANCELLATION OR CHANGES BY BUYER If Buyer requests that Seller delay delivery of Products for any reason, Seller may place Products in storage at Buyer's risk and expense and for Buyer's account. Orders in process may be cancelled only with Seller's written consent and upon payment of Seller's cancellation charges. Orders in process may not be changed except with Seller's written consent and upon agreement by the parties as to an appropriate adjustment in the purchase price therefor. Credit will not be allowed for Products returned without the prior written consent of Seller. Before returning any item, contact Seller's Order Administration Department for a Return Material Authorization (RMA) number at (800) 532-4752. Buyer may need to complete an RMA Form which includes a Hazard Free Form and/or Instrument Contamination Data Form. If authorized by Seller, Buyer must return items to Seller in their original or equivalent packaging, prepay shipping charges, and insure the shipment or accept the risk if the item is lost or damaged in shipment. In addition, Seller reserves the right to charge the Buyer the list price for missing components or subassemblies when incomplete items are returned to Seller. Authorized returns of any unused items which are free from material defects to Seller, in its sole discretion, may be subject to a twenty percent (20%) restocking charge.

Requests by Buyer to delay, postpone or suspend on-site Services, due to no fault of Seller, shall be subject to Seller's ability to recall its service representatives and to cancel and/or reschedule of any of their travel arrangements; and provided that, Buyer pays any and all additional costs (including, Travel Time and expenses) incurred by Seller as a result of the Services being postponed or suspended by Buyer. Cancellation of scheduled Services may be subject to a cancellation fee of twenty percent (20%) if Seller is notified less than 7 business days prior to the scheduled date of service.

6. DELIVERY OF SERVICES. Except as otherwise stated on the face hereof, all Services will be provided by Seller or its agent between the hours of 8:00 a.m. and 5:00 p.m. local standard time, Monday through Friday, excluding Seller's holidays, either at Seller's principal offices or, at Seller's option, at Buyer's installation address. If Seller advises Buyer that Services should be performed at Seller's facility, Buyer will properly package the Products to prevent damage, clearly mark the RMA number on the outer packaging, and ship it, via postage/freight prepaid, to the address set forth on the face hereof or such different address as Seller may from time to time provide to Buyer. After Seller completes the Services, or has made a determination that the products are beyond repair, Seller may, at its option, either advise Buyer to scrap the Products or to have the Products shipped, postage/freight prepaid, back to Buyer's installation address stated on the quotation, or to such other address as Buyer requests. In the event Buyer requires expedited delivery, such delivery will be made at Buyer's expense. If Seller advises Buyer that Services should be performed at Buyer's site, Buyer will use its best efforts to provide Seller with all requested diagnostic information for any products requiring Services; and subject to compliance with Buyer's reasonable security requirements, will allow Seller free access to all relevant equipment, documentation and records. In addition, Buyer will cooperate with Seller's efforts to perform the Services and will provide such additional assistance as Seller may reasonably request. At the completion of the Services, Seller's representatives will provide Buyer with a field service report on which will be indicated the number of hours spent and the materials used in completing the work. Buyer's signature on the field service report will signify approval of the information in the report and Seller's satisfactory completion of the Services. If Buyer does not sign the report or provide written objection within five (5) business days after receipt, then the report will be deemed unequivocally approved and accepted by Buyer.

7. TITLE AND RISK OF LOSS. Notwithstanding the transport terms indicated above, title to and risk of loss of the Products will pass to

Buyer upon delivery of possession of the Products by Seller to the carrier at the time and place of shipment; provided, however, that title to any software incorporated within or forming a part of the Products will at all times remain with Seller or the licensor(s) thereof, as the case may be.

All risk of loss or damage to Buyer's products being transported for Services shall remain with Buyer during shipment to and from the Buyer's site and during Seller's performance of Services hereunder.

8. WARRANTIES. Seller's sole obligation with respect to the Services is to provide the quoted Services in a workmanlike manner and if Buyer provides notice of defect in Service within ninety (90) days of completion of such Services, Seller will, at its sole option, either reperform the Services without charge to Buyer or grant Buyer a credit for the amount paid by Buyer with respect to such Service. Seller warrants that the Products will operate or perform substantially in conformance with Seller's published specifications and be free from defects in material and workmanship, when subjected to normal, proper and intended usage by properly trained personnel, for the period of time set forth in the Product documentation, published specifications or package inserts (the "**Warranty Period**"). If a Warranty Period is not specified in Seller's Product documentation, published specifications, or package inserts, the Warranty Period for new instruments is twelve (12) months from the date of shipment to Buyer; and for all other Products is ninety (90) days from the date of shipment. During the Warranty Period, Seller agrees to repair or replace, at Seller's option, defective Products so as to cause the same to operate in substantial conformance with Seller's published specifications; provided that Buyer (a) promptly notifies Seller in writing upon the discovery of any covered defect in the Products, including the Product model and serial number (if applicable) and details of the warranty claim; and (b) after Seller's review, Seller will provide Buyer with an RMA number and services data, which may include biohazard decontamination procedures and other Product-specific handling instructions. Then, if applicable, Buyer may return the defective Products to Seller with all costs prepaid by Buyer. Replacement parts may be new or refurbished, at the election of Seller. All replaced parts shall become the property of Seller. Shipment to Buyer of repaired or replacement Products will be made in accordance with the Delivery clause of this Agreement. Except for new consumable items manufactured and sold by Seller, this warranty expressly excludes all other consumable parts or components (e.g., bulbs, belts, cartridges, etc.) in the Products. If Seller elects to repair defective medical device instruments, Seller may, in its sole discretion, provide a replacement loaner instrument to Buyer as necessary for use while the instruments are being repaired.

Notwithstanding the foregoing, Products supplied by Seller that are obtained by Seller from an original manufacturer or third party supplier are not warranted by Seller; but Seller agrees to assign to Buyer any warranty rights in such Product that Seller may have from the original manufacturer or third party supplier, to the extent such assignment is allowed by such original manufacturer or third party supplier. In no event shall Seller have any obligation to make repairs, replacements or corrections under the Warranty, in whole or in part, as the result of or with respect to: (a) use of the Products in a manner for which they were not designed; (b) improper storage and handling of the Products; (c) use of the Products in combination with equipment or software not supplied by Seller (d) shipping damage incurred en route to Buyer's site or because of moving equipment, in which case Seller will promptly provide a cost estimate for Technical Support to the consignee for filing claims to carriers for shipping damage; (e) flood, lightning, earthquake, tornado, hurricane or fire, bombing, armed conflict, malicious mischief, sabotage or other natural or man-made disasters; (f) normal wear and tear, physical abuse, misuse, sprinkler damage, electrical surge or abnormal power variation; (g) repairs, maintenance, or modifications made by anyone other than Seller trained personnel or without Seller's supervision and/or approval; (h) relocation and

TERMS AND CONDITIONS OF SALE FOR PRODUCTS AND SERVICES

reinstallation of equipment; although upon request Seller will supervise the removing, crating, relocation and reinstallation of the Products at Seller's current Services rates; (i) maintenance or replacement of media (i.e., floppy disks, plotter supplies, etc.) whatever the reason for loss, failure or damage; (j) beta-site support; (k) operator training; or (l) repairing Product malfunctions if the fault is not with the equipment. If Seller determines that Products for which Buyer requested warranty services are not covered by this warranty, Buyer will pay or reimburse Seller for all costs of investigating and responding to such request at Seller's then prevailing time and materials rates. If Seller provides Services or replacement parts that are not covered by this warranty, Buyer shall pay Seller therefor at Seller's then prevailing time and materials rates.

ANY INSTALLATION, MAINTENANCE, REPAIR, SERVICE, RELOCATION OR ALTERATION TO OR OF, OR OTHER TAMPERING WITH, THE PRODUCTS PERFORMED BY ANY PERSON OR ENTITY OTHER THAN SELLER WITHOUT SELLER'S PRIOR WRITTEN APPROVAL, OR ANY USE OF REPLACEMENT PARTS NOT SUPPLIED BY SELLER, SHALL IMMEDIATELY VOID AND CANCEL ALL WARRANTIES WITH RESPECT TO THE AFFECTED PRODUCTS AND/OR SERVICES. THE OBLIGATIONS CREATED BY THIS WARRANTY STATEMENT FOR SELLER TO REPAIR OR REPLACE A DEFECTIVE PRODUCT OR TO REPERFORM OR CREDIT THE PRICE OF DEFECTIVE SERVICES SHALL BE THE SOLE REMEDY OF BUYER FOR SUCH DEFECTIVE PRODUCTS OR SERVICES UNDER THIS AGREEMENT. EXCEPT AS EXPRESSLY PROVIDED IN THIS WARRANTY STATEMENT, SELLER DISCLAIMS ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, ORAL OR WRITTEN, WITH RESPECT TO THE PRODUCTS, INCLUDING WITHOUT LIMITATION ALL IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR NONINFRINGEMENT. SELLER DOES NOT WARRANT THAT THE PRODUCTS OR SERVICES ARE ERROR-FREE OR WILL ACCOMPLISH ANY PARTICULAR RESULT.

9. INDEMNIFICATION.

9.1 By Seller. Seller will indemnify, defend and save Buyer, its officers, directors, and employees from and against any and all damages, liabilities, actions, causes of action, suits, claims, demands, losses, costs and expenses (including without limitation reasonable attorneys' fees) ("Indemnified Items") asserted by another party against Buyer for (i) bodily injury to or death of persons or damage to tangible property to the extent caused by the negligence or willful misconduct of Seller, its employees, agents or representatives or contractors in connection with the performance of Services at Buyer's premises under this Agreement; and (ii) claims that a Product infringes any U.S. patent, copyright or trade secret; provided, however, Seller's liability under this Section does not extend to any such Indemnified Items caused by either (u) the negligence or willful misconduct of Buyer, its employees, agents or representatives or contractors, (v) by any third party, (w) use of a Product in combination with equipment or software not supplied by Seller where the Product alone would not be infringing, (x) Seller's compliance with Buyer's designs, specifications or instructions, (y) use of the Product in an application or environment for which it was not designed, or (z) modifications of the Product by anyone other than Seller without Seller's prior written approval. Buyer will promptly notify Seller in writing of any claim covered by Seller's indemnification obligations hereunder. Seller may assume exclusive control of the defense of such claim or, at the option of the Seller, to settle the same. Buyer agrees to cooperate reasonably with Seller in connection with the performance by Seller of its obligations in this Section.

Notwithstanding the above, Seller's infringement related indemnification obligations shall be extinguished and relieved if Seller, at its discretion and at its own expense (a) procures for Buyer the right, at no additional

expense to Buyer, to continue using the Product; (b) replaces or modifies the Product so that it becomes non-infringing, provided the modification or replacement does not adversely affect the specifications of the Product; or (c) in the event (a) and (b) are not practical, refund to Buyer the amortized amounts paid by Buyer with respect thereto, based on a five (5) year amortization schedule. THE FOREGOING INDEMNIFICATION PROVISION STATES SELLER'S ENTIRE LIABILITY TO BUYER FOR, AND BUYER'S SOLE AND EXCLUSIVE REMEDY IN RESPECT OF, THE CLAIMS DESCRIBED HEREIN.

9.2 By Buyer. Buyer will indemnify, defend with competent and experienced counsel and hold harmless Seller, its parent, subsidiaries, affiliates and divisions, and their respective officers, directors, shareholders and employees, from and against any and all damages, liabilities, actions, causes of action, suits, claims, demands, losses, costs and expenses (including without limitation reasonable attorneys' fees and disbursements and court costs) to the extent arising from or in connection with (i) the negligence or willful misconduct of Buyer, its agents, employees, representatives or contractors; (ii) use of a Product in combination with equipment or software not supplied by Seller where the Product alone would not be infringing; (iii) Seller's compliance with designs, specifications or instructions supplied to Seller by Buyer; (iv) use of a Product in an application or environment for which it was not designed; or (v) modifications of a Product by anyone other than Seller without Seller's prior written approval.

10. SOFTWARE. With respect to any software products incorporated in or forming a part of the Products hereunder (i.e., firmware), Seller and Buyer intend and agree that such software products are being licensed and not sold, and that the words "purchase", "sell" or similar or derivative words are understood and agreed to mean "license", and that the word "Buyer" or similar or derivative words are understood and agreed to mean "licensee". Notwithstanding anything to the contrary contained herein, Seller or its licensor, as the case may be, retains all rights and interest in software products provided hereunder. Seller hereby grants to Buyer a royalty-free, non-exclusive, nontransferable license, without power to sublicense, to use software licensed hereunder solely for Buyer's own internal business purposes on its hardware Products and to use the related documentation solely for Buyer's own internal business purposes. This license terminates when Buyer's lawful possession of the hardware Products provided hereunder ceases, unless earlier terminated as provided herein. Buyer agrees to hold in confidence and not to sell, transfer, license, loan or otherwise make available in any form to third parties the software products and related documentation provided hereunder. Buyer may not disassemble, decompile or reverse engineer, copy, modify, enhance or otherwise change or supplement the software products provided hereunder without Seller's prior written consent. Seller will be entitled to terminate this license if Buyer fails to comply with any term or condition herein. Buyer agrees, upon termination of this license, to immediately stop using all software products and related documentation provided hereunder and all copies and portions thereof.

Certain of the software products provided by Seller may be owned by one or more third parties and licensed to Seller or may be stand-alone software products, which Buyer hereby agrees are subject to a separate browse-wrap, shrink-wrap or click-thru end user license agreement (EULA). Accordingly, the warranty and indemnification provisions herein do not apply to such software, which are exclusively provided in the applicable EULA.

11. LIMITATION OF LIABILITY. NOTWITHSTANDING ANYTHING TO THE CONTRARY CONTAINED HEREIN, THE LIABILITY OF SELLER UNDER THESE TERMS AND CONDITIONS (WHETHER BY REASON OF BREACH OF CONTRACT, TORT, INDEMNIFICATION, OR OTHERWISE, BUT EXCLUDING LIABILITY OF SELLER FOR BREACH OF

TERMS AND CONDITIONS OF SALE FOR PRODUCTS AND SERVICES

WARRANTY (THE SOLE REMEDY FOR WHICH IS PROVIDED UNDER THE PRODUCT AND SERVICES WARRANTIES HEREIN) SHALL NOT EXCEED AN AMOUNT EQUAL TO THE LESSER OF (A) THE TOTAL PURCHASE PRICE THERETOFORE PAID BY BUYER TO SELLER WITH RESPECT TO THE PRODUCT(S) OR SERVICES GIVING RISE TO SUCH LIABILITY OR (B) ONE MILLION DOLLARS (\$1,000,000). NOTWITHSTANDING ANYTHING TO THE CONTRARY CONTAINED HEREIN, IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL OR INCIDENTAL DAMAGES (INCLUDING WITHOUT LIMITATION DAMAGES FOR LOSS OF USE OF FACILITIES OR EQUIPMENT, LOSS OF REVENUE, LOSS OF DATA, LOSS OF PROFITS OR LOSS OF GOODWILL), REGARDLESS OF WHETHER SELLER (a) HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES OR (b) IS NEGLIGENT.

12. EXPORT RESTRICTIONS. Buyer acknowledges that each Product and any related services, software and technology, including technical information supplied by Seller or contained in documents (collectively "Items"), may be subject to export controls of the U.S. government and/or other governments. Such export controls may include, but are not limited to, the Export Administration Regulations of the U.S. Department of Commerce (the "EAR"), which may restrict or require licenses for the export of Items from the U.S. and their re-export from other countries and all other applicable laws, regulations, laws, treaties, and agreements relating to the export, re-export, and import of any Item. Buyer shall not export, re-export, distribute or supply any Item, directly or indirectly, to (i) any country, person or entity, in each case, without first obtaining from the U.S. government and/or other appropriate government agency any license required to do so lawfully; (ii) any person or organization in Cuba, Iran, North Korea, Sudan, Syria, or other country then the subject of a U.S. embargo, or any person or entity considered a part of the government of any such country; or (iii) any person or entity who is involved in improper development or use of nuclear weapons, or of chemical/biological weapons (CBW) or missiles, or in terrorist activities. Buyer shall cooperate fully with Seller in any official or unofficial audit or inspection related to applicable export or import control laws or regulations, and shall indemnify and hold Seller harmless from, or in connection with, any violation of this Section by Buyer or its employees, consultants, agents and/or representatives.

13. SUPPORT PLAN TERMS AND CONDITIONS.

A. General. In the event Buyer purchases a Support Plan from Seller under this Agreement, Seller agrees to maintain and/or repair those Products or instruments identified on the face hereof as covered under a Support Plan ("**Covered Equipment**") in a manner consistent with the specifications and entitlements included in the purchased Support Plan as specified by Seller on the face hereof, which may include various levels of service at the Buyer's site(s) and/or Seller's Depot Repair locations and are purchased separate from the original Product Warranty above (the "**Support Service(s)**"). The Support Services will only be valid for Covered Equipment within the Region covered by the Plan (e.g. 48 contiguous U.S.), Monday through Friday (excluding Seller's holidays) during the hours of 8:00 a.m. to 5:00 p.m. local standard time ("**Normal Hours**") during the term of the Agreement. The Covered Equipment must be operated according to the manufacturer's supplied instructions, including without limitation the Operator's Manual(s) and any malfunction must be promptly reported to Seller. Support Service calls requested outside of Normal Hours or for any non-Covered Equipment or for services not included in the Support Plan will be billed at Seller's standard rates for Technical Support in effect at the time of Buyer's request. Seller reserves the exclusive right to determine the assignment of its employees in the performance of Support Services.

B. Term. (a) The Support Plan will begin and remain effective for the period of time stated on the face hereof ("**Term**"). To renew the Support

Plan, Buyer must sign a Renewal Service Agreement accompanied by a purchase order prior to the expiration of the current Term ("**Renewal**"), which shall also be subject to the terms and conditions of this Agreement. Either party may terminate a Support Plan for any/no reason by providing at least thirty (30) days written notice to the other party. Seller will use commercially reasonable efforts to stop work and to incur no additional expenses. Regardless, if a Support Plan is cancelled, Seller will charge Buyer for the total price of Services actually performed and expenses actually and reasonably incurred in servicing the covered equipment under the underlying Support Plan from its effective date until the cancellation date or the prorated price of the underlying Support Plan from its effective date until the cancellation date, whichever is greater, plus fifteen percent (15%) of the total fee paid for the underlying Support Plan. In the event Buyer prepaid the Support Plan fees in full and a credit balance exists for the underlying Support Plan, Seller will provide a credit or refund the amount remaining to Buyer.

C. Pricing and Pricing Assumptions. Except as otherwise agreed in writing, the annual charge for each Renewal will be Thermo Fisher's standard support plan rates in effect at the start of the Renewal. All Support Plan pricing is based on the assumption that the Covered Equipment operates in accordance with product specifications as of the coverage start date; therefore, prior to the start of each Term and Renewal, Seller reserves the right to verify and correct the condition of the Covered Equipment and invoice Buyer at Seller's current billable rates for any Support Services deemed reasonably necessary to bring the Covered Equipment into good operating condition. Notwithstanding the above, Seller agrees to waive its right to bill the Buyer for bringing the Covered Equipment into good operating condition if there is no lapse between the end date of the current Support Plan Term and the beginning of any Renewal.

D. Parts and Consumables: The Support Plan level defines when and if the cost of parts is included under the Support Plan. Notwithstanding the foregoing, the cost for parts that are consumed in the normal and usual operation of the Covered Equipment including, but not limited to, sample preparation and analysis, consumables, paper, ink cartridges, ribbons, pens, lamps and/or data media are not covered under any Support Plan.

E. Key Operator: Buyer will designate a key operator of Covered Equipment who can describe instrument malfunctions to Seller's service representatives by telephone and who is qualified to perform simple adjustments and corrections to the Covered Equipment as requested by Seller's service representatives. Buyer's failure to designate a key operator or to perform or to have an authorized representative perform the routine maintenance specified in the Covered Equipment's instructions or Owner's Manual may result, at Seller's option, in Buyer being invoiced at Seller's standard Technical Support rates to provide such non-covered services.

F. Equipment Modification: Seller reserves the right to make any changes in the design or construction of Seller's Products without incurring any obligation to make any updates or changes whatsoever in the Covered Equipment under the Support Plan. Buyer agrees to allow Seller, at its expense and option, to make retrofits or design changes which improve product reliability, but do not change its performance characteristics. Any Buyer requests to modify or add devices or accessories to Covered Equipment that are not manufactured by Seller are outside the scope of the Support Plans and covered Support Services.

G. Support Services Warranty: Seller's sole obligation under any Support Plan is to provide the Support Services in a workmanlike manner in accordance with the entitlements of the Support Plan purchased by Buyer hereunder. SELLER MAKES NO OTHER WARRANTIES FOR SUPPORT SERVICES PROVIDED UNDER A SUPPORT PLAN, EXPRESS OR IMPLIED, AND DISCLAIMS ALL WARRANTIES INCLUDING, BUT NOT LIMITED TO, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ANY OTHER OBLIGATIONS OR LIABILITIES

TERMS AND CONDITIONS OF SALE FOR PRODUCTS AND SERVICES

WHETHER IN CONTRACT, WARRANTY, NEGLIGENCE OR OTHERWISE.

I. Support Plan Exclusions: The following occurrences are not covered by any Support Plan purchased by Buyer from Seller under this Agreement:

- (a) Covered Equipment malfunctions caused by any of the following abnormal conditions; and if Seller performs Support Services as a result thereof, Seller will invoice Buyer at Seller's standard billable rates for service, travel or move, labor and parts: (i) Shipping damage incurred en route to Buyer's site or any subsequent transport thereafter; (ii) Force Majeure events, including for example, floods, lightning, earthquake, tornado, hurricane or fire, bombing, terrorism, armed conflict, malicious mischief, sabotage or other such natural or manmade disasters; (iii) Physical abuse, misuse, sprinkler damage, electrical surge or abnormal power variation; (iv) Repairs, maintenance, or modifications made by anyone other than Seller's trained personnel or without Seller's supervision and/or approval; and (v) Relocation and reinstallation of Covered Equipment are not covered under the Support Plan; however, upon request Seller, will supervise the removing, crating, relocation and reinstallation of its products at Seller's standard billable rates for service, travel or move, labor and parts.
- (b) Maintenance or replacement of media (i.e., floppy disks, printer supplies, etc.) whatever the reason for loss, failure or damage;
- (c) Servicing of material or instruments manufactured by anyone other than Seller, including third-party material or instruments purchased for engineering specials;
- (d) Beta-site support;
- (e) Service calls made to train operators; and/or
- (f) Service calls made as a result of Buyer-identified areas of responsibility, i.e. malfunctions related to Buyer's site conditions, utilities and/or facilities (power, water, temperature, humidity, vibration, dust, etc.) or site computer/data network problems or integrity.

J. Buyer Responsibilities: Buyer will give Seller's personnel reasonable access to the Covered Equipment whenever Support Service is required. Buyer will cooperate with Seller's personnel so that Support Services can be performed efficiently and without interruption. Buyer will permit Seller to use of Buyer's equipment, including Covered Equipment, that Seller's personnel deem necessary to perform the Support Services. Buyer is solely responsible for the procurement, installation, maintenance and fees associated with all third party communication equipment and media as needed for the performance of Support Service under the Support Plan including, but not limited to, telephone and equipment for remote transmission of data.

14. INSURANCE. For the Term of a Support Plan and/or for the provision of on-site Services purchased hereunder, as applicable, Seller agrees to maintain and carry liability insurance in amounts set forth below with insurance companies rated B+ or better by "BEST" rating services. Insurance includes (a) commercial general liability insurance for a limit of US\$2,000,000 (two million) for each occurrence and US\$4,000,000 (four million) in the aggregate, (b) Statutory workers' compensation and employer's liability insurance for a limit of US\$1,000,000 (one million), (c) Automobile liability of US\$2,000,000 (two million) and (d) Umbrella coverage of US\$5,000,000 (five million). No policy will include a waiver of subrogation. Upon request from Buyer related to applicable Services, Seller will provide to Buyer a certificate of insurance using the standard ACORD form to evidence the insurance coverage required herein.

15. MEDICARE/MEDICAID REPORTING REQUIREMENTS. If Buyer is a recipient of Medicare/Medicaid funds, Buyer acknowledges that it has been informed of and agrees to fully and accurately account for, and report on its applicable cost report, the total value of any

discount, rebate or other compensation paid hereunder in a way that complies with all applicable federal, state and local laws and regulations which establish "Safe Harbor" for discounts. Buyer may make written request for additional information from Seller as needed to satisfy Buyer's reporting requirements. Buyer acknowledges that agreement to such reporting requirement was a condition precedent to Seller's agreement to provide Products and that Seller would not have entered into this Agreement had Buyer not agreed to comply with such obligations.

16. MISCELLANEOUS. (a) Buyer may not delegate any duties or assign any rights or claims hereunder without Seller's prior written consent, and any such attempted delegation or assignment shall be void. (b) The rights and obligations of the parties hereunder shall be governed by and construed in accordance with the laws of the Commonwealth of Massachusetts, U.S.A. without reference to its choice of law provisions. Each party hereby irrevocably consents to the exclusive jurisdiction of the state and federal courts located in the County of Suffolk, Massachusetts U.S.A. for any action arising out of or relating to this Agreement. Each party hereby waives any other venue to which it may be entitled by domicile or otherwise. (c) In the event of any legal proceeding between the Seller and Buyer relating to this Agreement, neither party may claim the right to a trial by jury, and both parties waive any right they may have under applicable law or otherwise to a right to a trial by jury. Any action arising under this Agreement must be brought within one (1) year from the date that the cause of action arose. (d) In the event that any one or more provisions contained herein shall be held by a court of competent jurisdiction to be invalid, illegal or unenforceable in any respect, the validity, legality and enforceability of the remaining provisions contained herein shall remain in full force and effect, unless the revision materially changes the bargain. (e) Seller's failure to enforce, or Seller's waiver of a breach of, any provision contained herein shall not constitute a waiver of any other breach or of such provision. (f) Unless otherwise expressly stated on the Product or in the documentation accompanying the Product, software and/or Services, they are not approved medical devices and are intended by Seller to be for "Research Use Only" as defined by the U.S. Food and Drug Administration regulations and is not to be used for any illegal or unapproved regulatory purposes, including without limitation, *in vitro* diagnostic uses, *ex vivo* or *in vivo* therapeutic uses, or any type of consumption by or application to humans or animals. (g) Seller agrees not to knowingly disclose any confidential information or data obtained by it during the performance of Services when such information or data is clearly identified in writing by Buyer as confidential. Buyer agrees that all pricing, discounts and technical information that Seller provides to Buyer are the confidential and proprietary information of Seller. The parties agree to keep such information confidential and not disclose each other's confidential information to any third party for one (1) year hereafter, and to use such information solely for Buyer's internal purposes and in connection with the Products supplied hereunder. Nothing herein shall restrict the use of information available to the general public. (h) Any notice or communication required or permitted hereunder must be in writing and shall be deemed received when personally delivered, upon delivery by any internationally recognized carrier such as Federal Express or similar overnight delivery service, or three (3) business days after being sent by certified mail, postage prepaid, to a party at the address specified herein or at such other address as either party may from time to time designate to the other. (i) Seller may, in its sole discretion, provide (I) applicable Product training to Buyer or its employees, or (II) samples of Products to Buyer for distribution to patients of Buyer. Buyer agrees to distribute any such samples to patients for patient use or, if not so distributed, to return them to Seller. Buyer may not use the samples to provide care to patients and must not bill any patients or third party payers when Buyer dispenses the samples.

Purchase Order - Submission Details

Quote Number	Quotation Date	Expiration Date	Page
CPQ-00067097	May 16, 2017	August 18, 2017	11
Lead Time	Payment Terms		PO Submission
6-8 weeks	NET 30 DAYS UPON INVOICE DATE		See below
Inco Terms 1	Inco Terms 2	Shipping Method	
Origin - Prepay And Add		Fed Ex Ground	

Thermo Electron North America LLC
5225 Verona Road
Madison WI 53711

1400 Northpoint Parkway
West Palm Beach FL 33407

To place your order and expedite shipment, please 1) sign and date the last page of this document; and 2) fax or e-mail it along with your Purchase Order to one of the addresses below.

Please note-all Purchase Orders must show the vendor name of Thermo Electron North America LLC

Thermo Electron North America LLC
5225 Verona Road
Madison WI 53711

or

Thermo Electron North America LLC
1400 Northpoint Parkway
West Palm Beach FL 33407

Complete System Orders:

Fax: 412-200-6542

e-mail: usmad.orderprocessing@thermofisher.com

Parts or Service Orders:

Fax: 877-680-2565

e-mail: USMAD.ServiceOE.PO@thermofisher.com

Notes:

- Items marked with an asterisk (*) on the face of the quotation are non-Thermo Electron North America LLC products.
- Prices, warranty, installation and service on the items quoted herein are available only in the United States and may not be otherwise assigned.
- Tax exemption certificates or direct pay permits must be provided with the order documents, if applicable. If tax exemption documentation is not provided, buyer shall pay federal, state and local taxes in addition to the price stated on this quotation.
- Buyer shall not export or re-export technical data or products supplied by Thermo Electron North America LLC in violation of applicable export regulation. Buyer who exports products purchased hereunder assumes all responsibility for obtaining required export documentation, authorization, and payment of all applicable fees.
- All prices are quoted in USD.

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Origin - Prepay And Add		Fed Ex Ground	

Thermo Electron North America LLC
5225 Verona Road
Madison WI 53711

1400 Northpoint Parkway
West Palm Beach FL 33407

"In the event of a conflict between any of the Thermo Electron North America LLC terms and conditions and those contained in the State of West Virginia Solicitation No. CRFQ 1400 AGR1700000016 terms and conditions, the terms of Thermo Electron North America shall prevail. Thermo Electron North America LLC also agrees to be bound by the laws of the State of West Virginia. We would like to negotiate mutually acceptable terms."

As an Authorized representative of the Buyer, your signature below creates an agreement to buy the products and services listed herein and your acceptance of the Seller's Standard Terms and Conditions of Sale included herein as the sole and exclusive terms for your purchase.

BUYER

SELLER

By:

By:

Print Name:

Print Name:

Print Title:

Print Title:

Date:

Date:

_____ Initial here to indicate Buyer's agreement to automatically apply Seller's Standard Terms and Conditions of Sale for Products and Services to all future orders of Products and Services from Seller, whether or not the Agreement is referenced on Seller's quote or Buyer's Purchase Orders, for _____ (write # of years) from later date of the parties' signature, or until either party provides written notice that this Agreement is terminated.



Thermo Scientific iCAP RQ ICP-MS



Simplicity, productivity and robustness
for routine labs

Thermo
SCIENTIFIC



Thermo Scientific iCAP RQ ICP-MS

The reliability, analytical performance and ease of use needed to meet the demands of the highest throughput labs

More productivity

Choose the Thermo Scientific™ iCAP™ RQ ICP-MS for a complete multi-element analysis solution for your high-throughput routine lab. With comprehensive interference removal for assured data accuracy and intuitive workflows to boost productivity, this single quadrupole (SQ) ICP-MS will expand your analytical capabilities.

Our user-inspired hardware and software maximizes ease-of-use and streamlines workflows to achieve 'right-first-time' analysis, essential to all busy laboratories.

Increase throughput, minimize sample re-runs and save analysts' valuable time and effort with intuitive features and broad compatibility with automated accessories.

- 'Get Ready' one-click set-up for easy, reproducible analysis
- Cone change in as little as 60 seconds
- Fast, easy operation with quick-connect sample introduction components

Bench height, open-access, sample introduction system.

More robustness

With its logical, problem-solving hardware design that meets real laboratory needs through minimized maintenance and maximized up-time, the iCAP RQ ICP-MS is a powerful, reliable work-horse analyzer.

Run samples 24/7 with complete confidence.

- Matrix tolerance and minimized drift in challenging samples, such as seawater
- Reliable, robust plasma operation, even for volatile organic solvents such as 100% acetonitrile
- Advanced heat management for long-term mass stability
- All new electronics and RF generator design



Integrated HD camera captures plasma images during all stages of operation.

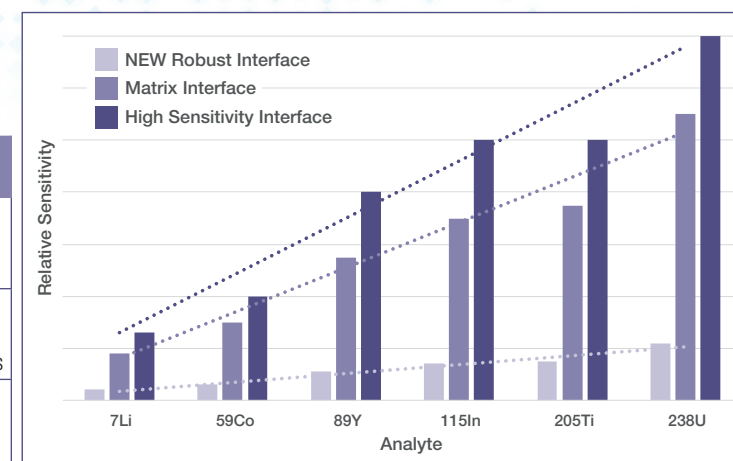


Why Choose SQ-ICP-MS for Your Routine Laboratory?

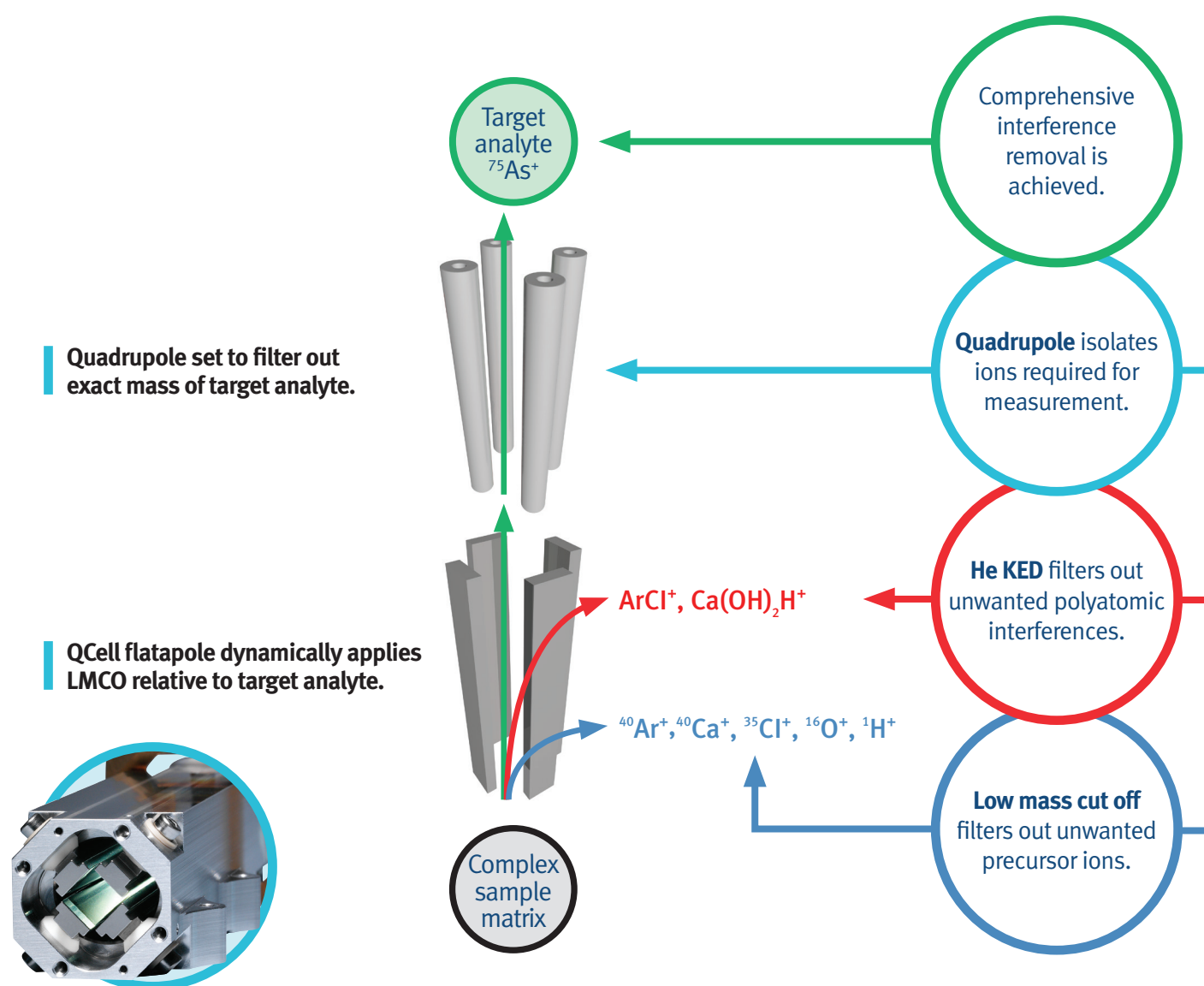
For the simplest possible method development and smart design features that drive productivity

- Measure all analytes in a single helium Kinetic Energy Discrimination (He KED) mode
- In He KED mode, even lithium and beryllium can be measured at sub ppt levels
- Excellent interference removal with high ion transmission
- Reactive gas capability targets specific interference ions for challenging applications

Interface	When	Why	Who
Robust	Long-term analysis of dirty, high matrix samples	Minimal drift and reduced user maintenance	Environmental and routine industrial applications
High Matrix	Typical, everyday matrix types	Best balance for sensitivity and matrix tolerance	Food safety, pharmaceutical and drinking water analysis
High Sensitivity	Advanced applications; e.g. laser, nanoparticles	Best signal to noise ratio and lowest detection	Geoscience, advanced materials, research



Choose from three dedicated interface types designed for maximum coverage of sensitivity and dynamic range.



QCell low mass cut off (LMCO) removes precursors to interferences and reduces BECs even further than He KED alone.



Compact, vertical design to save valuable lab space.

Powerful detector for high sensitivity.

QCell combined with unique flatapole design enables high data accuracy.

Simplified methods with He KED comprehensive interference removal.

Zero user maintenance beyond the slide valve.

New solid state RF generator and all new electronics ensures stability and maximizes uptime.

Plasma robustness to cope with the most challenging matrices.

Quick connect, self-aligning sample introduction system.

Drop-down door for simplified cone access.



Qtegra Intelligent Scientific Data Solution (ISDS) Software

Universal software for ultimate ease-of-use and productivity in high-throughput labs and demanding applications

Maximize productivity and simplify workflows utilizing intelligent features and automation.

Method development is streamlined with Thermo Scientific™ Qtegra™ Intelligent Scientific Data Solution™ (ISDS) software's intuitive user features; productivity is enhanced through a range of automated sample handling options, all managed within a logical dashboard interface.

Sample Handling

Our analysis-specific sample handling kits and additional mass flow controllers simplify instrument configuration and enable reproducibility.

Plug-in compatibility with a wide range of industry standard autosamplers and sampling valves optimizes your workflows.

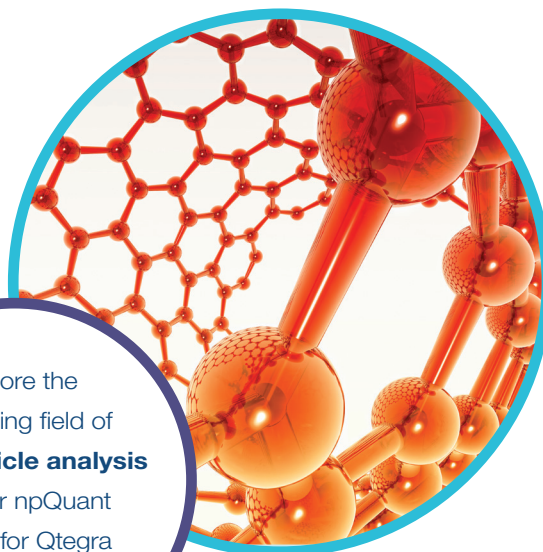
Auto-dilution

Increase throughput and automate the entire workflow from sample preparation to data review with an intelligent sample management accessory. Ensure error free operation of the full sample batch, including:

- Complete calibration from a single standard
- Intelligent dilution of high matrix or over range samples

Argon Gas Dilution

Eliminate the need for manual sample dilution and reduce matrix build-up on the interface by using automated Argon Gas Dilution (AGD). This feature provides a simple solution for direct analysis of high matrix samples at % level concentrations, enabling extended periods of operation without cleaning.



Accelerate your innovation with the advanced applications enabled by **hyphenated techniques**. Our simple coupling kits and a range of Qtegra ISDS software plug-ins allow easy pairing with IC/LC, GC and laser ablation systems.

Explore the expanding field of **nanoparticle analysis** with our npQuant plug-in for Qtegra ISDS software.

Reliable, unattended operation helps deal with sample backlogs.

Our easy-to-use Qtegra ISDS software delivers all the support features essential to any busy laboratory, while containing all the flexibility needed to achieve the most challenging applications.

This software approach, common to other Thermo Scientific ICP techniques, reduces training requirements and makes the addition of a SQ-ICP-MS into your lab, a simple process.

Low Cost per Sample

Operator time is freed up with simple workflows and a minimal number of steps per task.

The 'Get Ready' feature takes your iCAP RQ ICP-MS from standby to ready for analysis, through a fully automated process, saving time and ensuring consistent analysis.

A fully integrated QA/QC protocol reduces failures, driving down re-runs and cost per sample.

Data and Report Management

Automated report generation and export features, including full LIMS compatibility, makes data management effortless.

Customize report formats to fit with the needs of the laboratory or your customers.

Compliance Support

All the features needed to enable compliance with regulatory requirements are available within Qtegra ISDS software:

- EPA and FDA regulatory compliance and audit support
- Data security and access control
- Compliance management tools

Recovery results:

User name	Index	Label	51V (KED)	60Ni (KED)	63Cu (KED)	75As (KED)
MP14-PC\MP14 - second user	6	QL-1	101.811 %	103.496 %	102.844 %	102.576 %
MP14-PC\MP14 - second user	7	QL-2	99.219 %	101.195 %	100.859 %	100.530 %
MP14-PC\MP14 - second user	8	QL-3	100.279 %	102.939 %	101.654 %	101.867 %
MP14-PC\MP14 - second user	9	QL-4	100.180 %	103.087 %	102.325 %	101.860 %
MP14-PC\MP14 - second user	10	QL-5	100.677 %	103.694 %	102.819 %	101.864 %
MP14-PC\MP14 - second user	11	QL-6	98.861 %	102.034 %	101.584 %	100.142 %
		Average	100.1712 %	102.7407 %	102.0141 %	101.4732 %
		RSD	1.0544 %	0.9262 %	0.7698 %	0.9177 %
MP14-PC\MP14	6	QL-1	99.694 %	100.407 %	99.645 %	101.250 %
MP14-PC\MP14	7	QL-2	100.427 %	102.909 %	102.164 %	101.526 %
MP14-PC\MP14	8	QL-3	101.375 %	103.373 %	103.428 %	102.341 %
MP14-PC\MP14	9	QL-4	99.907 %	101.901 %	101.484 %	100.474 %
MP14-PC\MP14	10	QL-5	97.024 %	99.432 %	98.962 %	98.413 %
MP14-PC\MP14	11	QL-6	102.300 %	104.298 %	104.575 %	103.628 %
		Average	100.1211 %	102.0534 %	101.7097 %	101.2722 %
		RSD	1.7997 %	1.8131 %	2.1196 %	1.7423 %
		Pooled Recovery	100.1461 %	102.3970 %	101.8619 %	101.3727 %
		Pooled RSD	1.4064 %	1.4141 %	1.5266 %	1.3309 %

Advanced reporting capability.





In Action: Environmental, Food Safety, Pharmaceuticals, Clinical Research

Handle a broad variety of sample types with ease and accuracy

Growing need for nanoparticle characterization

Enhance food and environmental nanoparticle characterization with the npQuant plug-in for accurate single particle ICP-MS (spICP-MS) analysis.

Environmental

Confidently measure trace and major analytes in some of the most challenging matrices. Optimize productivity and accuracy with comprehensive interference removal for reliable multi-elemental analysis.

Whether analyzing drinking water, waste water or soil digests, the high-throughput, iCAP RQ ICP-MS meets demanding environmental requirements, such as US EPA 200.8 with ease.



More certainty with speciation

Species information is critical in environmental, drinking water, food and pharmaceutical analysis. Easily couple your iCAP RQ ICP-MS with an IC system for assured species data using IC-ICP-MS.



Pharmaceutical Compliance

Comfortably meet the most demanding global pharmaceutical regulations and legislation, including;

- International Council on Harmonization (ICH) guideline Q3D
- U.S. Pharmacopoeia (USP) chapters, 232, 233 and 2322

Comply with the most rigorous data audit and security measures. Our Qtegra ISDS software is fully compliant with Food and Drug Administration (FDA) 21 CFR Part 11 and is equipped with full IQ/OQ procedures for simple implementation in GMP/GLP regulated environments.



Clinical Research

Detect the smallest traces of toxic and essential elements, with the robustness, sensitivity and LoDs needed for complete analyte quantitation, even in tough matrices.

Accelerate your research with assured accuracy, utilizing analysis-boosting features such as auto-optimization of QCell reaction mode.

Food Safety

Simultaneously measure toxic and essential elements for food quality and safety assessment. Be ready to meet food safety legislation and regulatory requirements with a suite of integrated QC features.

Couple metal-free Ion Chromatography systems to ICP-MS to easily and accurately speciate critical elements such as chromium, arsenic and mercury.





In Action: Materials, Nuclear, Geoscience Exploration

Robust, reliable performance, even in the toughest environments

Solid Sampling with Laser Ablation

Expand capabilities, minimize sample preparation and improve analysis times for difficult samples. Easily integrate laser ablation systems to obtain the best spatial and depth characterization.

Advantages of the iCAP RQ ICP-MS

- Analyze challenging matrices, across a broad range of sample types
- Reliable and robust plasma, even in the presence of 100% organic solvents
- Effective comprehensive interference removal, for assured accuracy
- Simple maintenance, minimal down-time
- Straightforward to set up, ergonomic and intuitive to use
- Common software platform across our ICP techniques reduces training and enables operator flexibility
- Easily configured for laser ablation solid sampling
- Ability to analyze natural and engineered nanoparticles
- Hardware and software ready to easily integrate advanced hyphenated techniques



Material Analysis

Whether running low level alloy QA/QC analysis or qualifying advanced materials in the aerospace industry, the iCAP RQ ICP-MS can easily be configured to your needs.

Simplify material analysis with fully integrated, fast sampling accessories and intelligent dilution for automated sample preparation.

Flexibility of collision/reaction modes for optimal interference removal, enables accurate analysis in a broad range of material types.



Nuclear

Achieve advanced isotopic detection utilizing a high sensitivity interface and superior mass stability. Unique ion optics offer low background and high signal to noise ratios for optimal detection limits.

Collisional focusing with our unique QCell technology ensures the abundance sensitivity required for the challenge of measuring isotope ratios.



Geoscience Exploration

Robust long-term analysis of the toughest rock digests and lithium metabolite fusions. Customized interface ensures minimal drift over time and integrated QC checks enable automatic self assessments of performance.



We manage your instruments so you can focus on the science

When you buy a Thermo Scientific product, you gain the peace of mind that comes from the backing of a global team of Unity Lab Services experts committed to your long-term success.



Thermo Scientific™ iCAP™ RQ ICP-MS, part of the iCAP™ Qnova™ Series ICP-MS

A total, multi-element solution for high-throughput routine laboratories.

Expand your laboratory portfolio with this powerful, compact analyzer. With uniquely reliable cell mode performance and user-friendly platform software, SQ-ICP-MS analysis is easier than ever. Ideal for labs with a focus on environmental, food, water and geoscience analyses.



Compact design

Easy installation



User-friendly operation

Simplicity, productivity and robustness for routine labs

www.thermofisher.com/SQ-ICP-MS



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Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Request for Quotation
13 — Equipment

Proc Folder: 317430

Doc Description: Inductively Coupled Plasma Mass Spectrometry (ICP-MS)

Proc Type: Central Purchase Order

Date Issued	Solicitation Closes	Solicitation No	Version
2017-05-01	2017-05-18 13:30:00	CRFQ 1400 AGR1700000016	1

BID RECEIVING LOCATION

BID CLERK

DEPARTMENT OF ADMINISTRATION

PURCHASING DIVISION

2019 WASHINGTON ST E

CHARLESTON

WV

25305

US

VENDOR

Vendor Name, Address and Telephone Number:

Thermo Electron North America LLC

5225 Verona Road

Madison, WI 53711

Phone# 800-532-4752

FOR INFORMATION CONTACT THE BUYER

Tara Lyle

(304) 558-2544

tara.l.lyle@wv.gov

Signature X

FEIN # 43-1992201

DATE

All offers subject to all terms and conditions contained in this solicitation

ADDITIONAL INFORMATION:

The West Virginia Purchasing Division for the agency, the West Virginia Department of Agriculture, is soliciting bids for a one-time purchase of an Inductively Coupled Plasma Mass Spectrometry (ICP-MS), workstation PC, and software with shipping, installation, validation, warranty, training, and service, per the attached documentation.

INVOICE TO		SHIP TO	
PROCUREMENT OFFICER 304-558-2221 AGRICULTURE DEPARTMENT OF ADMINISTRATIVE SERVICES 1900 KANAWHA BLVD E CHARLESTON WV25305-0173 US		AUTHORIZED RECEIVER 304-558-2227 AGRICULTURE DEPARTMENT OF REGULATORY PROTECTION DIVISION 313 GUS R DOUGLAS LN, BLDG 11 CHARLESTON WV 25312 US	

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	ICP-MS Autosampler, computer, software	1.00000	EA		

Comm Code	Manufacturer	Specification	Model #
41000000			

Extended Description :

ICP-MS Autosampler, computer, software

INVOICE TO		SHIP TO	
PROCUREMENT OFFICER 304-558-2221 AGRICULTURE DEPARTMENT OF ADMINISTRATIVE SERVICES 1900 KANAWHA BLVD E CHARLESTON WV25305-0173 US		AUTHORIZED RECEIVER 304-558-2227 AGRICULTURE DEPARTMENT OF REGULATORY PROTECTION DIVISION 313 GUS R DOUGLAS LN, BLDG 11 CHARLESTON WV 25312 US	

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
2	Shipping Charges & Inside Delivery	1.00000	EA		

Comm Code	Manufacturer	Specification	Model #
78121603			

Extended Description :

Shipping Charges & Inside Delivery

INVOICE TO		SHIP TO	
PROCUREMENT OFFICER 304-558-2221 AGRICULTURE DEPARTMENT OF ADMINISTRATIVE SERVICES 1900 KANAWHA BLVD E CHARLESTON WV25305-0173 US		AUTHORIZED RECEIVER 304-558-2227 AGRICULTURE DEPARTMENT OF REGULATORY PROTECTION DIVISION 313 GUS R DOUGLAS LN, BLDG 11 CHARLESTON WV 25312 US	

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
3	Installation/Validation	1.00000	EA		

Comm Code	Manufacturer	Specification	Model #
73171605			

Extended Description :

Installation/Validation

INVOICE TO		SHIP TO	
PROCUREMENT OFFICER 304-558-2221 AGRICULTURE DEPARTMENT OF ADMINISTRATIVE SERVICES 1900 KANAWHA BLVD E CHARLESTON WV25305-0173 US		AUTHORIZED RECEIVER 304-558-2227 AGRICULTURE DEPARTMENT OF REGULATORY PROTECTION DIVISION 313 GUS R DOUGLAS LN, BLDG 11 CHARLESTON WV 25312 US	

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
4	Training/Warranty	1.00000	EA		

Comm Code	Manufacturer	Specification	Model #
73171605			

Extended Description :

Training/Warranty

INVOICE TO		SHIP TO	
PROCUREMENT OFFICER 304-558-2221 AGRICULTURE DEPARTMENT OF ADMINISTRATIVE SERVICES 1900 KANAWHA BLVD E CHARLESTON WV25305-0173 US		AUTHORIZED RECEIVER 304-558-2227 AGRICULTURE DEPARTMENT OF REGULATORY PROTECTION DIVISION 313 GUS R DOUGLAS LN, BLDG 11 CHARLESTON WV 25312 US	

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
5	Preventative maintenance	1.00000	EA		

Comm Code	Manufacturer	Specification	Model #
81101706			

Extended Description :

Preventative maintenance

SCHEDULE OF EVENTS

Line	Event	Event Date
1	Technical questions due by 4:00 pm	2017-05-09

AGR1700000016	Document Phase Final	Document Description Inductively Coupled Plasma Mass Spectrometry (ICP-MS)	Page 4 of 4
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ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions

Fully Automated, Intelligent, High-Throughput Elemental Analysis of Drinking Waters Using SQ-ICP-MS

Marcus Manecki, Daniel Kutscher, Christoph Wehe, Robert Henry, Julian Wills and Shona McSheehy Ducos
Thermo Fisher Scientific, Bremen, Germany

Key Words

Auto-Dilution, Drinking Water, ICP-MS, SQ-ICP-MS, He KED, Sample Preparation, U.S. EPA Method 200.8 Revision 5.5

Goal

To demonstrate robust high-throughput analysis of environmental samples using SQ-ICP-MS in He-KED mode, in accordance with the requirements of U.S. EPA method 200.8 Revision 5.5 and to demonstrate the performance of the Thermo Scientific™ iCAP™ RQ ICP-MS coupled to the ESI prepFAST™ auto-dilution system.

Introduction

EPA Method 200.8 analyses for the quantification of trace metals in drinking and waste waters are performed routinely in many laboratories. Thousands of analyses are performed per week to support the monitoring and control of drinking water contaminants and water quality. Due to the complexity of the standard operating procedure (SOP), skilled technicians are required to setup and prepare the daily analysis, as well as actively monitor the results and perform further sample manipulation as required throughout the analytical run. The need for technical staff is a factor that keeps the overall expense of routinely running the 200.8 method relatively high.

Recent advances in auto-dilution offer the potential to automate much of the sample preparation and data review with automated re-runs of any samples that do not meet predefined limits. By automatically creating a calibration set of standards from one stock standard and then diluting each sample to a predefined dilution level, an auto-dilution system can save valuable analysts' time and reduce costs overall, through the lowered consumption of utilities and lab supplies.

Fast sample throughput is another driving factor when implementing routine SOPs. Throughput in the method described herein is improved by the discrete sampling of the auto-dilution system, dramatically reducing uptake and washout time, as well as the use of a single measurement mode for the analysis of all the analytes in the method.



The use of kinetic energy discrimination with helium as a reaction cell gas (He KED) ensures comprehensive interference removal and confidence in the accuracy of the analytical results. Whereas other single quadrupole (SQ) ICP-MS systems require multiple methods for the analysis of drinking water, the iCAP RQ ICP-MS collision/reaction cell (QCell) has a high ion transmission across the mass range, so that all of the analytes in the method, including low mass analytes such as Li and Be can be measured in He KED mode. This eliminates the extra overheads of switching times between different modes and simplifies method development.

This application note describes the fully automated, intelligent, high throughput EPA 200.8 analysis of environmental samples using the ESI prepFAST™ auto-dilution system integrated with the iCAP RQ ICP-MS.

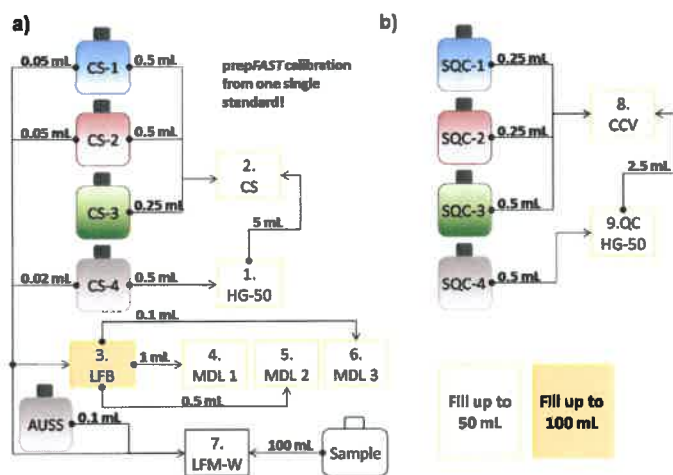


Figure 1. Scheme of (a) standard and (b) QC solutions required for EPA 200.8.

AUSS: Gold Standard Solution, CCV: Continuous Calibration Verification, CS-1 to 4: Calibration Standards, HG-50: Mercury Standard (50 ppb), LFB: Laboratory Fortified Blank, LFM-W: Laboratory Fortified Matrix, MDL-1 to 3: Solutions to determine Method Detection Limit, SQC-1 to 4: Standards for Quality control.

Table 1. Instrument conditions.

Parameter	Value
iCAP RQ ICP-MS	
Nebulizer	PFA-ST
Nebulizer gas flow	1.02 L·min ⁻¹
Interface setup	Ni Cones, High Matrix Skimmer insert
Cell gas flow	4.8 mL·min ⁻¹ He
KED voltage	3 V
prepFAST	
Sample loop	1.5 mL
Time per analysis	66 s



Figure 2. prepFAST auto-dilution system connected to the iCAP RQ ICP-MS (left). ESI SC-2DX autosampler (right).

Methods

Sample Preparation for U.S. EPA 200.8 Rev 5.5

All samples were prepared according to the EPA 200.8 method. For the determination of dissolved analytes in drinking water, tap water was collected in an HDPE tank and acidified to 1% v/v HNO₃ (Optima grade acid, Fisher Chemicals). Aliquots (20 mL) from the tank were filled into 50 mL polypropylene centrifuge tubes for analysis.

The standards and quality control (QC) solutions were prepared according to the protocol outlined in Figure 1.

Mass Spectrometry

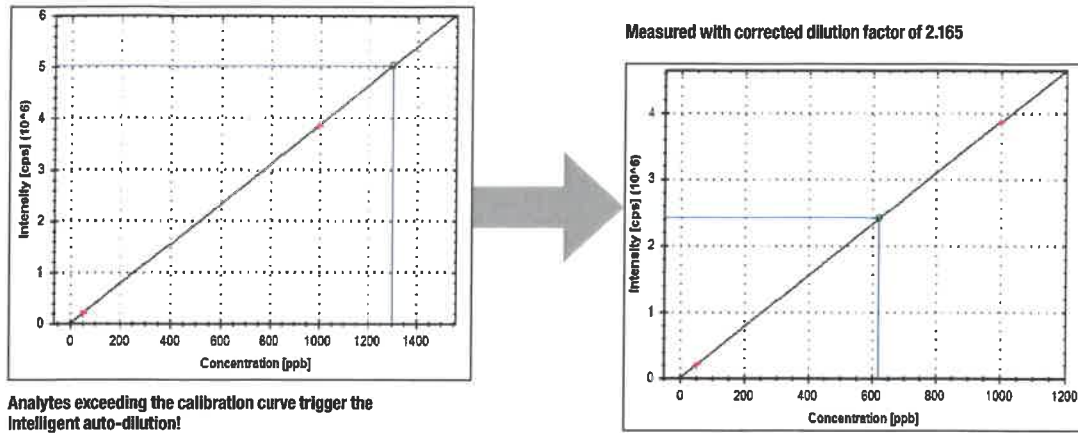
The iCAP RQ ICP-MS coupled to the Elemental Scientific prepFAST Auto-dilution System with an SC-2DX autosampler (Figure 2) was used for acquisition of all data. The iCAP RQ ICP-MS was operated in He KED mode for all analytes. Instrumental parameters are listed in Table 1.

Data Analysis

Thermo Scientific™ Qtegra™ Intelligent Scientific Data Solution™ (ISDS) software was used for quantitative assessment of the data. Working from a predefined EPA 200.8 template, the only user action needed is to enter the number of samples to be analyzed in the analytical batch. All parameters that must be monitored and achieve certain criteria to comply with EPA 200.8 are automatically checked by the Qtegra ISDS software. Samples that do not meet all criteria e.g. ISTD recovery rates or over-range analyte concentrations, are automatically diluted to an appropriate level as calculated or defined within the software and the measurement automatically repeated.

Intelligent Auto-Dilution with prepFast

Dilution factors of up to 400-fold are performed reliably and accurately, with all flows controlled by high precision syringe pumps. With the intelligent dilution, Qtegra ISDS software registers every analyte that falls outside of the defined quality control requirements. If an analyte exceeds the calibration range (Figure 3) the intelligent auto-dilution dilutes the sample and re-measures only the affected analytes without manual interaction.



Analytes exceeding the calibration curve trigger the intelligent auto-dilution!

Figure 3. Analyte concentration re-analyzed by intelligent auto-dilution. Original sample (left), reanalyzed analyte with dilution factor 2.165 (right).

Results

Routine Performance of the iCAP RQ ICP-MS

Over 320 tap water samples were analyzed according to method EPA 200.8. The analysis time was on average 66 s per sample. The concentration of all analytes and their internal standard recovery was monitored throughout the whole analysis time. In total 508 analyses were run in less than 10 h. Internal standard recovery was well within the EPA 200.8 method requirements of 60 to 125 % (Figure 4).

Quality Control (QC) Samples

During the analysis run, a Continuing Calibration Verification (CCV) QC sample was analyzed every 10 samples to assess the accuracy of the calibration.

The EPA 200.8 method requires that the recovery of this QC must be within $\pm 10\%$ or within the acceptance limits of the method (EPA 200.8, rev 5.5, Table 8). All elements were found to be accurate to within $\pm 10\%$ of the known concentration, as well as the acceptance criteria and were stable over all repeated analyses (Figure 5).

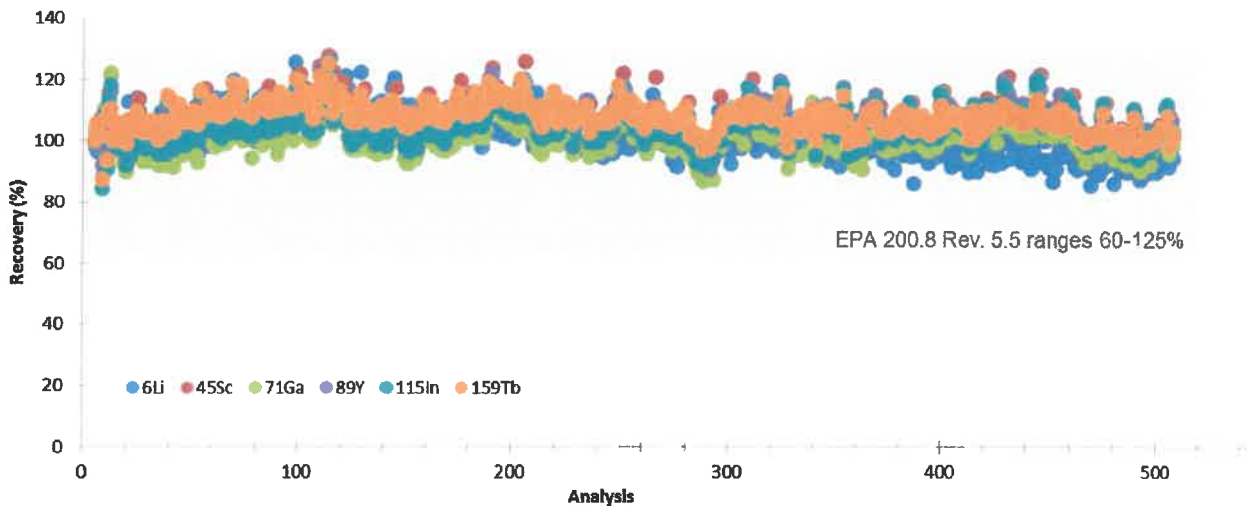


Figure 4. Internal standard response of running tap water samples and QCs showing recoveries well within the 60 – 125% range specified in EPA Method 200.8.

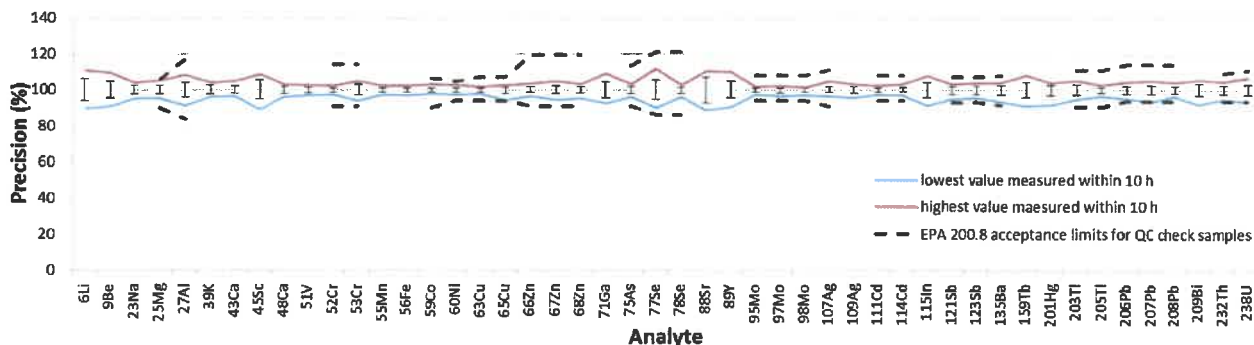


Figure 5. QC recovery and stability of the continuous calibration samples over the entire batch.

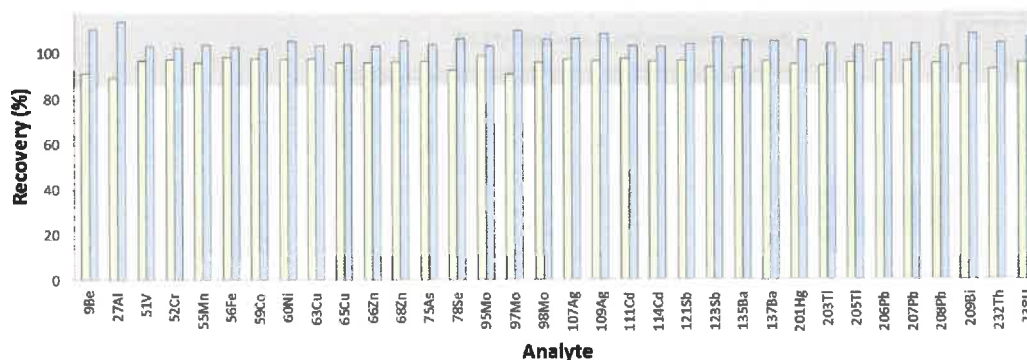


Figure 6. Laboratory Fortified Blank (LFB) recoveries from measurements. Blue bars show the highest (green lowest) recovery of the analyte measured during the 10 h run. Grey bar represent the LPA 200.8 acceptance range (85-115%) for LFB recoveries.

Laboratory Fortified Blank (LFB) and Matrix (LFM) Recoveries

The recovery of a fortified blank with known added amounts of analytes (Figure 1 a, solution 3) must be measured at least once per batch of samples. During this measurement the LFB was analyzed 32 times. In Figure 6 the calculated recovery rates are shown. All analytes show recoveries within the limits (85–115%) of EPA 200.8. Similar to the LFB recovery for every batch, one sample must also be spiked with a known amount of analytes, (Laboratory Fortified Matrix sample; LFM). All 32 LFM (Figure 1 a, solution 7) samples were within the EPA 200.8 recovery limits (75-130%).

Driven by Qtegra ISDS Software Fully Integrated

The Qtegra ISDS software provides all required features needed for the high-throughput analysis of environmental samples. Together with the fully integrated prepFAST system, Qtegra ISDS software offers:

- Prescriptive dilution of samples and calibration standards.
- Continuous monitoring of all quality controls (fortified matrix and blank recoveries or duplicate sample verification)
- LabBook feature that starts an intelligent sequence, with full QA/QC protocol and processes and reports results.
- Comprehensive, user definable reports enabling flexible export to external LIMS software packages.

Intelligent auto-dilution for samples exceeding the calibration range is fully integrated. Samples re-measured by the Qtegra ISDS software are added automatically to the sample list and clearly identified by a plus sign (Figure 7).

Conclusion

The Thermo Scientific iCAP RQ ICP-MS equipped with an ESI Autosampler and prepFAST Auto-dilution System was successfully validated for use with US EPA Method 200.8. With the robust iCAP RQ ICP-MS paired with an ESI prepFAST auto-dilution system, it is possible to run the entire analysis (encompassing sample dilution, calibration and measurement) with minimal manual intervention. After optimizing the uptake and washout parameters, the high sensitivity and stability of the iCAP RQ ICP-MS readily achieved the goal of 52 EPA Method 200.8 analyses per hour.

Robustness

The iCAP RQ ICP-MS delivers reliable analysis of drinking water with minimal drift when equipped with the high matrix insert. For extra robust operation in the face of higher matrix samples, the system can be equipped with the robust plasma interface.

Productivity

The iCAP RQ ICP-MS in combination with the ESI prepFAST Auto-dilution System is the ideal system to measure environmental samples in a high-throughput laboratory.

Simplicity

With the prescriptive and intelligent dilution capabilities provided by the system, manual sample preparation and data post processing is minimized.

No Impact on Bench Space

The integrated dual valve assembly is mounted directly beneath the sample introduction system, minimizing sample pathways.

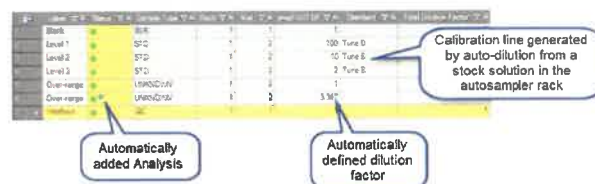


Figure 7. Screenshot of the intelligent auto dilution process in Qtegra ISDS Software.

To find a local representative, visit:
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