

Request for Quotation

ORIGINAL

Discrete Analyzer

For

**State of West Virginia
Health and Human Resources
Environmental Chemistry Laboratory**

From

Systea Scientific LLC
900 Jorie Blvd.
Oak Brook, IL 60523

Reference: RFQ No.: LBS90130
Due Date: Wednesday, May 20, 2009
Time: 1:30 P.M.

RECEIVED

2009 MAY 20 A 10: 04

PURCHASING DIVISION
STATE OF WV



Craig R Chinchilla
General Manager - Member
630-645-0600 Phone
630-645-0601 Fax

May 19, 2009

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State of West Virginia
 Department of Administration
 Purchasing Division
 2019 Washington Street East
 Post Office Box 50130
 Charleston, WV 25305-0130

Request for Quotation

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 LBS90130

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ADDRESS CORRESPONDENCE TO ATTENTION OF:
 ROBERTA WAGNER
 304-558-0067

RFQ COPY
 TYPE NAME/ADDRESS HERE

VENDOR

SYSTEA SCIENTIFIC, LLC
900 JORIE BLVD., SUITE 35
OAK BROOK, IL 60523
ATTN: CRAIG CHINCHILLA

SHIP TO

HEALTH AND HUMAN RESOURCES
 ENVIRONMENTAL CHEMISTRY LAB
 4710 CHIMNEY DRIVE
 CHARLESTON, WV
 25302 304-558-3530

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
04/22/2009				

OPENING DATE: 05/20/2009 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
001	1	JB		493-08		
<p>ONE AUTOMATED DISCRETE ANALYZER INSTRUMENT</p> <p>REQUEST FOR QUOTATION</p> <p>TO PROVIDE AN AUTOMATED DISCRETE ANALYZER INSTRUMENT TO ANALYZER FOR NITRATE+NITRITE NITROGEN AND NITRITE NITROGEN IONS IN DRINKING WATER TO FULFILL REQUIREMENTS OF US EPA REGULATIONS FOR COMPLIANCE MONITORING OF PUBLIC WATER SYSTEMS AND OF PRIVATE WELLS. PER THE ATTACHED SPECIFICATIONS.</p> <p>THIS INSTRUMENT IS TO BE INSTALLED FOR USE BY THE ENVIRONMENTAL CHEMISTRY LABORATORY LOCATED AT 4710 CHIMNEY DRIVE, SUITE G, CHARLESTON, WV 25302.</p> <p>PROOF OF WORKER'S COMPENSATION INSURANCE IS A REQUIREMENT OF THIS CONTRACT.</p> <p>CANCELLATION: THE DIRECTOR OF PURCHASING RESERVES THE RIGHT TO CANCEL THIS CONTRACT IMMEDIATELY UPON WRITTEN NOTICE TO THE VENDOR IF THE COMMODITIES AND/OR SERVICES SUPPLIED ARE OF AN INFERIOR QUALITY OR DO NOT CONFORM TO THE SPECIFICATIONS OF THE BID AND CONTRACT HEREIN.</p> <p>BANKRUPTCY: IN THE EVENT THE VENDOR/CONTRACTOR FILES FOR BANKRUPTCY PROTECTION, THIS CONTRACT IS AUTOMATICALLY NULL AND VOID, AND IS TERMINATED WITHOUT FURTHER ORDER.</p> <p>INQUIRIES:</p>						

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE: *Craig Chinchilla* TELEPHONE: 630-645-0600 DATE: 5-19-2009

FILE: General M&A - Mrs FEIN: 20-0779207 ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'



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 25302 304-558-3530

VENDOR

RFQ COPY
 TYPE NAME/ADDRESS HERE
System Scientific, LLC
900 Jonie Blvd., Suite 35
Oak Brook, IL 60523

SHIP TO

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04/22/2009				

BID OPENING DATE: 05/20/2009 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
<p>WRITTEN QUESTIONS SHALL BE ACCEPTED THROUGH CLOSE OF BUSINESS ON 5/4/2009. QUESTIONS MAY BE SENT VIA USPS, FAX, COURIER, OR E-MAIL. IN ORDER TO ASSURE NO VENDOR RECEIVES AN UNFAIR ADVANTAGE, NO SUBSTANTIVE QUESTIONS WILL BE ANSWERED ORALLY. IF POSSIBLE, E-MAIL QUESTIONS ARE PREFERRED. ADDRESS INQUIRIES TO:</p> <p>ROBERTA WAGNER DEPARTMENT OF ADMINISTRATION PURCHASING DIVISION 2019 WASHINGTON STREET, EAST CHARLESTON, WV 25311</p> <p>FAX: 304-558-4115 E-MAIL: RWAGNER@WVADMIN.GOV</p> <p>THE MODEL/BRAND/SPECIFICATIONS NAMED HEREIN ESTABLISH THE ACCEPTABLE LEVEL OF QUALITY ONLY AND ARE NOT INTENDED TO REFLECT A PREFERENCE OR FAVOR ANY PARTICULAR BRAND OR VENDOR. VENDORS WHO ARE BIDDING ALTERNATES SHOULD SO STATE AND INCLUDE PERTINENT LITERATURE AND SPECIFICATIONS. FAILURE TO PROVIDE INFORMATION FOR ANY ALTERNATES MAY BE GROUNDS FOR REJECTION OF THE BID. THE STATE RESERVES THE RIGHT TO WAIVE MINOR IRREGULARITIES IN BIDS OR SPECIFICATIONS IN ACCORDANCE WITH SECTION 148-1-4 (F) OF THE WEST VIRGINIA LEGISLATIVE RULES AND REGULATIONS.</p>						

NOTICE

SEE REVERSE SIDE FOR TERMS AND CONDITIONS.

SIGNATURE <i>Robert Wagner</i>	TELEPHONE 630-641-0600	DATE 6-19-2009
TITLE General MGR - Pur	FEIN 20-0779207	ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'



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VENDOR

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*System Scientific, LLC
 900 Jorie Blvd, suite 35
 OAK Brook, IL 60523*

SHIP TO

HEALTH AND HUMAN RESOURCES
 ENVIRONMENTAL CHEMISTRY LAB
 4710 CHIMNEY DRIVE
 CHARLESTON, WV
 25302 304-558-3530

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
04/22/2009				

BID OPENING DATE: 05/20/2009 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
<p>A SIGNED BID MUST BE SUBMITTED TO:</p> <p>DEPARTMENT OF ADMINISTRATION PURCHASING DIVISION BUILDING 15 2019 WASHINGTON STREET, EAST CHARLESTON, WV 25305-0130</p> <p>NOTE: A CONVENIENCE COPY WOULD BE APPRECIATED.</p> <p>THE BID SHOULD CONTAIN THIS INFORMATION ON THE FACE OF THE ENVELOPE OR THE BID MAY NOT BE CONSIDERED:</p> <p>SEALED BID</p> <p>BUYER: -----ROBERTA WAGNER/FILE 22-----</p> <p>RFQ. NO.: -----LBS90130-----</p> <p>BID OPENING DATE: ----- 5/20/2009-----</p> <p>BID OPENING TIME: -----1:30 PM-----</p> <p>PLEASE PROVIDE A FAX NUMBER IN CASE IT IS NECESSARY TO CONTACT YOU REGARDING YOUR BID: -----630-645-0601-----</p> <p>CONTACT PERSON (PLEASE PRINT CLEARLY): -----CRAIG CHINCHILLA-----</p>						

SIGNATURE <i>Craig Chinchilla</i>			TELEPHONE 630-645-0600		DATE 5-19-2009
TITLE General MGR - PLS		FEIN 20-0779207		ADDRESS CHANGES TO BE NOTED ABOVE	

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'



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System Scientific, LLC
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Oak Brook, IL 60523

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 4710 CHIMNEY DRIVE
 CHARLESTON, WV
 25302 304-558-3530

FOB Destination

DATE PRINTED	TERMS OF SALE	SHIP VIA	FOB	FREIGHT TERMS
04/22/2009			<i>Included</i>	<i>Included</i>

BID OPENING DATE: **05/20/2009** BID OPENING TIME: **01:30PM**

LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
***** THIS IS THE END OF RFQ LBS90130 ***** TOTAL: _____						

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE: *Robert Wagner* TELEPHONE: *630-645-0600* DATE: *5-19-2009*

ROLE: *General Mgr - Pres.* FEIN: *20-0779207* ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

Instrument Specifications:

1. The Environmental Chemistry Laboratory section of the Office of Laboratory Services is requesting for purchase an Automated Discrete Analyzer instrument to analyze for Nitrate+Nitrite Nitrogen and Nitrite Nitrogen ions in drinking water to fulfill requirements of US EPA regulations for compliance monitoring of public water systems and of private wells. Compliance monitoring testing is a requirement of a state's Principal State Laboratory mandated under federal code at 40 CFR 142.10(b)(4) for the state to maintain Primacy over its Drinking Water Program. The instrument will also serve the purpose of protecting public health by providing testing capabilities to private well owners. This instrument is requested to replace an older (35+ year old) piece of equipment, a Technicon AutoAnalyzer II, that is obsolete and unsupported by the manufacturer for service and repairs. This instrument is to be installed for use by the Environmental Chemistry Laboratory at the Big Chimney facility which is physically located at 4710 Chimney Drive, Suite G, Charleston, WV 25302
2. The technology of this discrete analyzer instrument must be compatible with and fulfill the requirements of United States Environmental Protection Agency (EPA) method 353.2 (Revision 2.0) for Nitrate+Nitrite and Nitrite. Vendor must provide proof that the EPA has determined that their proprietary technology and methodology are acceptable versions of EPA Method 353.2 (Revision 2.0) by using the same chemistry and determinative technique for Nitrate+Nitrite and Nitrite. Vendor must be able to produce a letter(s) from the EPA's Office of Ground Water and Drinking Water or the EPA's Alternate Test Procedure Coordinator that attests to this acceptability specifically for drinking water compliance monitoring under the National Primary Drinking Water Regulations for the particular EPA Method 353.2 (Revision 2.0) only.
3. Instrument must be equipped with a system software controlled autosampler. The sample tray must have up to 100 positions to accommodate large sample loads without operator intervention.
4. Instrument must be fully automated for analysis with necessary software provided for system controller that is compatible with Windows XP, with assurance that data can be exported to Laboratory Information Management System (LIMS).
5. Instrument system software must be able to define quality control (QC) checks such as sample spikes, sample duplicates, continuing calibration verification (CCV) checks and continuing calibration blanks (CCB) and evaluate these QC checks against operator specified acceptance ranges.
6. Instrument system software must provide for operator selectable corrective actions for QC checks that are determined to be outside of operator specified acceptance ranges.
7. For non-acceptable CCV and CCB QC checks, the instrument system software must provide for the operator selectable option to reanalyze all samples from the last acceptable CCV and CCB checks and continue with the remaining scheduled sample analyses without operator intervention.

8. Instrument system software must be able to calculate the coefficient of correlation for a method calibration curve and compare the calculated value with an operator specified minimum value.
9. Instrument system software must provide operator selectable response actions to a non-acceptable calibration curve coefficient of correlation which shall include the capability to automatically recalibrate.
10. Instrument system software must be able to spike a sample, calculate spike recovery, and compare against an operator specified acceptance range and follow an operator specified corrective action.
11. Instrument software must be capable of being custom programmed for automated standard preparation and dilution of over-range samples.
12. Instrument must be equipped with an integrated cadmium reaction reduction column or coil for reduction of nitrate to nitrite for subsequent colorimetric determination. The cadmium coil must be capable of being regenerated on-line, in situ, by automated commands through the software.
13. Instrument must employ 100% optical quality glass cuvette for precise absorbance measurement.
14. Instrument detection system must employ a stationary measurement cell with a 10 mm light path, that is automatically and thoroughly rinsed between sample readings to eliminate carryover cross contamination.

Installation Requirements:

1. Vendor shall install the discrete analyzer instrument system in the Environmental Chemistry Laboratory in the Elk Office Center building at 4710 Chimney Drive, Suite G, Charleston, WV 25302.
2. Vendor shall provide to the Environmental Chemistry Laboratory (ECL) Program Manager all relevant information concerning the installation in a documented form at least 2 weeks prior to the scheduled installation.
3. At the time of the discrete analyzer installation, Vendor shall provide to the ECL Program Manager: All relevant system manuals for hardware components; system and application software documentation; a parts, supplies, accessories catalog.
4. All costs of installation shall be included in the submitted bid price.

Training Requirements:

1. Vendor shall provide on-site training for Environmental Chemistry Laboratory personnel on the operation and user maintenance requirements of the discrete analyzer system.
2. Vendor shall provide on-site training relevant to the acceptable performance of the EPA method 353.2 (Rev. 2.0).
3. On-site training provided by Vendor shall be for a minimum of 3 days following Instrument system installation.

4. All costs incurred by the Vendor including travel, lodging, and living expenses necessary to provide this training shall be included in the bid price.

Warranty Requirements:

1. Vendor to include in the total price of the equipment at least 1-year factory warranty.
2. Software support must be included as part of one-year warranty. Vendor must agree to provide software support for any subsequent service agreements that may follow the original one-year standard warranty.
3. Warranty to include on-site service including labor, travel time, and expenses with a 24-hour on-site response time at no extra cost to maintain the specifications listed in this bid and the Vendor's product specifications.
4. Vendor is to include all warranty information upon delivery.
5. Warranty to begin upon completion of installation and on-site training.
6. Service provided under warranty must be provided directly by an employee of the Vendor's company exclusive of contracted third parties.
7. Vendor must agree to offer the first one year extended service warranty after the initial 1 year warranty expires at a cost indicated on the vendor cost sheet.
8. For a period of ten years commencing with the end of the one year warranty period following installation, the Vendor must make available a one-year service period for preventive maintenance and emergency service on both system hardware and software on a reoccurring annual basis.

Delivery Requirements:

1. Discrete Analyzer and its components to be "inside delivery" by freight delivery company.
2. F.O.B. Destination unless otherwise stated in quote by Vendor. Any shipping and handling requirements must be stated in Vendor's quote.

Conformance Requirements:

1. The discrete analyzer system shall be operated for a period of 30 days following installation and must be found to conform to the herein listed specifications.
2. Vendor agrees to accept the return of the discrete analyzer system should the discrete analyzer system fail to conform to any required specification within this 30 day period.
3. Should the discrete analyzer system be returned to the Vendor, the Vendor agrees to provide a full refund of the bid price of the discrete analyzer system to the State of West Virginia.

RFQ COST SHEET

Bidders shall provide a cost for the following:

Automated Discrete Analyzer System

\$ 36,712.00

On-site Training (3 days at installation of equipment)

\$ 2,250.00


First Year Extended Warranty

\$ Included

note: quoted with 2 yr standard warranty

Total Cost \$ 38,962.00

The award will be made to the vendor with the lowest overall total cost of the equipment which meets all requested specifications and requirements. Payment will be made in arrears.


Vendor Signature

5-19-2009
Date

AGREEMENT ADDENDUM

In the event of conflict between this addendum and the agreement, this addendum shall control:

1. **DISPUTES** - Any references in the agreement to arbitration or to the jurisdiction of any court are hereby deleted. Disputes arising out of the agreement shall be presented to the West Virginia Court of Claims.
2. **HOLD HARMLESS** - Any clause requiring the Agency to indemnify or hold harmless any party is hereby deleted in its entirety.
3. **GOVERNING LAW** - The agreement shall be governed by the laws of the State of West Virginia. This provision replaces any references to any other State's governing law.
4. **TAXES** - Provisions in the agreement requiring the Agency to pay taxes are deleted. As a State entity, the Agency is exempt from Federal, State, and local taxes and will not pay taxes for any Vendor including individuals, nor will the Agency file any tax returns or reports on behalf of Vendor or any other party.
5. **PAYMENT** - Any references to prepayment are deleted. Payment will be in arrears.
6. **INTEREST** - Should the agreement include a provision for interest on late payments, the Agency agrees to pay the maximum legal rate under West Virginia law. All other references to interest or late charges are deleted.
7. **RECOUPMENT** - Any language in the agreement waiving the Agency's right to set-off, counterclaim, recoupment, or other defense is hereby deleted.
8. **FISCAL YEAR FUNDING** - Service performed under the agreement may be continued in succeeding fiscal years for the term of the agreement, contingent upon funds being appropriated by the Legislature or otherwise being available for this service. In the event funds are not appropriated or otherwise available for this service, the agreement shall terminate without penalty on June 30. After that date, the agreement becomes of no effect and is null and void. However, the Agency agrees to use its best efforts to have the amounts contemplated under the agreement included in its budget. Non-appropriation or non-funding shall not be considered an event of default.
9. **STATUTE OF LIMITATION** - Any clauses limiting the time in which the Agency may bring suit against the Vendor, lessor, individual, or any other party are deleted.
10. **SIMILAR SERVICES** - Any provisions limiting the Agency's right to obtain similar services or equipment in the event of default or non-funding during the term of the agreement are hereby deleted.
11. **ATTORNEY FEES** - The Agency recognizes an obligation to pay attorney's fees or costs only when assessed by a court of competent jurisdiction. Any other provision is invalid and considered null and void.
12. **ASSIGNMENT** - Notwithstanding any clause to the contrary, the Agency reserves the right to assign the agreement to another State of West Virginia agency, board or commission upon thirty (30) days written notice to the Vendor and Vendor shall obtain the written consent of Agency prior to assigning the agreement.
13. **LIMITATION OF LIABILITY** - The Agency, as a State entity, cannot agree to assume the potential liability of a Vendor. Accordingly, any provision limiting the Vendor's liability for direct damages to a certain dollar amount or to the amount of the agreement is hereby deleted. Limitations on special, incidental or consequential damages are acceptable. In addition, any limitation is null and void to the extent that it precludes any action for injury to persons or for damages to personal property.
14. **RIGHT TO TERMINATE** - Agency shall have the right to terminate the agreement upon thirty (30) days written notice to Vendor. Agency agrees to pay Vendor for services rendered or goods received prior to the effective date of termination.
15. **TERMINATION CHARGES** - Any provision requiring the Agency to pay a fixed amount or liquidated damages upon termination of the agreement is hereby deleted. The Agency may only agree to reimburse a Vendor for actual costs incurred or losses sustained during the current fiscal year due to wrongful termination by the Agency prior to the end of any current agreement term.
16. **RENEWAL** - Any reference to automatic renewal is hereby deleted. The agreement may be renewed only upon mutual written agreement of the parties.
17. **INSURANCE** - Any provision requiring the Agency to insure equipment or property of any kind and name the Vendor as beneficiary or as an additional insured is hereby deleted.
18. **RIGHT TO NOTICE** - Any provision for repossession of equipment without notice is hereby deleted. However, the Agency does recognize a right of repossession with notice.
19. **ACCELERATION** - Any reference to acceleration of payments in the event of default or non-funding is hereby deleted.
20. **CONFIDENTIALITY**: -Any provision regarding confidentiality of the terms and conditions of the agreement is hereby deleted. State contracts are public records under the West Virginia Freedom of Information Act.
21. **AMENDMENTS** - All amendments, modifications, alterations or changes to the agreement shall be in writing and signed by both parties. No amendment, modification, alteration or change may be made to this addendum without the express written approval of the Purchasing Division and the Attorney General.

ACCEPTED BY:

STATE OF WEST VIRGINIA

Spending Unit: _____

Signed: _____

Title: _____

Date: _____

VENDOR

Company Name: Systema Scientific, LLC

Signed: Angelo R. Chalkley

Title: General MGR - President

Date: 5-19-2009

ATTACHMENT
P.O.# LB390130

This agreement constitutes the entire agreement between the parties, and there are no other terms and conditions applicable to the licenses granted hereunder.

Agreed

Signature : Date

Title

Company Name

Ray R. Childs 5-19-2003

Signature Date

General MGR - President

Title

Agency/Division

State of West Virginia

VENDOR PREFERENCE CERTIFICATE

Certification and application* is hereby made for Preference in accordance with West Virginia Code, §5A-3-37. (Does not apply to construction contracts). West Virginia Code, §5A-3-37, provides an opportunity for qualifying vendors to request (at the time of bid) preference for their residency status. Such preference is an evaluation method only and will be applied only to the cost bid in accordance with the West Virginia Code. This certificate for application is to be used to request such preference. The Purchasing Division will make the determination of the Resident Vendor Preference, if applicable.

1. Application is made for 2.5% resident vendor preference for the reason checked:

- Bidder is an individual resident vendor and has resided continuously in West Virginia for four (4) years immediately preceding the date of this certification; or, Bidder is a partnership, association or corporation resident vendor and has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification; or 80% of the ownership interest of Bidder is held by another individual, partnership, association or corporation resident vendor who has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification; or, Bidder is a nonresident vendor which has an affiliate or subsidiary which employs a minimum of one hundred state residents and which has maintained its headquarters or principal place of business within West Virginia continuously for the four (4) years immediately preceding the date of this certification; or,

2. Application is made for 2.5% resident vendor preference for the reason checked:

Bidder is a resident vendor who certifies that, during the life of the contract, on average at least 75% of the employees working on the project being bid are residents of West Virginia who have resided in the state continuously for the two years immediately preceding submission of this bid; or,

3. Application is made for 2.5% resident vendor preference for the reason checked:

Bidder is a nonresident vendor employing a minimum of one hundred state residents or is a nonresident vendor with an affiliate or subsidiary which maintains its headquarters or principal place of business within West Virginia employing a minimum of one hundred state residents who certifies that, during the life of the contract, on average at least 75% of the employees or Bidder's affiliate's or subsidiary's employees are residents of West Virginia who have resided in the state continuously for the two years immediately preceding submission of this bid; or,

4. Application is made for 5% resident vendor preference for the reason checked:

Bidder meets either the requirement of both subdivisions (1) and (2) or subdivision (1) and (3) as stated above; or,

5. Application is made for 3.5% resident vendor preference who is a veteran for the reason checked:

Bidder is an individual resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard and has resided in West Virginia continuously for the four years immediately preceding the date on which the bid is submitted; or,

6. Application is made for 3.5% resident vendor preference who is a veteran for the reason checked:

Bidder is a resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard, if, for purposes of producing or distributing the commodities or completing the project which is the subject of the vendor's bid and continuously over the entire term of the project, on average at least seventy-five percent of the vendor's employees are residents of West Virginia who have resided in the state continuously for the two immediately preceding years.

Bidder understands if the Secretary of Revenue determines that a Bidder receiving preference has failed to continue to meet the requirements for such preference, the Secretary may order the Director of Purchasing to: (a) reject the bid; or (b) assess a penalty against such Bidder in an amount not to exceed 5% of the bid amount and that such penalty will be paid to the contracting agency or deducted from any unpaid balance on the contract or purchase order.

By submission of this certificate, Bidder agrees to disclose any reasonably requested information to the Purchasing Division and authorizes the Department of Revenue to disclose to the Director of Purchasing appropriate information verifying that Bidder has paid the required business taxes, provided that such information does not contain the amounts of taxes paid nor any other information deemed by the Tax Commissioner to be confidential.

Under penalty of law for false swearing (West Virginia Code, §61-5-3), Bidder hereby certifies that this certificate is true and accurate in all respects; and that if a contract is issued to Bidder and if anything contained within this certificate changes during the term of the contract, Bidder will notify the Purchasing Division in writing immediately.

Bidder: System Scientific, LLC Signed: [Signature]

Date: 5-19-2009 Title: General MGR President

*Check any combination of preference consideration(s) indicated above, which you are entitled to receive.

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

VENDOR OWING A DEBT TO THE STATE:

West Virginia Code §5A-3-10a provides that: No contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and the debt owed is an amount greater than one thousand dollars in the aggregate.

PUBLIC IMPROVEMENT CONTRACTS & DRUG-FREE WORKPLACE ACT:

If this is a solicitation for a public improvement construction contract, the vendor, by its signature below, affirms that it has a written plan for a drug-free workplace policy in compliance with Article 1D, Chapter 21 of the *West Virginia Code*. The vendor **must** make said affirmation with its bid submission. Further, public improvement construction contract may not be awarded to a vendor who does not have a written plan for a drug-free workplace policy in compliance with Article 1D, Chapter 21 of the *West Virginia Code* and who has not submitted that plan to the appropriate contracting authority in timely fashion. For a vendor who is a subcontractor, compliance with Section 5, Article 1D, Chapter 21 of the *West Virginia Code* may take place before their work on the public improvement is begun.

ANTITRUST:

In submitting a bid to any agency for the state of West Virginia, the bidder offers and agrees that if the bid is accepted the bidder will convey, sell, assign or transfer to the state of West Virginia all rights, title and interest in and to all causes of action it may now or hereafter acquire under the antitrust laws of the United States and the state of West Virginia for price fixing and/or unreasonable restraints of trade relating to the particular commodities or services purchased or acquired by the state of West Virginia. Such assignment shall be made and become effective at the time the purchasing agency tenders the initial payment to the bidder.

I certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm, limited liability company, partnership or person or entity submitting a bid for the same materials, supplies, equipment or services and is in all respects fair and without collusion or fraud. I further certify that I am authorized to sign the certification on behalf of the bidder or this bid.

LICENSING:

Vendors must be licensed and in good standing in accordance with any and all state and local laws and requirements by any state or local agency of West Virginia, including, but not limited to, the West Virginia Secretary of State's Office, the West Virginia Tax Department, West Virginia Insurance Commission, or any other state agencies or political subdivision. Furthermore, the vendor must provide all necessary releases to obtain information to enable the Director or spending unit to verify that the vendor is licensed and in good standing with the above entities.

CONFIDENTIALITY:

The vendor agrees that he or she will not disclose to anyone, directly or indirectly, any such personally identifiable information or other confidential information gained from the agency, unless the individual who is the subject of the information consents to the disclosure in writing or the disclosure is made pursuant to the agency's policies, procedures and rules. Vendor further agrees to comply with the Confidentiality Policies and Information Security Accountability Requirements, set forth in <http://www.state.wv.us/admin/purchase/privacy/noticeConfidentiality.pdf>.

Under penalty of law for false swearing (*West Virginia Code* §61-5-3), it is hereby certified that the vendor affirms and acknowledges the information in this affidavit and is in compliance with the requirements as stated.

Vendor's Name: System Sciences LLC
Authorized Signature: [Signature] Date: 5-19-2009



State of West Virginia
 Department of Administration
 Purchasing Division
 2019 Washington Street East
 Post Office Box 50130
 Charleston, WV 25305-0130

Request for Quotation

RFQ NUMBER
LBS90130

PAGE
1

ADDRESS CORRESPONDENCE TO ATTENTION OF
ROBERTA WAGNER 304-558-0067

RFQ COPY
 TYPE NAME/ADDRESS HERE

BIDDING

SYSTEA SCIENTIFIC, LLC.
900 JORIE BLVD., SUITE 35
OAK BROOK, IL 60523
CRAIG CHINCHILLA

SHIP TO

HEALTH AND HUMAN RESOURCES
 ENVIRONMENTAL CHEMISTRY LAB

 4710 CHIMNEY DRIVE
 CHARLESTON, WV
 25302 304-558-3530

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
05/06/2009				

BID OPENING DATE: 05/20/2009 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
ADDENDUM NO. 1 1. QUESTIONS AND ANSWERS ARE ATTACHED. 2. ADDENDUM ACKNOWLEDGEMENT IS ATTACHED. THIS DOCUMENT SHOULD BE SIGNED AND RETURNED WITH YOUR BID. FAILURE TO SIGN AND RETURN MAY RESULT IN DISQUALIFICATION OF YOUR BID. EXHIBIT 10 REQUISITION NO.: LBS90130 ADDENDUM ACKNOWLEDGEMENT I HEREBY ACKNOWLEDGE RECEIPT OF THE FOLLOWING CHECKED ADDENDUM(S) AND HAVE MADE THE NECESSARY REVISIONS TO MY PROPOSAL, PLANS AND/OR SPECIFICATION, ETC. ADDENDUM NO.'S: NO. 1 NO. 2 NO. 3 NO. 4 NO. 5 I UNDERSTAND THAT FAILURE TO CONFIRM THE RECEIPT OF THE ADDENDUM(S) MAY BE CAUSE FOR REJECTION OF BIDS.						

SEE REVERSE SIDE FOR TERMS AND CONDITIONS		
SIGNATURE <i>Craig Chinchilla</i>	TELEPHONE 630-645-0600	DATE 5-19-2009
TITLE General Mgr - Pres.	FEIN 20-0779207	ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'



State of West Virginia
 Department of Administration
 Purchasing Division
 2019 Washington Street East
 Post Office Box 50130
 Charleston, WV 25305-0130

Request for Quotation

RFQ NUMBER
 LBS90130

PAGE
 2

ADDRESS CORRESPONDENCE TO ATTENTION OF
 ROBERTA WAGNER
 304-558-0067

VENDOR

RFQ COPY
 TYPE NAME/ADDRESS HERE

*System Scientific, LLC
 900 Jamie Blvd, Suite 35
 Oak Brook, IL 60523*

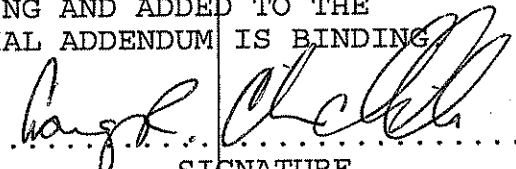
SHIP TO

HEALTH AND HUMAN RESOURCES
 ENVIRONMENTAL CHEMISTRY LAB

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 25302 304-558-3530

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OPENING DATE: 05/20/2009 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
<p>VENDOR MUST CLEARLY UNDERSTAND THAT ANY VERBAL REPRESENTATION MADE OR ASSUMED TO BE MADE DURING ANY ORAL DISCUSSION HELD BETWEEN VENDOR'S REPRESENTATIVES AND ANY STATE PERSONNEL IS NOT BINDING. ONLY THE INFORMATION ISSUED IN WRITING AND ADDED TO THE SPECIFICATIONS BY AN OFFICIAL ADDENDUM IS BINDING.</p> <p style="text-align: center;">  SIGNATURE <i>System Scientific, LLC</i> COMPANY <i>May 19, 2009</i> DATE </p> <p>REV. 11/96</p> <p style="text-align: center;">END OF ADDENDUM NO. 1</p>						

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE *Robert Wagner* TELEPHONE 670-645-0600 DATE 5-19-2009

TITLE General MGR - Pres FEIN 20-0779207 ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

STATE OF WEST VIRGINIA
PURCHASE CONTINUATION SHEET

Page 2 of 2 PagesRequisition / P.O. No.:
LBS90130

File:

Acct. No.:

5201-2009-3045-099-072-15384

Spending Unit:
DHHR/OLS

Vendor: _____ P.O. Date: _____

Item No.	Quantity	Description	Unit Price	Amount
		<p>VENDOR QUESTION #1:</p> <p>Will the State of West Virginia consider an instrument that has auto sampling capability but not as large as 100 positions?</p> <p>RESPONSE:</p> <p>Please refer to Specification #3 under Instrument Specifications on Page 5 of the Request for Quote.</p> <p>Specification #3 must have up to 100 positions to allow for the larger sample loads which accommodates the operator and prevents operator intervention.</p> <p>VENDOR QUESTION #2</p> <p>Will you consider a instrument that has EPA approval for wastewater analysis of nitrates not using the toxic cadmium and or hydraxine chemicals. It is a green method and has a pending EPA approval for drinking water.</p> <p>RESPONSE:</p> <p>Please refer to Specification #2 under Instrument Specifications on Page 5 of the Request for Quote.</p> <p>Specification #2 must be strictly adhered to regarding approval by EPA for method 353.2 for both Nitrate+Nitrite and Nitrite specifically for drinking water. They must have approvals for this now, not pending, not for other methods, not for wastewater.</p>		

Specifications – Comments

Systea Scientific, LLC has submitted data for USEPA method 353.2 (Revision 2) to the USEPA Alternate Test Procedure (ATP) for review and approval. (See attached letter) Systea Scientific anticipates that an approval letter will be received in a few weeks. We have also submitted data on our new Systea Easy (1-Reagent) non-hazardous nitrate method which received approval for NPDES compliance monitoring on January 22, 2009. We were recently informed by the Office of Ground Water and Drinking Water that the new non-hazardous method was reviewed and will be listed in the Federal Register in early July.

The new “green” nitrate method is offered exclusively by Systea Scientific and is not available on any instrumentation other than the EasyChem Plus discrete analyzer. The new “green” nitrate method is far superior to all other nitrate methods both in flexibility and performance. The new “green” nitrate method is not subject to matrix interference that adversely effect cadmium columns and coils. The new “green” nitrate method is also inexpensive with a cost of less than 4 cents per test. No hazardous waste is generated and laboratory personnel are not exposed to toxic cadmium as a result of using Systea Scientific’s “green” nitrate method.

For more information on the status of the method approval we recommend that your office contact the Office of Ground Water and Drinking Water.

Steven C. Wendelken Ph.D.
ATP Coordinator
Office of Ground Water and Drinking Water
Technical Support Center (MS-140)
26 W. Martin Luther King Dr.
Cincinnati, Ohio 45219
(513) 569-7491

Additional Comments:

The EasyChem Plus discrete analyzer system comes with a sixty (60) position sample tray and will be provided with two sample trays. The software allows for additional work lists to be edited while the system is operating. Loading the sample tray and editing the sample tray on any discrete analyzer system is the most time consuming part for an operator. Having the ability to prepare additional work lists while the unit is running will improve productivity verses having just a larger sample tray.

Most companies that provide analytical instrumentation only offer a one (1) year warranty. Because we are confident in the performance of the EasyChem, we have included a standard two (2) year warranty. A free loaner is available during the warranty period with 24-48 hour guaranteed response time.

The overall operating and service costs over the life of the unit will be substantially lower with the EasyChem discrete analyzer versus any other discrete analyzer system. All other discrete analyzers are service intensive and absolutely require a service agreement for the life of the unit. Service agreements are available after the warranty if desired.

The proposed EasyChem system includes a spares kit and consumables for 5,000 tests, on-site training and installation, and a free loaner is available during the warranty period. Software upgrades are free for the life of the unit. The system will be provided with the Systea Scientific version of Timekeeper America® continuous maintenance monitoring software.

Description of service plan is located in Section 2. Service plan can be modified and customized to include training and to accommodate the laboratories schedule.

Advanced training is available which would cover service and hardware.

Maintenance is the simplest of all discrete analyzers and consists of the following:
Once a week – replace 5 cm of waste tubing by moving the tubing through the platen on the side of the unit and cutting off the worn part. The unused waste line tubing is refastened and ready to go. Maximum time needed five minutes.

Once a month – Flush the flow cell with some bleach for about two minutes. Lubricate the dosing syringe and a couple of other spots. Maximum time needed five minutes.

Every six months to one year – Replace system tubing and probes. Maximum time needed about twenty minutes.

Lamp replace as needed. After approximately every 2,000 hour of operating time.

Dosing Syringe as needed. Syringe is good for at least 200,000 movements. Replace approximately every 2-3 years.

The EasyChem system comes with TimeKeeper America continuous maintenance monitoring software to inform the user when to perform maintenance and to help document all work done for NELAC compliance.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
CINCINNATI, OHIO 45268

Craig Chinchilla
Systea Scientific, LLC
Jorie Blvd., Suite 35
Oak Brook, IL 60523
Phone: (630) 645-0600

04/29/2009

RE: ATP Case No. pending

Mr. Chinchilla

This letter is to confirm the receipt of Systea's recent ATP submissions; Easy Nitrate Method 353.2-01 DW, Easy Nitrite Method 4500-NO2-B DW, Easy Orthophosphate Method 365.1-02 DW and Easy Silica I-2700-85 DW. We are in the process of assigning case numbers and beginning the ATP review. You will be notified of the case numbers once they have been assigned. From that point forward please use these numbers in correspondence regarding these ATP Submissions.

We appreciate your interest in the development of environmental monitoring methods. If you have any questions regarding the review of these alternate test procedures, please contact me by email at: wendelken.steve@epa.gov or by telephone at: 513-569-7491.

Sincerely,

A handwritten signature in cursive script, appearing to read "Steve Wendelken".

Steven C. Wendelken, Ph.D.
ATP Coordinator
Office of Ground Water and Drinking Water
Technical Support Center (MS-140)
26 W. Martin Luther King Dr.
Cincinnati, Ohio 45219

cc:
Danielle Carter, CSC, SCC



Systema Scientific LLC

900 Jorie Boulevard
Suite 35
Oak Brook, IL 60523

Quotation

Date	Quotation #
5/19/2009	574

Wet Chemistry Made "Green" and Easy!

Attention
Mr. Larry Duffield Office of Laboratory Services Environmental Laboratory 4710 Chimney Dr. Suite G Charleston, WV 25302

Part Number	Description	Qty	Price USD	Total
110-EASY-02	EasyChem Plus Discrete Analyzer w/ Software and Spare Kit	1	35,745.00	35,745.00
120-CADC-01	Cadmium Reduction Module	1	967.00	967.00
130-T025-01	Onsite Training and Installation	1	2,250.00	2,250.00
140-TKA-01	TimeKeeper America Continuous Maintenance Monitoring Software for EasyChem	1	0.00	0.00
	Note: The System includes the new "green" nitrate method exclusively from Systema Scientific.			

Local Rep
VG

Freight: Included
Delivery: 2-4 Weeks ARO
Validity: 90 Days
Terms: Net 30
Warranty: 2 Years Parts & Labor

Subtotal	\$38,962.00
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Total	\$38,962.00
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Phone # 630-645-0600 Fax # 630-645-0601

Web Site
www.easychem.com



Systema Scientific LLC

Product Detail

110-EASY-02

EasyChem Plus Discrete Analyzer w/Software and Spares Kit

EasyChem Plus

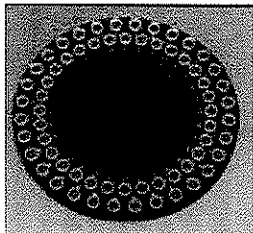


The new EasyChem Plus discrete analyzer is fast becoming the industry standard for inorganic nutrient analysis.

Advantages

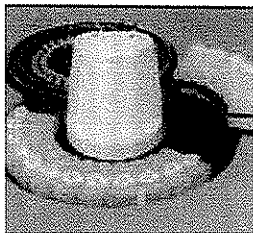
- Easy to use; no experience required.
- Easy run flexibility; individual parameters can be selected for each sample.
- Easy running costs; low reagent consumption, only a few microliters of reagent per sample. Minimal waste generation.
- Easy software to operate; works on Windows 98 or higher platforms.
- Easy maintenance; virtually no consumables or spare parts required.
- Easy operation; no hydraulics, no pump tubes.

Sample Tray:



The Sample Tray is located in the center of the working area; 60 samples, standards or controls can be easily inserted in the proper positions, identified by a progressive number. Positions can be reserved for off-scale dilutions and are identified by a red line. The sample tray is easily removed for loading and unloading of samples.

Reagent Tray:



The Reagent Tray can contain up to 18 reagents, temperature controlled for stability by a Peltier, which is located in the left side of the working area. A computer controlled needle, connected to a high precision micro syringe, allows for sample and reagent pickup. The needle also senses reagent levels.

Reaction Cuvettes:



The Reaction Cuvettes are located around the Sample Tray. A computer controlled needle connected to a high precision micro syringe, picks up the sample and the reagents. After preheating, in a coil positioned in the body of the needle arm, they are inserted into a reaction cuvette that is temperature controlled up to 50°C. A proper wash cycle between samples ensures that there is no carry-over from the previous sample. Possible carry-over can be measured and corrected via the software.

Colorimeter:

As soon as the analysis program is complete, a second needle connected to a peristaltic pump is activated. The needle is inserted into the cuvette. The sample is then pumped into a temperature controlled flow cell, where the O.D. is detected by a colorimeter, which automatically selects the right wavelength. A proper flow cell wash cycle ensures that there is no carry-over from the previous sample. Optional flow cell lengths are available for greater resolution.

EasyChem Software:

EasyChem software was specially created for Windows 98 and higher platforms and is written and supported by Systea.



Systema Scientific LLC

Product Detail

120-CADC-02

Cadmium Reduction Module

The module allows for the reduction of Nitrate by use of a Cadmium lined coil mounted on top of the dosing station. Valves located in the dosing station open when the coil is being used, allowing sample to pass through the Cadmium coil for reduction. When the coil is not in use, the system's valves isolate the Cadmium coil. A valve is also used to bypass the wash reservoir and allow buffer to be passed through the coil between each sample reduction. Additionally, buffer solution is passed through the Cadmium coil between each sample reduction increasing recovery, and extending the life of the Cadmium coil. This minimizes the need for coil regeneration. Two LEDs located on the top of the dosing station light when sample or buffer is passing through the coil to indicate which step is taking place.

- Cadmium Coil can be regenerated automatically on-line by the instrument or manually off-line by removing the coil.
- Uses a standard five or ten turn Cadmium coil commonly used in continuous flow systems.
- Eliminates operator contact of Cadmium since there are no loose granules and the coil is externally sealed.



Systema Scientific LLC

Product Detail

130-T025-01

Onsite Training and Installation

An experienced Systema Scientific engineer will be assigned as the technical support person for this project.

On the first day, the engineer will travel to your site. In the afternoon of that day, he/she will start with the installation and commissioning of the system. This will be followed by the start-up and technical check of the analyzer system.

The Systema Scientific engineer will then train your technicians for three total days on software, general maintenance, and operation of the system.

Includes all travel and living expenses.



Systea Scientific LLC

Product Detail

140-TKA-01

TimeKeeper America Maintenance Software



TKA provides "Continuous Maintenance Monitoring" software specific for, and included with the purchase of Systea chemistry analyzers.

TimeKeeper® America features are designed to help the user increase revenues through efficiencies in time, containment of cost and "anytime" documentation of compliance actions. The first step in being a profitable laboratory is to have a proactive maintenance plan to insure that data is being produced to the highest standards.

TimeKeeper® America's specifically created program "TKA-Systea" will track, schedule and document manufacturer's recommended maintenance on Systea instruments. Extra features include:

- (1) TKA will schedule, track and document personnel actions (i.e. regular reports or meetings, training, milestones, travel and travel costs).
- (2) TKA contains a NELAP segment to meet the NELAP Demonstration of Capability requirements. This segment can also be used to for periodic demonstrations of calibration for autopipettors, balances, thermometers, etc.
- (3) The "Look Ahead Scheduler®" alerts when actions are coming due, due or past due.
- (4) The "Look Ahead Planner®" projects all maintenance actions for the next three or more months.

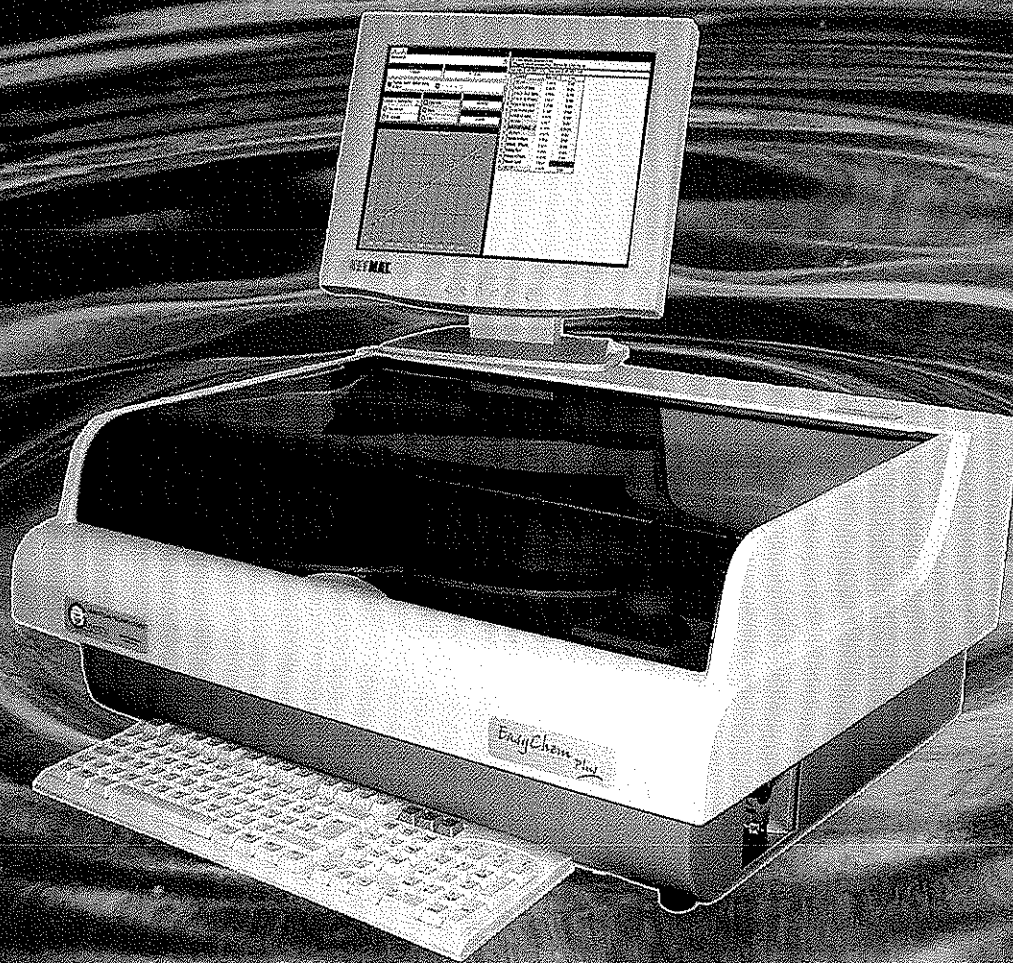
In addition an expanded version of the Systea specific program may be purchased to provide this service for the entire lab, the physical plant, all personnel and also your chemical inventory.

For more information visit TimeKeeper America website www.timekeeperamerica.com.



EasyChem *Plus*

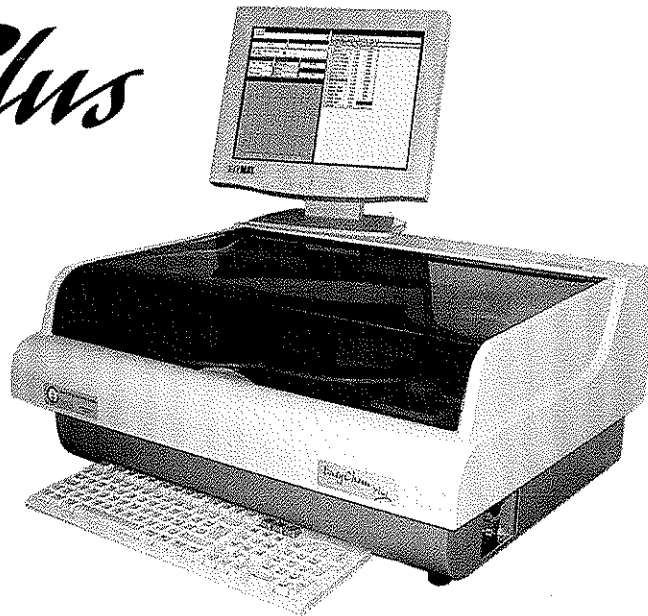
A New Generation of Lab Analyzer



Systema Scientific, LLC

EasyChem *Plus*

Styeta Scientific – Automated Analyzer for water, wastewater, soil, plant, food, beverage and industrial samples.



EasyChem Plus Discrete Analyzer

EASYCHEM: Advantages and Benefits

- Easy to use; no specific experience required. Reduced labor costs.
- Easy run flexibility; individual parameters can be selected for each sample. True unattended operation.
- Easy running costs; low reagent consumption; only a few microliters of reagent per sample. Minimal waste generation.
- Easy operation; no hydraulic problems, no reagents or samples continuously pumped into a manifold, no pump tubing, no clogging valves, no noise, etc.
- Easy preparation of standards from a stock solution.
- Easy automatic pre and post run sample dilution.
- Easy to use Windows® based software with full user friendly adjustable graphic interface.
- Easy software to operate and learn; specifically designed for chemists.
- Easy maintenance; virtually no consumables or spare parts required.

EASYCHEM: Random Access Analyzer includes

- 60 sample capacity tray including blanks, standards, samples, controls, spikes, and free positions for off-scale sample dilution and rerun.
- Up to 18 reagents in a temperature controlled tray.
- 96 reaction cuvettes temperature controlled.
- Colorimeter with a computer controlled filter wheel, for automatic wavelength selection.
- Selectable length flow cells 10, 20, or 40mm.
- Up to 16 standards per method.
- 5 levels of QC per method.
- 20 column thermal diagnostic printer.
- LIMS compatible.
- Bar code reader. (optional)

EASYCHEM: Data Handling System

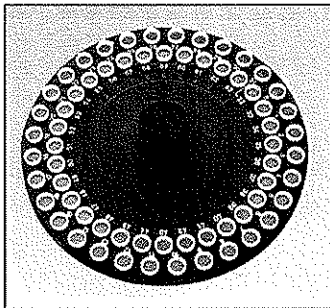
- The Optical Density (O.D.) is processed by the EasyChem Windows® software on an external PC. The final results are printed in a report containing all relevant information including: sample ID, sample O.D., date, time, QC values, and parameters analyzed. Real time results and O.D. values are visible during the run.

USEPA Method

Method No.

Alkalinity	310.2
Ammonia (N)	350.1 Rev. 2
Chloride (Cl -)	4500 Cl-C
Chromium VI	3500 Cr-B
Cyanide	335.4 Rev. 1
Fluoride	4500 F-E
Hardness	130.1
Nitrate+Nitrite (N)	4500 NO3-H, 353.2 Rev. 2
Nitrite (N)	353.2 Rev. 2
Ortho-Phosphate (P)	365.1 Rev. 2
Phenol	420.2
Total Kjeldahl Nitrogen	351.2 Rev. 2
Total Phosphorus	365.1 Rev. 2, 365.4
Silicate	4500 SiO2-C
Sulfate	ASTM D516-02

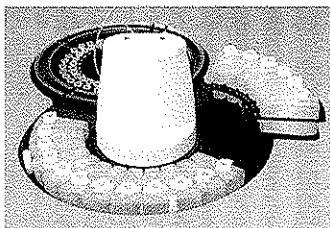
Note: 3500 & 4500 Standard Methods 20th Edition



SAMPLE TRAY

The Sample Tray is located in the center of the working area; 60 samples, standards, spikes, or controls can be easily inserted in the proper position, identified by a progressive number. Positions

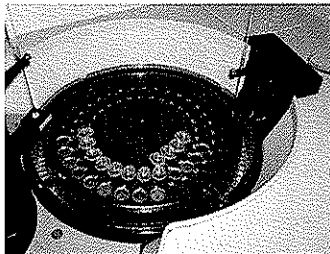
can be reserved for off-scale dilutions. The sample tray is easily removed for loading and unloading of samples and accommodates various size sample cups.



REAGENT TRAY

The Reagent Tray can contain up to 18 reagents, temperature controlled for stability by a Peltier, which is located in the left side of the of the working area. A computer controlled needle, connected to a high precision micro syringe, allows for sample and reagent pickup. The needle also senses reagent levels.

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REACTION CUVETTES

The Reaction Cuvettes are located around the sample tray. A computer controlled needle connected to a high precision micro syringe, picks up the sample and the reagents. After preheating, in a coil positioned in the body of the needle arm, they are inserted into a reaction cuvette that is temperature controlled up to 50°C. A proper wash cycle between samples ensures there is no carry-over from the previous sample.

After preheating, in a coil positioned in the body of the needle arm, they are inserted into a reaction cuvette that is temperature controlled up to 50°C. A proper wash cycle between samples ensures there is no carry-over from the previous sample.

COLORIMETER

As soon as the analysis program is complete, a second needle connected to a peristaltic pump is activated. The needle is inserted into the cuvette. The sample is then pumped into a temperature controlled flow cell, where the O.D. is measured by the colorimeter at the programmed wavelength. A proper flow cell wash cycle ensures that there is no carry-over from the previous sample. Optional flow cell lengths are available for greater resolution.

Technical Specifications

Sample Tray

- 60 free positions for samples, blanks, standards, spikes, controls, and off-scale dilutions

Reagent Tray

- 18 Position, 45 ml reagent bottles, temperature controlled

Throughput

- 50 - 150 tests per hour

Reading Methods

- Endpoint, Endpoint differential
- Endpoint differential sample blank
- Bichromatic endpoint
- Fixed time, Kinetic, Virtual

Calibration

- From 1 to 16 Standards
- Linear regression
- Polynomial
- Stored curve and factor

Optical Group

- 6V/10W halogen lamp with extended UV emission
- 9 Interference filters +/- 2 mm
- Automatic zero setting for all wavelengths
- Accuracy +/- 1% from 0 to 2.5 O.D.
- Linearity better than 0.5%
- Noise < +/- 2m Abs. at 340 nm 2.5 O.D.
- Micro-flow cell 35 microliters internal volume (Standard)
- Accommodates 10, 20, and 40 mm flow cells
- Programmable temperature controlled flow cell by Peltier +/- 0.1°C
- Programmable aspiration by peristaltic pump

Diluter Module

- 1000 microliter syringe
- Zero automatic
- Self-adjustment of mechanical tolerance

Reaction Plate

- 96 reaction cuvettes with incubation temperature programmable +/- 0.1°C
- Disposable cuvettes 1.8 ml

Hardware

- External computer with self-test coded in Eproms

Software

- Sample analysis: independent list of parameters can be selected for each sample and stored in a non-volatile memory
- 3 levels of security
- Automatic pre-run sample dilutions
- Automatic post-run off-scale dilutions
- Automatic spike calculations
- Automatic preparation of standards from a stock solution
- Data reprocessing
- QC charts
- Sample ID: Alphanumeric
- Self-Diagnostic: Included
- Analysis Batch: Self-Optimized
- LIMS compatible

Systema Scientific EasyChem Software

EasyChem software was specially created for Windows® platforms and is written and supported by Systema.

Easy to use

Setting up a run is easy, the user simply clicks the work list icon or menu and selects colored symbols for samples, standards, spikes, or QCs. The operator then chooses which analysis will be performed on the work list, by selecting a pre-defined method. Multiple methods can be selected for each sample, standard, spike, or QC. Pre-run dilutions can also be selected on specific samples, and standards can be automatically prepared from a stock solution. Automatic dilution and re-run of off-scale samples can also be selected. The operator can include in the work list, gain, and carry-over correction if desired. Usual combinations of methods can be pre-defined as "profiles" in the software setup for ultra-fast startup on a routine basis. Once the work list is complete, the operator simply "clicks" to start the run; EasyChem does the rest. During the run, real time sample results, calibration correlation and system functions are displayed to inform the operator.

QC Controls

Up to five levels of real time QCs can be used, QC results are automatically stored and plotted in a user defined QC chart. In case of QC failure, the analyzer can stop the run or simply flag the QC result and go on. After the run, EasyChem prints a symbol to show at a glance whether each passed or failed.

Sample	Position	Dilution	Spike/SDup	Test to run	Notes
1 <BLANK>	1	OFF		(P04)NH3(CL)	
2 <CAL1>	2	OFF		(P04)NH3(CL)	
3 <CAL2>	3	OFF		(P04)NH3(CL)	
4 <CAL3>	4	OFF		(P04)NH3(CL)	
5 <CAL4>	5	OFF		(P04)NH3(CL)	
6 <CAL5>	6	OFF		(P04)NH3(CL)	
7 <QC1>	7	OFF		(P04)NH3(CL)	
8 Sample1	8	OFF		(P04)NH3(CL)	
9 Sample2	9	OFF		(P04)NH3	
10 Sample3	10	OFF		(P04)NH3	
11 Sample4	11	OFF		(P04)NH3	
12 Sample5	12	OFF		(P04)NH3	
13 Sample6	13	OFF		(P04)NH3(CL)	
14 Sample7	14	OFF		(P04)NH3	
15 Sample8	15	OFF		(NH3)	
16 Sample9	16	OFF		(P04)NH3(CL)	
17 Sample10	17	OFF		(P04)NH3(CL)	
18 <SDUP>	18	OFF	N/S	(P04)NH3(CL)	
19 <SPIKE>	19	OFF	N/S	(P04)NH3(CL)	
20 <QC1>	20	OFF		(P04)NH3(CL)	

P	SAMPLE	Final O.D.	COC
1	<BLANK>	0.0476	0.001
2	<CAL1> (0 ppm)	0.0478	0.001
3	<CAL2> (0.01 ppm)	0.0604	0.010
4	<CAL3> (0.05 ppm)	0.0623	0.050
5	<CAL4> (0.1 ppm)	0.0766	0.087
6	<CAL5> (0.5 ppm)	0.1992	0.405
7	<CAL6> (1 ppm)	0.3470	0.859
8	<BLANK>	0.0477	0.001
9	<QC1> (0.5 ppm)	0.1979	0.501(P)
10	<BLANK>	0.0475	0.000
11	Sample 0.05ppm	0.0626	0.061
12	Sample - Effluent	0.0521	0.016
13	Sample Raw	0.0605	0.044
14	Sample 0.01ppm	0.0606	0.011
15	Sample 2ppm	0.6527	0.001
16	<BLANK>	0.0470	0.001

LIMS Connection

Data can be transferred to an internal or network drive at the end of the run, in a Text or ASCII format. Sample IDs can be imported

from a central computer. EasyChem software is compatible with all windows supported networks.

YOUR LOCAL CONTACT

Systema Scientific LLC • 900 Jorie Blvd. Suite 35, Oak Brook, IL 60523
 Phone 630/645-0600 • Fax 630/645-0601 • info@easychem.com • www.easychem.com

HOW IT WORKS

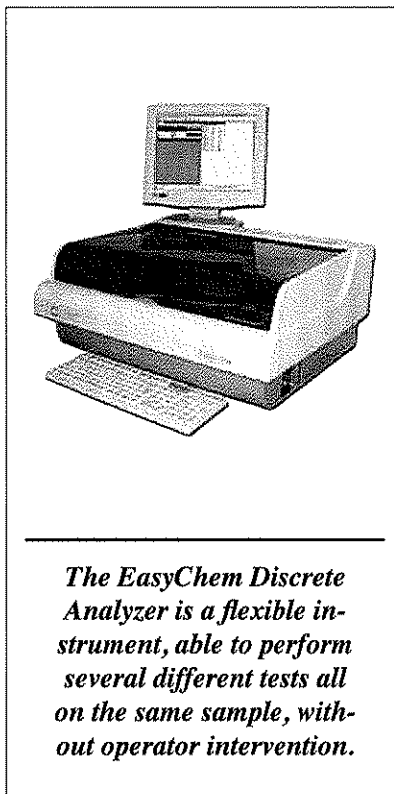
Wet Chemistry Made Easy

Problem:

The way laboratories operate and perform analyses is changing. The market is demanding that laboratories become more efficient and reduce overall operating costs. At the same time, less-skilled personnel are more affordable or more available to perform these functions. Liability associated with operating a laboratory and producing quality defensible data has increased. Turnover remains high in positions that perform the most labor-intensive functions. Nowhere is this truer than in the Wet Chemistry department, where many laboratories are still using manual techniques or outdated technology such as segmented flow analysis (SFA) and flow injection analysis (FIA). Several problems exist with these technologies: lengthy start-up and shutdown times, carryover, hydraulic noise, clogging valves, etc. SFA and FIA analyzers require much more attention and better-skilled personnel to operate. Changing from one method to another can also be very labor intensive. True unattended operation is not possible.

Solution:

The EasyChem automated discrete analyzer meets the demands of the changing marketplace without compromising performance. EasyChem is a flexible instrument, able to perform several different tests all on the same sample, without operator intervention. EasyChem requires no specific experience to operate, and can be learned by anyone in a matter of minutes. Operation consists of simply loading the sample tray and reagents, selecting the tests to be performed, and clicking start. It's that simple. Virtually no time is required for start-up or shutdown. Labor costs are greatly reduced and productiv-



The EasyChem Discrete Analyzer is a flexible instrument, able to perform several different tests all on the same sample, without operator intervention.

ity is increased, enabling technicians to perform other tasks.

The EasyChem automated discrete analyzers can best be described as robotic systems that perform manual and automated chemistries on a micro scale. The EasyChem employs a computer-controlled needle connected to a high-precision micro syringe for transferring and dispensing precise amounts of sample and reagent. After being preheated in a coil positioned in the body of the needle arm, sample and reagents are inserted into a reaction cuvette that is temperature

controlled up to 50°C. A proper wash cycle between movements ensures there is no carryover from the previous sample or reagent. Upon completion of incubation, depending on the type of discrete analyzer, the reacted sample is then drawn into a flow cell or read directly through the reaction cuvette at the desired wavelength.

Costs associated with operating and maintaining a discrete analyzer compared with a flow analyzer are greatly reduced. EasyChem has virtually no consumables and requires a minimal amount of maintenance, which can be performed by the technician. Maintenance consists of replacing a small piece of waste tubing once a week, lubricating a few parts each month, and changing the system's tubing every six months to a year. EasyChem comes with a customized version of TimeKeeper America's Continuous Maintenance Monitoring software. This software package alerts technicians when maintenance needs to be performed and then logs its completion, demonstrating NELAP compliance. The system uses micro quantities, on average 3-500µl/test, minimizing reagent consumption. Waste generation is dramatically reduced, saving laboratories money and reducing potential liability.

EasyChem does all the work. No longer is there any variation in results based on who the operator is or what kind of day they may be having. EasyChem performs up to 180 tests per hour of true unattended operation, with the highest possible data quality, regardless who "clicks" start. For more information on the EasyChem discrete analyzer, visit www.easychem.com.

Automated Colorimetric Method for Nitrate Analysis

A NON-HAZARDOUS ALTERNATIVE TO TRADITIONAL METHODS FOR AQUEOUS SOLUTIONS *by Craig R. Chinchilla*

"The nitrate-to-nitrite reduction is consistently between 95 percent and 105 percent, which is a dramatic improvement over traditional nitrate methods."

Several methods exist for determining nitrate in aqueous solutions. However, the most commonly performed USEPA-approved methods are problematic and can be unreliable. USEPA methods 353.1 nitrate Hydrazine Reduction^{1,2} and 353.2 nitrate Cadmium Reduction³ utilize chemicals that are carcinogenic and highly toxic. Hazardous waste is generated when performing these methods and disposal is costly. Other methods performed by ion chromatography (IC)^{4,5} and ion selective electrode (ISE)⁶ are slow and can have issues when performing analysis on samples with high ionic strength, such as wastewater, ground water and soil extracts. The new Syssta Easy (1 – Reagent) nitrate method was developed to eliminate the problems associated with these traditional methods and improve performance.

Method summary

The method was primarily designed to be performed by automated discrete analysis. The method can also be performed by traditional flow analysis instrumentation. However, discrete analysis is rapidly becoming the preferred technique for environmental ion analysis in laboratories throughout the United States. The advantages include ease of use, minimization of waste and reagent consumption, and true unattended operation.

The procedure for determining nitrate utilizes a reaction in which nitrate is reduced to Nitrite by a proprietary reagent "R1." The reaction is slow and requires greater than 12 minutes for 100 percent reduction of nitrate to Nitrite at 50°C. The reduced nitrate is then treated under acidic conditions to form a highly colored soluble dye, which is measured colorimetrically between 520 and 550 nm. The final product measured represents the Nitrite ion originally present, plus that formed from the reduction of nitrate (nitrate+Nitrite). In order to determine the true

nitrate concentration, the sample must also be analyzed separately for Nitrite to determine the amount originally present in the sample. The value obtained for Nitrite is then subtracted from the nitrate + Nitrite value to determine the true value for nitrate.

The method has several advantages over USEPA methods 353.1 nitrate Hydrazine Reduction, and 353.2 nitrate Cadmium Reduction, including elimination of hazardous waste and hydrazine and cadmium exposure. The method utilizes a non-hazardous, non-enzymatic reducing agent, protecting personnel and the environment. Also, potential liability associated with waste handling and disposal is significantly reduced or eliminated. Discrete analysis usually reduces waste generation one-third to one-sixth compared to traditional flow analysis techniques, with total reaction volumes of 300 to 700 µl per test.

Analytical performance is greatly enhanced by the use of the new method. The nitrate to Nitrite reduction is consistently between 95 percent and 105 percent, which is a dramatic improvement over traditional nitrate methods. In the cadmium reduction method, the reduction efficiency changes over time. Depending on the matrix, efficiency of the cadmium reduction can change quickly, causing the analysis to be outside of quality control limits. Examples include samples with high ionic strength, surfactants, and oils and grease, all commonly found in environmental matrices. Charging and recharging of the cadmium coil or column can also be uncertain from procedure to procedure. The introduction of air into a cadmium coil or column also reduces the efficiency of the reduction. When performing the hydrazine method, adjustments to the reagent quantity must be made for proper reduction. High chlorides are known to interfere with the reduction in the hydrazine method. IC and ISE methods experience similar matrix interference problems with samples of high ionic

strength. After extensive testing on various matrices, no matrix interference problems have been observed when using the Easy (1 – Reagent) nitrate method.

Depending on how the method is performed, the associated reagent cost is approximately four cents or less per

“Discrete analysis is rapidly becoming the preferred technique for environmental ion analysis in laboratories throughout the United States.”

test. Furthermore, the reagent cost is dramatically less than that of other non-hazardous methods for nitrate, such as enzymatic tests. There are also savings from a labor standpoint, when considering the amount of time that is required to perform the traditional tests. Since the overall performance of the new method is better—and matrix interference problems are not present—analytical runs need not be re-run, saving laboratories time. Finally, since the method has been developed for the discrete analyzer, it can truly run unattended.

Inter-laboratory study

In order to substantiate the new method's reliability and performance, a comparative inter-laboratory study utilizing various USEPA-approved methods and sample matrices was conducted. The approach taken by the study was different from that of most studies, because the study not only analyzed a variety of sample matrices, but also compared the results of several different EPA-approved methods. Ten laboratories were selected to participate in the study. Each laboratory selected had a unique matrix type, which enabled the Systema method to be compared more rigorously to current USEPA methodology. The laboratories were also selected based on their expertise with particular matrices and the variety of instrumentation used.

The 10 laboratories chosen and various matrices were as follows:

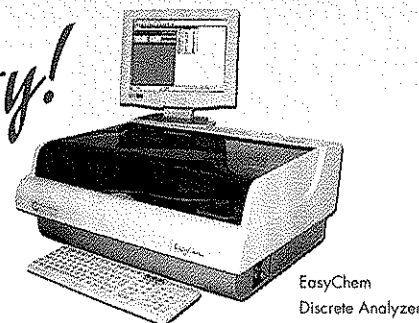
- (4) Wastewater treatment plants
- (2) Commercial laboratories testing drinking water and wastewater
- (1) University testing seawater
- (1) Private laboratory testing seawater

- (1) Drinking water treatment plant
- (1) Laboratory testing soils

Selected samples from laboratories analyzing treated and untreated wastewater included various matrices with the following characteristics: Total Suspended Solids (TSS) greater than 40 mg/L, Total Dissolved Solids (TDS) greater than 100 mg/L, oil and grease greater than 20 mg/L, pre-treatment, and sludge samples. At laboratories analyzing seawater, real seawater samples were analyzed with NaCl concentrations greater than 120 mg/L (near coastal). At the chosen soils laboratory, samples that had been extracted with 2 N KCl were analyzed. Drinking water samples were analyzed from a drinking water plant performing chlorination, and from two commercial testing laboratories. Finally, samples from the commercial test laboratories included steel mill effluent and groundwater.

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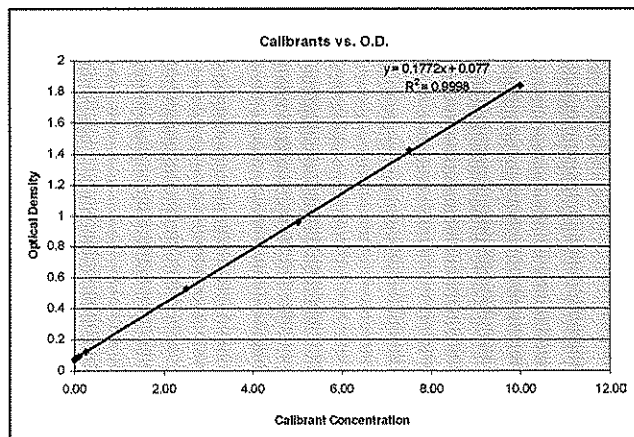
- Guaranteed 5 year trouble-free operation.
- Easy to use; no experience required.
- Easy run flexibility; individual parameters can be selected for each sample.
- Easy operation; no hydraulic problems, no reagents or samples continuously pumped into a manifold, no pump tubes, minimal waste generation.
- Easy preparation of standards from a stock solution, auto-dilutions.



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▲ Regression Analysis of Calibration Curve
0.050–10.0 mg/L

Each of the laboratories analyzed its matrix-specific, round robin, initial precision recovery (IPR) and method detection limit (MDL) samples. Standards, quality control (QC) samples and round robin samples were purchased from a third-party manufacturer (Analytical Products Group or APG) and split into 10 duplicate sets labeled I through 10 A and B. Each laboratory performed the analytical runs using its current methodology and range. Concurrently, Systea Scientific performed the same analytical tests using the new nitrate method with a range of 0.050–10.0 mg/L. Each of the 10 participating laboratories performed four analytical runs, for a total of 40 runs. Each of the runs was duplicated by Systea Scientific utilizing the new method. To confirm the operation of the method at other calibration ranges, a smaller test group of samples was also run at the following ranges: 0.003 – 0.150 mg/L, 0.020 – 2 mg/L and 0.5 – 50 mg/L.

Sample	Standards	Optical Density	Calc. Conc.
<BLANK>		0.0727	-0.001
<CAL1>	0.00	0.0716	-0.007
<CAL2>	0.05	0.0816	0.050
<CAL3>	0.10	0.0918	0.107
<CAL4>	0.25	0.1219	0.276
<CAL5>	2.50	0.5306	2.576
<CAL6>	5.00	0.9599	4.992
<CAL7>	7.50	1.422	7.592
<CAL8>	10.00	1.835	9.916

▲ Calibration Data 0.050–10.0 mg/L

Study results

A statistical analysis of the participating laboratories and the new method data was performed. An assumption was made that the accuracy of the APG samples would ultimately determine the accuracy of the analysis. If the APG round robin samples were found accurate and cross-instrument sample analysis results were erroneous, the APG results would be used as the standard of accuracy. No significant variation between the new method data and the participating laboratories' method data was observed. The results from the Systea method data were equal or superior to the results from the various data from the participating laboratories. Participating laboratories had variable amounts of recoveries and matrix interference issues, depending on the type of instrumentation and methodology employed. In general, labs performing flow analysis methods experienced fewer problems with matrix interferences than labs using IC and ISE techniques.

As part of the study, 10 mg/L nitrate and a Nitrite sample were tested at the end of each nitrate run to determine the percentage of recovery of nitrate to Nitrite. The average nitrate-to-nitrite recovery for all the analytical runs performed with the new method was 95.9 percent. This is quite remarkable, considering that perhaps the biggest problem with using the traditional USEPA colorimetric methods for nitrate is poor recovery. The data also demonstrated that the percentage of recovery was very consistent from run to run, with little or no variation.

Method detection limit (MDL) and method limit (ML) data were equally as impressive, or more impressive than, any data obtained during the study. Using a 0.050

Sample	Optical Density	Calc. Conc.	St. Dev.	MDL
MDL 0.050 mg/L 1	0.0810	0.046		
MDL 0.050 mg/L 2	0.0814	0.048		
MDL 0.050 mg/L 3	0.0809	0.046		
MDL 0.050 mg/L 4	0.0811	0.047		
MDL 0.050 mg/L 5	0.0809	0.046		
MDL 0.050 mg/L 6	0.0807	0.045		
MDL 0.050 mg/L 7	0.0808	0.045		
MDL 0.050 mg/L 8	0.0807	0.045		
MDL 0.050 mg/L 9	0.0806	0.044		
MDL 0.050 mg/L 10	0.0804	0.043	0.001433721	0.00404453

▲ Method Detection Limit Example

Avg MDL 7 (mg/L)	0.01119
Avg ML 7 (mg/L)	0.03558
MDL Pooled 7 (mg/L)	0.00416
ML (mg/L)	0.01323
Avg MDL 10 (mg/L)	0.011483
Avg ML 10 (mg/L)	0.036515
MDL Pooled 10 (mg/L)	0.004256
ML (mg/L)	0.013535

▲ Statistical Results of Method Detection Limits

mg/L sample, detection limits obtained were consistent and ranged between 0.010-0.015 mg/L. Continuous flow analyzers typically report MDL values of about 0.5 to 1 percent of the full-scale concentration of the range. The full-scale concentration of the Systea method study was 10 mg/L. Using the Avg MDL 7 and the MDL Pooled 7, the study obtained a MDL of $0.01119/10 * 100 = 0.11$ percent and $0.00416/10 * 100 = 0.04$ percent, respectively.

Conclusion

The new Systea Easy (1 – Reagent) nitrate method offers a suitable alternative to traditional nitrate methods for aqueous solutions. Problems associated with performing nitrate analysis, such as poor recovery and matrix interferences, are minimal or nonexistent. Greater method sensitivity and linear range enable both high- and low-range samples to be performed together without compromising performance.

The new method utilizes a non-hazardous reducing agent, eliminating hazardous waste and associated disposal costs. Potential liability associated with disposal of and exposure to carcinogenic chemicals is eliminated. Since the method has been designed for discrete analysis, labor costs associated with performing the analysis are minimized and true unattended operation is possible.

References

1. *Methods for Chemical Analysis of Waters and Wastes - Nitrite 353.1, Nitrogen, nitrate-Nitrite (Colorimetric, Automated Hydrazine Reduction)*, U.S. EPA National Exposure Research Laboratory EPA-600/4-79/020 (NTIS PB 84-128677), Issued 1971; Reissued with Revision 1978.
2. *APHA, AWWA, WEF, Standard Methods for the Examination of Water and Wastewater, 20th Edition - 4500-NO3-H Automated Hydrazine*, American Public Health Association: Washington, DC, 1998.
3. *Methods for Chemical Analysis of Waters and Wastes - ni-*

trate 353.2, Rev 2.0 Determination of nitrate-Nitrite Nitrogen by Automated Colorimetry, U.S. EPA National Exposure Research Laboratory EPA-600/R93/100 (NTIS PB 84-120821), 1993.

4. *Methods for Chemical Analysis of Waters and Wastes - nitrate 300.0, Rev 2.1 Determination of Inorganic Anions by Ion Chromatography*, U.S. EPA National Exposure Research Laboratory EPA-600/R93/100 (NTIS PB 94-120810), 1993.

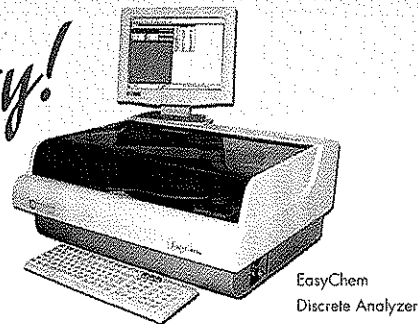
5. *Methods for the Determination of Organic and Inorganic Compounds in Drinking Water, Volume 1 – 300.1, Rev 1.0 Determination of Inorganic Anions in Drinking Water by Ion Chromatography*, U.S. EPA Office of Ground Water and Drinking Water/Technical Support Center (NSCEP PB 815-R-00-014), 1997.

6. *APHA, AWWA, WEF, Standard Methods for the Examination of Water and Wastewater 20th Edition - 4500-NO3-D nitrate Electrode Method*, American Public Health Association: Washington, DC, 1998.

Craig R. Chinchilla Sr. BS, is general manager for Systea Scientific, LLC. He has many years of experience developing chemistry methods and working with discrete and flow analysis instrumentation. craig@easychem.com, 630-645-0600.

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- Easy to use; no experience required.
- Easy run flexibility; individual parameters can be selected for each sample.
- Easy preparation of standards from a stock solution, auto-dilutions.



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Systea Scientific LLC

Product Detail

TSSA-EASY

Total Service & Support Agreement for EasyChem

Equipment to be covered must be fully operational before the Total Service & Support Agreement becomes effective. Equipment not covered by warranty or an agreement will require on-site inspection and remedial service if necessary, by a Systea Scientific service engineer prior to commencement of an agreement. The inspection/service visit will be performed at current time and material rates. Serial numbers of all modules to be serviced must be provided before the agreement begins.

Standard Features

One (1) Preventative Maintenance Visit – A qualified Service Engineer will travel to your site. Necessary service parts, cleaning and adjustments will be made to bring the covered instrument to original factory specifications.

Loan and Repair Service – A loaner unit is available for the length of a factory repair or during instrument down time. Includes charges associated with shipping the loaner unit to and from the customer site. Also includes shipping charges on the instrument to be factory repaired.

Service Parts – Includes all items not in contact with sample or reagents (i.e. Flow Cell and consumables).

Emergency Telephone Support – Available 24 hours a day excludes weekends and holidays.

Qualified Service and Applications Specialist – Electronics, Mechanical, Chemistry and Operation Specialization.

Explanation of Options

Emergency Service Visit – Billed on an hourly basis to and from the technician location plus associated travel costs.

Additional Preventative Maintenance Visits – Additional visits are available, call for pricing.

Applications Software Support – One or more days can be provided.

Training with PM Visit – One or more days can be provided along with customized training as well.

Remove Service Parts – Parts coverage can be removed from the agreement and billed as a separate item.

Consumable Parts – Systea Scientific will provide a specific, agreed upon group of parts. Regular pre-schedule shipments can be arranged.

Multi Instrument Pricing – A discount will be extended when there is more than instrument covered at one single location.

Multi Year Pricing – A discount will be extended when the agreement is for more than a single year.

Items Not Covered

Systema Scientific LLC does not offer coverage on: Consumables, Computers, Computer Monitors, and Printers. In addition, equipment malfunctions due to operator negligence, electrical surges, third party supplies, natural disasters, or wear and tear due to non-performance of cleaning and routine maintenance is not covered.

Customizable Plans

Systema Scientific, LLC offers a variety of service plan and options. Plan can be changed to include multiple preventative maintenance visits, emergency visits, on-site training, and method validation if desired. Bronze, Silver, and Gold Plans are available. Call for details.



Systema Scientific LLC

Product Detail

EasyChem Discrete Analyzer Warranty Details

EasyChem Discrete Analyzers comes with a two (2) year warrant on all parts and labor.

Additional Benefits include:

Loan and Repair Service – A loaner unit is available for the length of a factory repair or during instrument down time. Includes charges associated with shipping the loaner unit to and from the customer site. Also includes shipping charges on the instrument to be factory repaired.

Service Parts – Includes all items not in contact with sample or reagents (i.e. Flow Cell and consumables).

Emergency Telephone Support – Available 24 hours a day excludes weekends and holidays on all mechanical, electrical, chemistry, and operation issues.

Items Not Covered

Systema Scientific LLC does not offer coverage on: Consumables, Computers, Computer Monitors, and Printers. In addition, equipment malfunctions due to operator negligence, electrical surges, third party supplies, natural disasters, or wear and tear due to non-performance of cleaning, and routine maintenance is not covered.

PLEASE NOTE: Computers and computer monitors are covered by a separate three (3) year warranty provided directly by the manufacturer.



Systea Scientific, LLC

<u>Inorganic Test</u>	<u>EPA Waste Water Method</u>	<u>Range</u>	<u>MDL / POL</u>
Alkalinity	310.2	2.5 – 250 mg/L	1.0 / 2.5 mg/L
Ammonia, as N-NH ₃	350.1 Rev. 2	0.010 – 5.0 mg/L	0.0010 / 0.010 mg/L
Chemical Oxygen Demand (COD)	410.4 Rev. 2	5.0 – 1000 mg/L	3.0 / 5.0 mg/L
Chloride as Cl ⁻	SM 20 4500 Cl C	0.5 – 200 mg/L	0.2 / 0.50 mg/L
Chromium VI	SM 20 3500 Cr B	0.010 – 1.0 mg/L	0.003 / 0.010 mg/L
Cyanide – Post Distillation	335.4 Rev. 1	0.0030 mg/L – 5.0 mg/L	0.0010 / 0.0030 mg/L
NO ₂ +NO ₃ as N-NO ₂	353.2 Rev. 2	0.10 – 10.0 mg/L 0.02 – 2.0 mg/L	0.040 / 0.10 mg/L 0.007 / 0.02 mg/L
NO ₂ +NO ₃ as N-NO ₂	Systea Easy (1-Reagent) Nitrate “Green” Nitrate	0.050 – 10.0 mg/L 0.005 – 0.150 mg/L 0.50 – 50.0 mg/L	0.011 / 0.050 mg/L 0.001 / 0.005 mg/L 0.20 / 0.50 mg/L
NO ₂ as N-NO ₂	353.2 Rev. 2 SM 20 4500 B	0.005 – 1.0 mg/L	0.0015 / 0.005 mg/L
Ortho-Phosphate as P-PO ₄	365.1 Rev. 2	0.010 – 5.0 mg/L	0.005 / 0.010 mg/L
Total Phosphate Post digestion	365.1 Rev. 2 365.4	0.01 – 20.0 mg/L	0.005 / 0.01 mg/L
Phenols	420.1	5 – 500 ug/L	2.5 / 5 ug/L (20 mm F/C)
Silica as SiO ₂	I-2700-85	0.10 – 10 mg/L	0.025 / 0.10 mg/L
Sulfate	ASTM D516-02	1 – 40 mg/L	2.0 / 4.0 mg/L
T.K.N. Post digestion	351.2 Rev. 2	0.10 – 20 mg/L	0.05 / 0.10 mg/L

Note: Detection limits were obtained with a 10mm flow cell or where noted differently. Lower detection limits are possible by adjusting the range and when using a longer path length flow cells. Ranges listed above may be larger. Detection limits and ranges are general and should not be considered as maximums.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
WATER

MEMORANDUM

SUBJECT: Recommendation for Approval of Syssta Easy (I-Reagent) Nitrate Method
[Revision Date, January 16, 2009] (ATP Case No. N06-0041)

FROM: Lemuel Walker *L.W.*
ATP Coordinator
Engineering and Analytical Support Branch, EAD, OST

TO: USEPA Regional Administrators (all Regions)

DATE: January 22, 2009

We have reviewed the Syssta Easy (I-Reagent) Nitrate Method (Revision Date, January 16, 2009, *Nitrate by Discreet Analysis Syssta Easy (I-Reagent) Nitrate Method (Colorimetric, Automated, I-Reagent)*), and the supporting validation data in ATP Case No. N06-0041. We have determined that this method meets all requirements for measurements of nitrate and nitrite singly or combined in water and wastewater. That is, the performance of this method is substantially similar to methods listed at 40 CFR Part 136 for measurement of nitrate and nitrite singly or combined.

We will recommend that this method be included in future regulatory actions in which we periodically update the methods approved at 40 CFR Part 136.3. Meanwhile, Regions may wish to exercise their authority under 40 CFR Part 136.5 to allow use of this method.

If I can be of any additional assistance on this matter or others, please contact me at walker.lemuel@epa.gov.

cc: Quality Assurance Managers (all Regions)
Water Management Division Directors (all Regions)
ATP Coordinators (all Regions)
Craig Chinchilla., Syssta Scientific, LLC
Kevin Roberts, CSC, SCC



Systema Scientific, LLC

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NO3, NO2, NH3, TKN, TP, PO4,

Introduction

1.0 Goals

Systea Scientific, LLC's goal for this project is to provide a high quality dependable instrument for the State of West Virginia Environmental Chemistry laboratory, that will reliably perform the specified chemistries, be easy to learn and operate, and at a competitive price. We also would like the purchase of this instrument to be a pleasant experience. We will try to achieve this by responding quickly to your request for installation and training. One of our technical engineers will also facilitate the process by training your personnel on-site. Once training and installation is complete, our professional staff will continue to service your facility with excellent technical, service, and after-sale support.

2.0 Statement of Qualifications

2.1 Previous Experience

Although Systea Scientific, LLC only operates in the North American market, its parent company Systea S.p.A., has been in business since 1986 and is worldwide leader in Discrete Analyzer technology. (Systea S.p.A. has placed over 5,000 EasyChem discrete analyzers since it introduced the product in 1990) **Systea Scientific, LLC is one of the few companies in the United States that actually manufactures the discrete analyzer that it sells.** All other discrete analyzers sold in North America are "private labeled". Having control over manufacturing gives distinct advantages to Systea Scientific, in that it can make changes quickly if necessary to the software, and mechanics that may be required by customers. Another advantage of being the actual manufacturer is that the instrument purchase price, parts, and service costs are greatly reduced. Systea Scientific has also designed the EasyChem Plus discrete analyzer specifically for the environmental and industrial markets with the user in mind. EasyChem requires virtually no maintenance unlike other discrete analyzers that are service intensive.

2.2 Company History

Systea S.p.A. which started in 1986 with a focus on designing and manufacturing products for the environmental and industrial marketplace first developed a segmented flow analyzer. The company then identified that the market was changing, and introduced a discrete analyzer (1990). The latest version of the discrete analyzer "EasyChem Plus" was reintroduced in the fall of 2005, and has seen many improvements over previous versions. Some examples are: external software operating on Windows, the ability to accommodate different size sample cups, improved electronics and motors, pre and post run dilutions, preparation of standards from a stock solution, and improved optics for greater resolution. Today, Systea S.p.A. is an international company headquartered in Anagni, Italy, with a unit "Systea Scientific, LLC" located in Oak Brook, Illinois, a suburb of Chicago. It also has independent operating companies and agents in most parts of the world.

2.3 Organizational and Staff Experience

Support capability, with list of key staff, including names for the following installation, field training and service personnel:

Craig R. Chinchilla – BS Chemistry 86' Northern Illinois University – General Manager: Mr. Chinchilla has 20 years experience and previously worked at Chemical Waste Management, Inc., Engineers International, Inc., and Bran+Luebbe in charge of Wet Chemistry Analyzer sales and support. He is very familiar with the specified chemistries and has worked directly with the USEPA to obtain approval on wet chemistry discrete analyzer methods. Mr. Chinchilla is currently working on developing new methodology, and assists with technical support as needed.

J. Paul Georgiou – MS Environmental Engineering 98' Illinois Institute of Technology, Chemistry 89' Illinois State University – Director of Applications: Mr. Georgiou has 20 years experience and previously worked at Waste Management, Inc., USEPA contract laboratory, and Bran+Luebbe operating chemistry analyzers and other laboratory equipment. He is very familiar with the specified chemistries and has obtained USEPA approval on several wet chemistry methods. Mr. Georgiou is currently working on developing new methodology, performs applications, and technical support.

Marco De Angelis – MS Chemistry 86' University of Rome - Senior Applications Chemist: Mr. De Angelis has over 20 years of experience and previously worked for Technicon as a chemist. Having installed several flow systems in the environmental industry and developed environmental methods, he is very familiar with the requested chemistries and methodology. He is currently working on developing new methodology. Mr. De Angelis performs applications and technical support.

Todd M. Stephanuik – Chemistry 08' Concordia University - Applications Chemist: Mr. Stephanuik is a hard working energetic chemist with a special skill for solving problems. Mr. Stephanuik performs applications, installations, and technical support on all Syssta Scientific products.

Robert Piper – Service and Installation Engineer: Mr. Piper formerly of Technicon/Bran+Luebbe has 17 years of experience working with discrete and continuous flow analyzers. He operates both as a service and installation engineer. He is located in Tampa Florida, and can respond to service issues within 24-48 hours. He also answers technical support calls as needed.

Ken Earle – Service and Installation Engineer/Chemist: Mr. Earle, formerly with Alpkem, has 14 years of experience and has worked on most types of flow analyzers ever developed. He has installed flow systems for environmental analysis in the U.S. and in several foreign countries, and has developed environmental methods. Mr. Earle performs

method development, service, and technical support. He is located in Portland, Oregon and can respond to service issues within 48-72 hours.

Burton J. Dodick - Service and Installation Engineer: Mr. Dodick, has over 25 years of experience working on analyzers and laboratory equipment. Mr. Dodick performs service and support as well as in-house repair work and can respond to service issues within 24-48 hours.

Robert Horbus – Service Engineer: Mr. Horbus, formerly a repair service manager at Fermi National Laboratory, has over 35 years of experience working on electronics and other equipment. Mr. Horbus performs in-house repair work.

Field Service personnel: Systea Scientific has four field service technicians that perform maintenance at customer sites. Service technicians are located in Chicago, Pittsburgh, Portland and Tampa.

Telephone Support Personnel: Technical support (chemistry or mechanical) is also available by simply calling. There is always some one in-house to answer “tech” questions. When the field training personnel are not at client sites they answer calls. Our service manager also assists in tech support. **Tech support is available between 7:00 AM and 5:00 PM Central time during normal business hours. Before and after hours support is also available.**

Guaranteed response time: Unlike our competitors, an on-site technician is available **within 24-48 hours** if a service agreement is purchased following the warranty period. The service agreement includes an annual on-site maintenance visit and reduced cost emergency visits. **Emergency responses are within 24-48 hours to help you avoid costly downtime.** Service contracts can be modifiable to include customized on-site training, validation and additional service visits.

Systea Scientific also offers a **loan and repair program**. Any instrument that is under warranty or service contract is entitled to the user to a free loaner. Having a loaner program eliminates costly downtime, and ensures that your laboratory remains productive. If your instrument is down and is in need of repair, a loaner will be sent to your facility within 24 hours. You simply remove the loaner for the shipping case, plug in your power cord, and you are up and running. Your instrument is then returned to us for repair. Maintenance contracts performed by our factory trained and certified technicians are also available to ensure your instrument operates at specifications for years to come. Note: on-site service is available in your area.

Internet access for service and support personnel: Technical support (chemistry or mechanical) is also available via e-mail. Systea maintains a dedicated e-mail address for service and support issues. All service and support personnel are available via phone and e-mail. There is always some one in-house to answer “tech” questions.

Executive Summary

1. Specifications/Features

Systea Scientific LLC's (Systea) EasyChem *Plus* discrete analyzer is highly automated multi-chemistry discrete analyzer system for analyzing environmental nutrients in raw wastewater, industrial effluents, drinking water, treated wastewater, **soil extractions, acid digests, and other matrices**. Several hundred different applications are routinely performed throughout the world on the **over 5,000 installed** Systea EasyChem *Plus* discrete analyzer. **Common matrices include treated and untreated wastewater, industrial discharges, drinking water, turbid samples, samples with color, groundwater, sludge, and soil extract samples**. The EasyChem *Plus* uses all the advantages of discrete sample analysis technology, so that even reaction times up to 30 minutes or more can be automated. The proposed EasyChem *Plus* discrete analyzer system consists of a two 60 position integrated sampler (includes positions for off scale dilutions), high precision 1000 microliter syringe with greater than 1ul resolution, multi-speed peristaltic pump external to all electronic components, high sensitivity spectrophotometer (10mm Flow Cell) with the ability to adjust the flow cell path length up to 40mm, temperature controlled flow cell ± 1 C, with noise ± 2 m Abs. at 340nm 3.5 O.D., a 9 position automatic computer controlled filter wheel with automatic zero setting for all wavelengths, Cadmium reduction module (included) and the EasyChem *Plus* software that operates on windows 98 and higher.

The system is a bench unit with a low profile, top accessible design, for **ease of operator use**. The compact design enables the system to be placed virtually anywhere optimizing laboratory space and productivity. All working components are accessible to the user both visually and physically. The operator can observe if all functions are working properly, (i.e. syringe and dosing station) because they are not hidden inside as on other instruments. Changes to all critical parts (syringe, flow cell, and lamp) can be made without the use of tools or taking the instrument apart. All internal critical components are protected from spills by proper placement within the instrument, and a minimal amount of internal tubing is double lined for added safety.

The proposed system utilizes the latest in discrete analyzer technology. No pump tubing or glass coils are used on the system that can break or wear as on other analyzers. Maintenance simply consists of replacing part of the waste line each week, applying some lubrication once a month, and changing the system tubing once a year. All routine maintenance can be performed by the technician. **Please remember that all discrete analyzer systems have tubing. Some system's tubing is visible, where as others are hidden within the instrument and require a costly service visit for repair and can leak onto electrical components.**

As a standard feature, the EasyChem *Plus* also has a temperature controlled reagent tray for longer reagent life, and an adjustable temperature controlled reaction plate. The reaction plate, which holds 96 disposable incubation cuvettes, can be programmed up to 55C +/- 0.1C. The flow cell is also temperature controlled and can be programmed to operate at different temperatures. The EasyChem *Plus* reads through a standard 10mm quartz glass flow cell that can be replaced with flow cell of 20 or 40mm length. This gives operators more flexibility on the low end to achieve greater detection limits. The system also comes with software that is easy to use and user friendly. The software comes with methods for the requested chemistries. Additional methods can be added to the system software in a matter of just a few minutes if desired. Three levels of password protection are also designed in the software. Technician, supervisor, and administrator password levels ensure that unintended changes are not made by unauthorized personnel. **The system also comes with lifetime free software upgrades. The system is compatible with LIMS systems. The system will also be provided with TimeKeeper America® maintenance tracking software, which alerts the operator as to when scheduled maintenance is required.**

Operation is easy. In order to run the system, the user simply loads the sample tray, selects a pre-developed work list or creates a new one. On the work list the user selects the number of samples, QCs, standards, and other parameters to be performed such as dilutions and standards preparation. Methods are also selected for each sample to be performed. Once the work list is complete, the user clicks start. The system works with true unattended operation. The system first does an auto-zero to determine the energy for each interference filter as a diagnostic check. Once complete, the system software determines the amount of time the analysis will take and programs the tests. The operator is alerted to the amount of time the analysis will take, what reagents will be used, and what volume of reagent will be required for the run. **Training is simple and can be accomplished within a few hours.**

The EasyChem *Plus* routinely meets and exceeds typical drinking water and wastewater water permit detection limits in compliance with the Environmental Protection Agency and NELAP requirements. Furthermore, the EasyChem *Plus* methods more closely follow the USEPA methods as were they originally written as compared to segmented flow, flow injection methods, and other discrete analyzers. Since no surfactants or special cleaning fluids are needed like on other discrete analyzers.

The ability to use variable length flow cells greatly enhances detection limits and performance along with the improved resolution of the EasyChem's colorimeter.

1.1 General

As previously mentioned **Systea uses all the advantages of the latest discrete sample technology. Large quantities of samples can therefore be analyzed without dispersion and carry-over.** Carry-over, blank and gain can also be measured and corrected if desired. Excessive amounts of sample and reagents are not

required like in other systems. **Systea discrete sample technology also minimizes operating cost and waste generation.** The proposed system does not need to utilize a special surfactants or cleaning solutions like other systems, thus greatly minimizing waste and giving flexibility to laboratories that desire to analyze a variety of parameters on the same sample. The following chemistries, as well as others, can easily be performed on the proposed analyzer without the need for any changes: **Nitrate, Nitrite, Alkalinity, Ammonia, Chloride, Cyanide, Total Nitrogen, TKN, Phenol, Ortho Phosphate, Total Phosphorous, Silica, Sulfate, and Chrome VI.** Low concentrations (ppb) and high concentrations (ppm) can be performed on the same system with the auto dilution and rerun feature. **Standards can also be performed from a stock solution, along with automatic pre-run and post-run dilutions. Unlike other discrete analyzers, the EasyChem Plus also inserts Quality Control cups where needed after re-analysis of off-scale sample, and performs spikes, spike calculations, thus making the software NELAP compliant.**

1.2 Sampler

The **sampler is random access, and is computer controlled.** The sampler holds up to 60 sample cups with the ability to replicate samples approximately seven or more times. Spaces can be reserved for off-scale samples to be rerun. Auto dilutions both pre and post run can be run during a run or independently of the run. **Standards and QCs can be made from a stock solution** to save the operator time. **Matrix specific dilution liquids can also be used to insure pH of pre and post diluted samples are the same. Note: The system will be provided with an extra sample tray.**

1.3 Pump Unit

The high precision peristaltic pump has a single platen of rugged construction. **The platen never needs replacement** and is easily adjusted by a thumb screw. **The platen is external to all electronic components and is only used for directing waste from the flow cell.** The system pump is computer controlled and only operates as needed. There is no hidden pump tubing on the system as on all other discrete analyzers.

1.4 Chemistry

Complete reaction – more robust chemistry. Systea's chemistries operate at complete reaction. This is where the reaction has had time to come to completion and the color is fully developed. Therefore values tend to be more accurate and follow the original manual chemistries more closely. In other discrete analyzers which use surfactants, chemistries can be affected by the addition of these chemicals from one test to another. The EasyChem's colorimeter has been specifically designed to eliminate even the smallest of bubbles that could compromise data integrity.

EasyChem's system batch method of analysis insures that all chemistries are analyzed at the same exact time interval. The EasyChem Plus system also has the ability to aspirate up to **950 µl of sample and reagent** on the first movement. **This gives the EasyChem Plus an advantage over other discrete analyzers when working with low levels.** Most other discrete analyzers can only aspirate up to 450 µl.

Note: EasyChem uses USEPA approved methodology, including the new USEPA approved non-hazardous Syssta Easy (1-Reagent) Nitrate method. The new “green” non-hazardous nitrate method has a better operating range and greater sensitivity than the traditional USEPA approved cadmium reduction method. Interference issues associated with performing nitrate on water samples with high ionic strength are nonexistent with the new method as well. The method is offered by Syssta Scientific exclusively for EasyChem users.

1.5 Colorimeter

The proposed system employs a colorimeter with the ability to adjust the flow cells path length for greater resolution. The systems colorimeter utilizes a 6V/10W Halogen bulb with extended UV transmission. The bulb is operated at 5V load with a very high performance power supply. This creates stability and greatly diminishes noise, thus eliminating fluctuations in lamp output, unlike other analyzers. The stability of the colorimeter is $\pm 0.5m$ Abs. units. This means the colorimeter is very stable. The flow cell is made of the highest quality optical quartz glass unlike other analyzers. All readings are made through the same flow cell thus making readings more accurate. The colorimeter's flow cell is temperature controlled and makes readings more accurate and stable. The colorimeter also has a programmable 9 position filter wheel to perform multiple chemistries. The EasyChem *Plus* colorimeter allows for accuracy better than $\pm 1\%$ from 0 to 3.5 O.D., linearity of better than 0.3% and noise $\pm 0.5m$ Abs. at 340nm 35 O.D..

1.6 Data system

A PC has been included in the proposal if required. **PC includes a Dell factory 3 year warranty.**

2. Software Specifications

The proposed system utilizes EasyChem *Plus* software. This software was specially written for Windows 98 and higher operating systems and works with Windows XP or Vista. **Some important software features:**

- **Automatic start-up and shut down** of an analysis. The system also saves your settings for your convenience.
- The system will **automatically dilute and resample over-range samples.**
- The system can be programmed to do **pre-run dilutions** and make **standards and QCs from a stock solutions.**
- **Work list can be edited during a run.**
- Single screen display of analysis results and calibration curve.
- Raw data can be stored on disk as well as in the program.
- The **system always keeps raw data** and is always saved regardless of recalculations and manipulation.
- **Real time display of data** is a standard feature.
- One step transfer to Microsoft excel is available.
- All Quality control cups can be inserted anywhere in the work list and can be measured in real time.

- Once the real time measurement is completed, the software will act on the user defined pass/fail criteria.
- Software allows the operator to **view the calibration curve during the run.**
- As a safety feature, raw data is always in a format that prohibits operators from deleting or manipulating original values.
- Three levels of password protection.
- The software allows **re-analysis of the calibration curve** by disabling one or more points.
- Software is **LIMS compatible** and data can be import as well as exported in an ASCII, Text, CVS or other formats. The work list can also be imported and exported in an ASCII, Text, CVS or other formats. EasyChem *Plus* software is ideal for LIMS and Networks. Networking and two-way data transfer can be performed before or after a run.
- **The software includes the following QC management features: User defined QC limits with out of range detection and immediate correction. Automated QC protocol to monitor accuracy and precision. Up to 5 different QCs, can be performed an unlimited number of times. Multiple types of QCs. Limits for each QC. Software log changes made to the runs. QC charts are made automatically. The system software also calculates the percent recovery for each of the QCs and Spikes. The system software is also designed to re-run samples form the last pasted QC if a QC should fail. The Software meets and exceeds NELAC standards.**
- **QCs and Blanks can be automatically inserted where needed for re-analysis of off-scale samples.**
- **Automatic Spike preparation and calculations. Compares against operator specified acceptance ranges.**
- **Operator selectable corrective action for quality control checks and calibration curves that are out of user defined acceptance criteria. (i.e. re-run)**
- **Time stamp for each analysis performed.**
- Temperature display of reaction cuvettes and flow cell.
- **The report format is graphically based and can be customized** to meet your needs. Software comes with a signed certificate of compliance.
- Screen background color and appearance can be adjusted to the users preference.
- Reports display all instrument settings, curves, calibration values, optical densities, QC values, Flags, calculated values and general laboratory information and a notes section.
- System has an auto zero feature as a **self diagnostic check.**
- **Calibration curves can be stored and reused.**
- An annual software **support agreement is not required.** Systea supports all users at no cost. **Technical support is always available** via phone during business hours.

- **Upgrades can be downloaded from our website for free for the life of the instrument.**
- **7 modes of detection: end point, fixed time, kinetic, differential, differential sample blank, bi-chromatic, and virtual.**
- **Maintenance tracking software is included which notifies the user when to perform maintenance. Logs maintenance for NELAC compliance.**
- Post run dilution and re-run of out of range samples.
- **Free lifetime Software upgrades are available.**

3. Service/Technical Support

The EasyChem *Plus* system comes with a **two-year warranty**, which includes all parts and labor, and a service agreement.

Systema has four **field service technicians that perform maintenance at customer sites**. The field technicians are located in Chicago, Pittsburgh, Portland, and Tampa. Unlike our competitors, an on-site technician is available within 24- 48 hours if a service agreement is purchased following the warranty period. The service agreement includes an annual on-site maintenance visit and reduced rate emergency service visits. Service contracts can be modifiable to include customized on-site training, advanced training, validation and additional service visits. Unlike competitors, Systema Scientific **Guarantees response time** for emergency visits. An on-site technician or loaner instrument is available **within 24-48 hours** if a service agreement is purchased following the warranty period.

Systema Scientific also offers a **loan and repair program**. Any instrument that is under warranty or service contract, entitles the user to a free loaner instrument, if for any reason the unit should have mechanical or electrical problems. A loaner instrument can be shipped to your facility in 24-48 hours. When the loaner arrives you simply remove the loaner for the shipping case and plug it in, and you are up and running. Your instrument is then returned to us for repair in the same protective shipping container that the loaner arrived in. **Having a loaner program eliminates costly downtime, and ensures that your facility remains productive.**

Note: On-site repair is available in your area.

Technical support (chemistry or mechanical) is also available by simply calling. There is **always some one in-house to answer “tech” questions**. When the field training personnel are not at client sites they answer calls. The person in-charge of service also assists in tech support. **Tech support is available between 7:00 AM and 5:00 PM Central time during normal business hours. Before and after hours support is also available.**

4. Accessories and Spare Parts

The **proposal includes the cost for one full set of all routinely replaceable parts** and enough consumables for about 5,000 tests.

5. Unit Cost
Freight costs are included in the proposal as specified (F.O.B. Destination). Training for two or more State of West Virginia personnel have been included which includes all travel, lodging, and technician expenses.
6. Statement of Accuracy
The proposed system will meet or exceed detection limits and instrument performance requirements (USEPA). The proposed EasyChem *Plus* system has an accuracy better than +/- 1% from 0 to 3.5 O.D., linearity of better than 0.3% and noise <+/- 0.5m Abs. at 340nm 35 O.D..
7. Detection Limits
The EasyChem *Plus* discrete analyzer meets or exceeds the specified USEPA detection limits for drinking water and wastewater discharge reporting limits with the use of its standard 10mm flow cell.
8. Ease of Use
Although the **Systea EasyChem *Plus* is easy to use**, some training is suggested. The proposed three days of onsite instruction will be more than enough time to perform training. Telephone support is always available, and free courses at Systea are routinely scheduled for those who would like additional training. **In the unlikely event that more training is required at installation, the field training technician usually will stay an extra day** if time is available.
9. Training Requirements
As stated above, the required days of on-site training are usually sufficient to teach an operator on the system (two training visits are included as required). **Training will cover chemistry, software, general operation of the equipment, maintenance and any technical questions your personnel may have.** Further technical support (chemistry or mechanical) is also available by simply calling if needed. Refresher course are also available on-site and in-house.
10. Implementation Plan
The system will be shipped to your facility within two to four weeks after receipt of order. Training will begin within one to two weeks after you receive the equipment. We ask that your laboratory call our facility after receiving the instrument to schedule training. **An experienced Systea employee will be assigned as the technical support person for this project.** On the first day, the engineer will travel to your site. In the morning of that day, he will start with the installation and commissioning of the system. This will be followed by a technical check of the analyzer system. Following installation the engineer will train your personnel on the software and operation of the system.

11. TimeKeeper® America Continuous Maintenance Monitoring Software

The system comes with TimeKeeper® America “Continuous Maintenance Monitoring” software specific for, and included with the purchase of Systea chemistry analyzers. TimeKeeper® America features are designed to help the user increase productivity through efficiencies in time, containment of cost and “anytime” documentation of compliance actions. The first step in being a productive laboratory is to have a proactive maintenance plan to insure that data is being produced to the highest standards.

TimeKeeper® America’s specifically created program “TKA-Systea” will track, schedule and document manufacturer’s recommended maintenance on Systea instruments. Extra features include:

- (1) TKA will schedule, track and document personnel actions (i.e. regular reports or meetings, training, milestones, travel and travel costs).
- (2) TKA contains a NELAP segment to meet the NELAP Demonstration of Capability requirements. This segment can also be used to for periodic demonstrations of calibration for autopipettors, balances, thermometers, etc.
- (3) The “Look Ahead Scheduler®” alerts when actions are coming due, due or past due.
- (4) The “Look Ahead Planner®” projects all maintenance actions for the next three or more months.

In addition an expanded version of the Systea specific program may be purchased to provide this service for the entire lab, the physical plant, all personnel and also your chemical inventory.

12. Preventative Maintenance Service Visit

A preventative maintenance service contract is available after the warranty period expires. An extended warranty is also part of the service agreement which includes all parts and labor, and a free loaner is also available if necessary. See Section 2 Pricing and Additional Information “Product Detail Sheets” for more information.

Frequently Asked Questions

1. Why should I purchase a Systea Scientific EasyChem *Plus* discrete analyzer versus another discrete analyzer?

There are several reasons for purchasing an EasyChem *Plus* versus the others. Perhaps the most common reason laboratories purchase the EasyChem *Plus* is because of the reliability and performance. Systea is one of the few distributors of discrete analyzers in the environmental market that actually makes the product it sells. All other discrete analyzers are private labeled. This means that that Systea has the ability to make changes and improvements to the analyzer as needed. All other sellers of discrete analyzers are at the mercy of their manufacturer.

The EasyChem *Plus* has also been designed for easy of use. All critical components are visible to the operator and can easily be accessed for service and inspection by the user with out the use of tools. All components on the unit have been designed for long life and minimal maintenance. Maintenance is also simpler on the EasyChem *Plus* versus all other discrete analyzers. For example, the dosing syringe, and lamp for the colorimeter are not hidden deep within the unit and can easily be changed by any skill level of operator. On other units tubing needs to be changed frequently since the systems use special surfactants for cleaning. **Less required maintenance means less downtime and more productivity! All other discrete analyzers are service intensive.**

The EasyChem *Plus* also comes with a 1mL syringe which is an advantage over the competitors. A larger syringe enables the system to use more sample for low level tests than the competitors. When performing low level analysis, it is beneficial to use as much sample as possible for lower detection limits. A larger syringe also enables the system to better wash system tubing and prevent contamination.

Systea Scientific has a trained staff that is dedicated to servicing and supporting the EasyChem *Plus* as well as doing research into new methodology. **Systea Scientific was also the first company to offer a loaner repair program, free software upgrades for the life of the unit, and a standard two year warranty.**

2. What chemistries can be performed with an EasyChem *Plus* discrete analyzer?

Virtually any colorimetric test can be performed on the EasyChem discrete analyzer. However, there are some limitations in temperature. The EasyChem has a maximum operating temperature of 55°C. (EasyChem operates all of the EPA chemistry at 42°C)

Historically, most of the segmented flow or flow injection methods commonly performed today were derived from manual methods. All of these methods, because of hydraulic issues actually compromised the original manual methods in some way. The additions of surfactants or adjustments in reaction time were some of the common changes in flow methods.

The EasyChem methods closely follow the original EPA methods and are considered equivalent by the USEPA.

Systea Scientific now offers a non-hazardous USEPA approved method for Nitrate analysis. The new method eliminates the use of carcinogenic cadmium and hydrazine required for the traditional USEPA Nitrate methods. Hazardous waste generation and liability associated with disposal are also eliminated. Along with having greater range and sensitivity than the traditional methods, interferences that effect cadmium and hydrazine reduction are non-existent. The new Systea Easy (1-Reagent) Nitrate method is only available for EasyChem users.

3. How would the EasyChem *Plus* discrete analyzer system address our objective as follows?

We are aiming to reduce downtime for maintenance, reduce cost of reagents by using less, and reducing cost of operation by having less operator requirements.

The EasyChem *Plus* discrete analyzer's **user friendly design and simplicity**, enables operators of virtually any skill level, to do routine maintenance and trouble shooting. Unlike all other discrete analyzers, **an EasyChem operator can see all critical functioning parts and easily determine if the unit is operating properly. There are no hidden pump tubes or syringes like on most discrete analyzers.** No complex washing stations or articulate complex syringe movements that may break or cause fluids to leak inside of the instrument. **No pump tubing, no valves that can clog, and no hydraulics of any kind.** All routine maintenance can be performed without the use of tools. For example, the colorimeter can be accessed simply by opening a hinged door panel located directly above it. Through this door, the flow cell can be examined and or changed without the use of tools. The colorimeter source lamp can also be replaced by loosening a thumb screw. Other parts that can be serviced by an operator include the systems high precision micro-syringe and peristaltic pump. The high precision micro-syringe located on the inner back wall of the unit, is in complete view, and can also be removed by loosening the assembly's thumb screws. The peristaltic pump located on the side of the instrument, external to all electronic components, has a single platen of rugged construction. The pumps platen never needs replacement, uses no special pump tubing, and is easily adjusted by tightening a thumb screw. All parts that require routine lubrication are accessible without the use of tools. **Maintenance consists of replacing part of the waste line each week, applying some lubrication each month, and replacing the systems tubing once a year. All routine maintenance can be performed on-site by the system operator.** Thus the **simple robust design** of the EasyChem *Plus* reduces downtime for maintenance and minimizes the need for service visits.

Reagent use and waste generation are minimized when using the EasyChem *Plus* discrete analyzer. Unlike traditional analyzers which constantly have reagents flowing through the system using chemicals and generating waste, the EasyChem *Plus* only uses the amount of reagent necessary to perform the specified test. On average, a combined total of 500 – 600 μL of sample and reagent are used per test. When the system is not performing a test, no waste is being generated. The systems flow cell design minimizes the need for washing. The EasyChem *Plus* minimizes the generation of waste by washing the flow cell with the incoming reacted sample like on a traditional flow analyzer. EasyChem *Plus* draws reacted sample through the flow cell in three steps, aspirating a small amount of air between each step to enhance cleaning by eliminate laminar flow. As the liquid moves through the flow cell in steps, it washes the inside of the flow cell. Normally all 500 – 600 μL of sample are flushed through the flow cell.

The reading is taken near the end of the third aspiration of reacted sample. The interstitial volume of a 10 mm flow cell as will be provided with the proposed system is 35 μL . Thus passing 500 – 600 μL of reacted sample through the flow cell washes it on average of 15-20 times the interstitial volume. The user can also select an additional 1mL wash of the flow cell with DI water between sample readings if he or she so chooses.

(Note: Most discrete analyzers use bulky tanks for washing their system that take up valuable bench space. The EasyChem uses a 1 Liter bottle for washing the system conveniently located in a front of the unit in a spill proof compartment.)

Operator costs are also greatly reduced when using the EasyChem *Plus* discrete analyzer. Since there are no pump tubes, continuous flowing streams of liquid to constantly monitor, chemistry manifolds/cartridges or other hardware specific to each analysis to adjust, the EasyChem system requires less time and skill to operate. The operator simply loads the removable sample tray, selects one or more tests to be performed on each of the samples in the work list, and then “clicks” start. He or she is then free to do other tasks. (Stored calibration curves can be used to save time as well) The system does a self diagnostic check of itself by performing an auto-zero and determines if it is functioning properly. Once the system check is completed, sample tests are performed. The system does each of the selected tests, washes itself when complete, and then waits for the next set of samples. When the system is on but not in use, reagents are kept cool by a peltier. This feature saves users money on costly chemicals, by extending the life of reagents, and improves reproducibility and performance. Most analyzers do not have the ability to cool reagents.

Systea Scientific offer local support by factory trained employees. Systea Scientific’s central or west coast service center can respond to customer needs quickly; unlike our competitors which can only dispatch service from an eastern United States location.

The system software can also interface **with a LIMS system** to save time.

4. What level of support is available for instrumentation set-up?

A trained Systea Scientific installation engineer will arrive on-site and perform the commissioning of the unit. First, the unit will be inspected for damage that may have occurred during shipment, and will be checked to ensure all of the specified components and spares have been included with the system. Next, the system will be prepared for testing by connecting computer cables and installing any parts such as reagent trays and probes that ship separately with the system. Once the system is ready, and software has been installed on a designated computer, the system will be checked. The installation technician will run a diagnostic check of the unit to make sure that all of the systems components are operating at factory specification. All procedures and results will be recorded in the installation manual provided, and will become part of the instruments permanent records. A duplicate copy will also be retained by Systea Scientific.

The instrument set-up usually takes about an hour.

5. What training support does Systea Scientific offer?

The Systea Scientific installation engineer assigned to the project will perform all training in-house or at your facility. After set-up of the unit is complete, the engineer will train for two to three days on all aspects of the system. This will include software, functionality, chemistry and general maintenance. The engineer will start by giving an overview of the system's operation. Next, the engineer will run your chemistries and samples. This will also include making reagents and preparing samples if necessary. The engineer will then train on the different aspects of the software. The process will be very hands on, although we require that the personnel being trained read the software and operations manual some time before or at the start of the training. By the beginning of the second day, the trainees should be able to operate the unit completely on their own. Several runs on the instrument will then be performed by the trainees with as little as possible of input from the instructor. By the end of the second day, the training should be complete. If more time is required, then the installation engineer will stay an extra day, time permitting. MDLs for the specified chemistries will be performed during the installation if time permits.

Installation manuals are provided with set-up and training which covers the following: Instrument serial numbers, methods, data collected during training for instrument validation and reference, operations, software, trouble shooting, service record, maintenance log, and spare parts ordering information.

6. Describe your warranty (address labor, parts and length of time of each):

The system comes with a standard **two year warranty** that includes all parts and labor. The warranty covers all mechanical and electrical components excluding components that come in contact with chemicals or samples, i.e. consumables, tubing, and flow cell.

Systea Scientific also offers a **loan and repair program**. Any instrument that is under warranty or service contract, entitles the user to a free loaner instrument, if for any reason the unit should have mechanical or electrical problems. A loaner instrument can be shipped to your facility in 24-48 hours. When the loaner arrives you simply remove the loaner for the shipping case, plug in your power cord and communication cable, and you are up and running. Your instrument can then be returned to us for repair in the same protective shipping container that the loaner arrived in. Having a loaner program eliminates costly downtime, and ensures that your facility remains productive. On-site service is also available.

7. What maintenance service is offered upon expiration of warranty?

Preventative maintenance contracts performed by our factory trained and certified technicians are available to ensure your instrument operates at specifications for years to come. The preventative maintenance agreements include an annual on-site maintenance visit to clean and adjust the unit to original factory

specifications, a free loaner in case of instrument down time, reduced cost emergency visits, and all necessary service parts and labor throughout the life of the contract. Unlike competitors, Systea Scientific **Guarantees response time** for emergency visits. An on-site technician or loaner instrument is available **within 24-48 hours** if a service agreement is purchased following the warranty period. Emergency visits are billed at a reduced rate for instruments under service agreement. **Service contracts can be modifiable to include customized on-site training, validation and additional service / emergency visits.**

Technical support (chemistry or mechanical) is also available by simply calling. There is always some one in-house to answer "tech" questions. When the field training personnel are not at client sites they answer calls. Our service manager also assists in tech support. **Tech support is available between 7:00 AM and 5:00 P.M. Central time during normal business hours. After hours support is also available from our west coast service facility.**

Systea Scientific stocks a full line of consumables and all needed service parts locally for quick response to customer needs.

8. Why you would consider your software to be user friendly?

The software operates on all current Windows® platforms (98, 2000, XP Pro, XP Home, and Vista editions). The software uses both pull down tabs and icons for easy use. There are three levels of security so unauthorized users can not change instrument and method settings. The software also **stores and saves up to 32 different methods** that can be programmed on a sample. Setting up a run is easy, the user simply clicks the work list icon or menu and selects colored symbols for each type of standard, Quality Control (QC), or sample. The operator then chooses which analysis will be performed on the work list, by selecting a predefined method. Multiple methods can easily be selected for each sample, standard or QC. Pre-run dilutions can be selected on specific samples, and standards can be automatically prepared from a stock solution. Automatic dilution and re-run of off-scale samples can also be selected. Usual combinations of methods and samples can be pre-defined as "profiles" in the software setup, for **ultra-fast startup** on a routine basis. Stored calibration curves can also be used to eliminate the need to run a curve every time. Once the work list is complete, the operator simply "clicks" to start a run; EasyChem does the rest! During the run, real time sample results, calibration correlation, and system functions are displayed to inform the operator. EasyChem software is ideal for laboratories that run environmental type samples on a routine basis.

Up to five levels of real time QC's can be used for each method. QC results are automatically stored and plotted in a user defined QC chart. In case of QC failure, the analyzer can stop the run or simply notify the operator, flag the QC result, and go on. Software can also be programmed to automatically rerun samples from the last passing QC. After the run, EasyChem software shows the limits for the QC standards and prints a symbol to show at a glance, whether each passed or failed. QC's that fail and over range sample are also marked in red on the computer screen to notify the operator.

The software can transfer data to an internal or network drive at the end of the run in a CVS, Text, ASCII and other formats. Sample IDs can be imported from a central computer. EasyChem is compatible with all Windows® support networks.

All pertinent data can be selected to print out on the report format. This includes: Optical Density (OD) values, concentration values, start and finish times, time stamp for each sample, user name, general instrument set-up parameters, method set-up parameters including reagent volumes and filter wavelength used, QC parameters and limits, dilutions, calibration curve(s), and calibration energy values and concentrations.

Note: More software features are described in Section 4 Executive Summary.

Free software upgrades are provided free of charge for the life of the instrument.

9. Do you offer support in method development and validation?

Systea Scientific, LLC has already developed and validated the common EPA methods. Additional methods can be developed usually at no charge. If the method to be developed is an existing method, that needs to be slightly modified, such as a range change, then usually it can be done quickly. Normally methods take less than a few days to run and validate. Systea Scientific utilizes experienced local applications personnel as well as the expertise of its parent, Systea S.p.A..

10. Do you offer for on-site equipment evaluation?

We realize that a brochure may not always answer all of your questions. Systea Scientific is confident that **if try our product that you will buy it**. We normally offer a 30 day trial of the EasyChem discrete analyzer at no cost. This would include shipping to your site and installation and training. The trial period would begin after training and installation. Technical support for both mechanical and chemistry would also be provided.

11. What would you consider the most prominent feature/function of your equipment offering over others in the market place?

Ease of use and design! Operators of virtually any skill level can learn to effectively operate the EasyChem in a short period of time and get just as reliable data as the next operator. The simple design of the system, with the ability to view and access all relevant functioning parts, makes it easy to operate, maintain and trouble shoot. This makes the instrument ideal for laboratories where various operators with differing skill levels will be using the equipment. This is why we believe we do not have any returned instruments like our competitors.

The EasyChem is also the easiest discrete analyzer to service and support. All other discrete analyzers are service intensive and require a costly service agreement to maintain.

12. What special computer or software requirements do you recommend?

The system will operate on any newer model of computer and operating system. We recommend the following as a minimum:

CPU Pentium 4 class 2 GHz
RAM 256 MB
HD 40 GB
Serial Port on Board
TCP/IP Port
OS Windows XP Pro
Monitor and video board with 1024 x 768 resolution
UPS

We usually provide a Dell 745 when providing a computer.

13. What if any consumable parts should be stocked onsite?

Although there are a minimal amount of consumables required to operate the EasyChem discrete analyzer, Systea Scientific recommends having the following consumable and spare parts on hand.

Consumables

P/N	Description	Sales Unit
CUP-EASY-02	Sample Cup 2.0ml	500/Pk.
E/RZ24	Reaction Cuvettes	100/Pk. (2400 tests)
E/K02	Probe Kit (Includes 2 Probes)	Ea.
562-3050-X1	Silicone Tubing	Meter
E/K01	Tube Kit	Ea.
E/R18	Reagent Bottles	18/Pk.
E/T25	Stopper – Reagent Bottle	25/Pk.
E/LA01	Source Lamp Assembly	Ea.
E/SP01	Dosing Syringe (Optional)	Ea.

Spare Parts

E/F01	Fuse Kit	Pk.
P1-0102-03	Flow Cell 10mm (optional)	Ea.

We recommend that one each of the above listed items be stored on site to eliminate down time. **Please note that all of the above items are supplied in the spares kit.**