



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

# State of West Virginia Purchase Order

Order Date: 09-17-2021

CORRECT ORDER NUMBER MUST APPEAR  
ON ALL PACKAGES, INVOICES, AND  
SHIPPING PAPERS. QUESTIONS  
CONCERNING THIS ORDER SHOULD BE  
DIRECTED TO THE DEPARTMENT  
CONTACT.

Order Number:	CPO 1400 1400 AGR2200000004 1	Procurement Folder:	907845
Document Name:	Discrete Analyzer	Reason for Modification:	
Document Description:	Discrete Analyzer		
Procurement Type:	Central Purchase Order		
Buyer Name:	Jessica S Chambers		
Telephone:	(304) 558-0246		
Email:	jessica.s.chambers@wv.gov		
Shipping Method:	Best Way	Effective Start Date:	
Free on Board:	FOB Dest, Freight Prepaid	Effective End Date:	

VENDOR	DEPARTMENT CONTACT																				
Vendor Customer Code: 000000227959 SEAL ANALYTICAL INC 6501 W DONGES BAY RD  MEQUON WI 53092-4460 US Vendor Contact Phone: 999-999-9999 Extension: Discount Details: <table><thead><tr><th></th><th>Discount Allowed</th><th>Discount Percentage</th><th>Discount Days</th></tr></thead><tbody><tr><td>#1</td><td>No</td><td>0.0000</td><td>0</td></tr><tr><td>#2</td><td>Not Entered</td><td></td><td></td></tr><tr><td>#3</td><td>Not Entered</td><td></td><td></td></tr><tr><td>#4</td><td>Not Entered</td><td></td><td></td></tr></tbody></table>		Discount Allowed	Discount Percentage	Discount Days	#1	No	0.0000	0	#2	Not Entered			#3	Not Entered			#4	Not Entered			Requestor Name: Joseph M Monroe Requestor Phone: (304) 538-2397 Requestor Email: mmonroe@wvda.us  <b>22</b> FILE LOCATION
	Discount Allowed	Discount Percentage	Discount Days																		
#1	No	0.0000	0																		
#2	Not Entered																				
#3	Not Entered																				
#4	Not Entered																				

INVOICE TO	SHIP TO
PROCUREMENT OFFICER 304-558-2221 AGRICULTURE DEPARTMENT OF ADMINISTRATIVE SERVICES  1900 KANAWHA BLVD E  CHARLESTON WV 25305-0173  US	AUTHORIZED RECEIVER 304-538-2397 AGRICULTURE DEPARTMENT OF MOOREFIELD FIELD OFFICE  60B INDUSTRIAL PARK RD  MOOREFIELD WV 26836-0302  US

Total Order Amount: \$46,925.00

Purchasing Division's File Copy

ENTERED

PURCHASING DIVISION AUTHORIZATION DATE: Linda Harper 9/23/21 ELECTRONIC SIGNATURE ON FILE	ATTORNEY GENERAL APPROVAL AS TO FORM DATE: [Signature] ELECTRONIC SIGNATURE ON FILE	ENCUMBRANCE CERTIFICATION DATE: ELECTRONIC SIGNATURE ON FILE
---	---	--

9/29/2021

**Extended Description:**

The Vendor, Seal Analytical, Inc. of Mequon, WI agrees to enter with the Agency, The Department of Agriculture, into a one-time purchase of a discrete analyzer per the specifications, terms and conditions, bid requirements, addendums, the Vendor's submitted bid response date: 7/28/2021 in the amount of: \$46,925.00 all incorporated herein by reference and made apart of hereof as attached hereto

Line	Commodity Code	Quantity	Unit	Unit Price	Total Price
1	41113007	1.00000	EA	46925.000000	46925.00
Service From	Service To	Manufacturer		Model No	

**Commodity Line Description:** Discrete Analyzer

**Extended Description:**

## **GENERAL TERMS AND CONDITIONS:**

**1. CONTRACTUAL AGREEMENT:** Issuance of an Award Document signed by the Purchasing Division Director, or his designee, and approved as to form by the Attorney General's office constitutes acceptance by the State of this Contract made by and between the State of West Virginia and the Vendor. Vendor's signature on its bid, or on the Contract if the Contract is not the result of a bid solicitation, signifies Vendor's agreement to be bound by and accept the terms and conditions contained in this Contract.

**2. DEFINITIONS:** As used in this Solicitation/Contract, the following terms shall have the meanings attributed to them below. Additional definitions may be found in the specifications included with this Solicitation/Contract.

**2.1. "Agency" or "Agencies"** means the agency, board, commission, or other entity of the State of West Virginia that is identified on the first page of the Solicitation or any other public entity seeking to procure goods or services under this Contract.

**2.2. "Bid" or "Proposal"** means the vendors submitted response to this solicitation.

**2.3. "Contract"** means the binding agreement that is entered into between the State and the Vendor to provide the goods or services requested in the Solicitation.

**2.4. "Director"** means the Director of the West Virginia Department of Administration, Purchasing Division.

**2.5. "Purchasing Division"** means the West Virginia Department of Administration, Purchasing Division.

**2.6. "Award Document"** means the document signed by the Agency and the Purchasing Division, and approved as to form by the Attorney General, that identifies the Vendor as the contract holder.

**2.7. "Solicitation"** means the official notice of an opportunity to supply the State with goods or services that is published by the Purchasing Division.

**2.8. "State"** means the State of West Virginia and/or any of its agencies, commissions, boards, etc. as context requires.

**2.9. "Vendor" or "Vendors"** means any entity submitting a bid in response to the Solicitation, the entity that has been selected as the lowest responsible bidder, or the entity that has been awarded the Contract as context requires.

**3. CONTRACT TERM; RENEWAL; EXTENSION:** The term of this Contract shall be determined in accordance with the category that has been identified as applicable to this Contract below:

☐ **Term Contract**

**Initial Contract Term:** This Contract becomes effective on \_\_\_\_\_ and the initial contract term extends until \_\_\_\_\_.

**Renewal Term:** This Contract may be renewed upon the mutual written consent of the Agency, and the Vendor, with approval of the Purchasing Division and the Attorney General's office (Attorney General approval is as to form only). Any request for renewal should be delivered to the Agency and then submitted to the Purchasing Division thirty (30) days prior to the expiration date of the initial contract term or appropriate renewal term. A Contract renewal shall be in accordance with the terms and conditions of the original contract. Unless otherwise specified below, renewal of this Contract is limited to \_\_\_\_\_ successive one (1) year periods or multiple renewal periods of less than one year, provided that the multiple renewal periods do not exceed the total number of months available in all renewal years combined. Automatic renewal of this Contract is prohibited. Renewals must be approved by the Vendor, Agency, Purchasing Division and Attorney General's office (Attorney General approval is as to form only)

☐ **Alternate Renewal Term** – This contract may be renewed for \_\_\_\_\_ successive \_\_\_\_\_ year periods or shorter periods provided that they do not exceed the total number of months contained in all available renewals. Automatic renewal of this Contract is prohibited. Renewals must be approved by the Vendor, Agency, Purchasing Division and Attorney General's office (Attorney General approval is as to form only)

**Delivery Order Limitations:** In the event that this contract permits delivery orders, a delivery order may only be issued during the time this Contract is in effect. Any delivery order issued within one year of the expiration of this Contract shall be effective for one year from the date the delivery order is issued. No delivery order may be extended beyond one year after this Contract has expired.

☐ **Fixed Period Contract:** This Contract becomes effective upon Vendor's receipt of the notice to proceed and must be completed within \_\_\_\_\_ days.

☐ **Fixed Period Contract with Renewals:** This Contract becomes effective upon Vendor's receipt of the notice to proceed and part of the Contract more fully described in the attached specifications must be completed within \_\_\_\_\_ days. Upon completion of the work covered by the preceding sentence, the vendor agrees that maintenance, monitoring, or warranty services will be provided for \_\_\_\_\_ year(s) thereafter.

☒ **One Time Purchase:** The term of this Contract shall run from the issuance of the Award Document until all of the goods contracted for have been delivered, but in no event will this Contract extend for more than one fiscal year.

☐ **Other:** See attached \_\_\_\_\_  
Revised 07/01/2021

**4. AUTHORITY TO PROCEED:** Vendor is authorized to begin performance of this contract on the date of encumbrance listed on the front page of the Award Document unless either the box for “Fixed Period Contract” or “Fixed Period Contract with Renewals” has been checked in Section 3 above. If either “Fixed Period Contract” or “Fixed Period Contract with Renewals” has been checked, Vendor must not begin work until it receives a separate notice to proceed from the State. The notice to proceed will then be incorporated into the Contract via change order to memorialize the official date that work commenced.

**5. QUANTITIES:** The quantities required under this Contract shall be determined in accordance with the category that has been identified as applicable to this Contract below.

☐ **Open End Contract:** Quantities listed in this Solicitation/Award Document are approximations only, based on estimates supplied by the Agency. It is understood and agreed that the Contract shall cover the quantities actually ordered for delivery during the term of the Contract, whether more or less than the quantities shown.

☐ **Service:** The scope of the service to be provided will be more clearly defined in the specifications included herewith.

☐ **Combined Service and Goods:** The scope of the service and deliverable goods to be provided will be more clearly defined in the specifications included herewith.

☒ **One Time Purchase:** This Contract is for the purchase of a set quantity of goods that are identified in the specifications included herewith. Once those items have been delivered, no additional goods may be procured under this Contract without an appropriate change order approved by the Vendor, Agency, Purchasing Division, and Attorney General’s office.

**6. EMERGENCY PURCHASES:** The Purchasing Division Director may authorize the Agency to purchase goods or services in the open market that Vendor would otherwise provide under this Contract if those goods or services are for immediate or expedited delivery in an emergency. Emergencies shall include, but are not limited to, delays in transportation or an unanticipated increase in the volume of work. An emergency purchase in the open market, approved by the Purchasing Division Director, shall not constitute of breach of this Contract and shall not entitle the Vendor to any form of compensation or damages. This provision does not excuse the State from fulfilling its obligations under a One Time Purchase contract.

**7. REQUIRED DOCUMENTS:** All of the items checked below must be provided to the Purchasing Division by the Vendor as specified below.

☐ **BID BOND (Construction Only):** Pursuant to the requirements contained in W. Va. Code § 5-22-1(c), All Vendors submitting a bid on a construction project shall furnish a valid bid bond in the amount of five percent (5%) of the total amount of the bid protecting the State of West Virginia. The bid bond must be submitted with the bid.

☐ **PERFORMANCE BOND:** The apparent successful Vendor shall provide a performance bond in the amount of 100% of the contract. The performance bond must be received by the Purchasing Division prior to Contract award.

☐ **LABOR/MATERIAL PAYMENT BOND:** The apparent successful Vendor shall provide a labor/material payment bond in the amount of 100% of the Contract value. The labor/material payment bond must be delivered to the Purchasing Division prior to Contract award.

In lieu of the Bid Bond, Performance Bond, and Labor/Material Payment Bond, the Vendor may provide certified checks, cashier's checks, or irrevocable letters of credit. Any certified check, cashier's check, or irrevocable letter of credit provided in lieu of a bond must be of the same amount and delivered on the same schedule as the bond it replaces. A letter of credit submitted in lieu of a performance and labor/material payment bond will only be allowed for projects under \$100,000. Personal or business checks are not acceptable. Notwithstanding the foregoing, West Virginia Code § 5-22-1 (d) mandates that a vendor provide a performance and labor/material payment bond for construction projects. Accordingly, substitutions for the performance and labor/material payment bonds for construction projects is not permitted.

☐ **MAINTENANCE BOND:** The apparent successful Vendor shall provide a two (2) year maintenance bond covering the roofing system. The maintenance bond must be issued and delivered to the Purchasing Division prior to Contract award.

☐ **LICENSE(S) / CERTIFICATIONS / PERMITS:** In addition to anything required under the Section of the General Terms and Conditions entitled Licensing, the apparent successful Vendor shall furnish proof of the following licenses, certifications, and/or permits upon request and in a form acceptable to the State. The request may be prior to or after contract award at the State's sole discretion.

☐

☐

☐

☐

The apparent successful Vendor shall also furnish proof of any additional licenses or certifications contained in the specifications regardless of whether or not that requirement is listed above.

**8. INSURANCE:** The apparent successful Vendor shall furnish proof of the insurance identified by a checkmark below and must include the State as an additional insured on each policy prior to Contract award. The insurance coverages identified below must be maintained throughout the life of this contract. Thirty (30) days prior to the expiration of the insurance policies, Vendor shall provide the Agency with proof that the insurance mandated herein has been continued. Vendor must also provide Agency with immediate notice of any changes in its insurance policies, including but not limited to, policy cancelation, policy reduction, or change in insurers. The apparent successful Vendor shall also furnish proof of any additional insurance requirements contained in the specifications prior to Contract award regardless of whether that insurance requirement is listed in this section.

Vendor must maintain:

☒ **Commercial General Liability Insurance** in at least an amount of: 100,000.00 per occurrence.

☐ **Automobile Liability Insurance** in at least an amount of: \_\_\_\_\_ per occurrence.

☐ **Professional/Malpractice/Errors and Omission Insurance** in at least an amount of: \_\_\_\_\_ per occurrence. Notwithstanding the forgoing, Vendor's are not required to list the State as an additional insured for this type of policy.

☐ **Commercial Crime and Third Party Fidelity Insurance** in an amount of: \_\_\_\_\_ per occurrence.

☐ **Cyber Liability Insurance** in an amount of: \_\_\_\_\_ per occurrence.

☐ **Builders Risk Insurance** in an amount equal to 100% of the amount of the Contract.

☐ **Pollution Insurance** in an amount of: \_\_\_\_\_ per occurrence.

☐ **Aircraft Liability** in an amount of: \_\_\_\_\_ per occurrence.

☐☐☐☐

Notwithstanding anything contained in this section to the contrary, the Director of the Purchasing Division reserves the right to waive the requirement that the State be named as an additional insured on one or more of the Vendor's insurance policies if the Director finds that doing so is in the State's best interest.

**9. WORKERS' COMPENSATION INSURANCE:** Vendor shall comply with laws relating to workers compensation, shall maintain workers' compensation insurance when required, and shall furnish proof of workers' compensation insurance upon request.

**10. [Reserved]**

**11. LIQUIDATED DAMAGES:** This clause shall in no way be considered exclusive and shall not limit the State or Agency's right to pursue any other available remedy. Vendor shall pay liquidated damages in the amount specified below or as described in the specifications:

☐ \_\_\_\_\_ for \_\_\_\_\_.

☐ Liquidated Damages Contained in the Specifications.

☐ Liquidated Damages Are Not Included in this Contract.

**12. ACCEPTANCE:** Vendor's signature on its bid, or on the certification and signature page, constitutes an offer to the State that cannot be unilaterally withdrawn, signifies that the product or service proposed by vendor meets the mandatory requirements contained in the Solicitation for that product or service, unless otherwise indicated, and signifies acceptance of the terms and conditions contained in the Solicitation unless otherwise indicated.

**13. PRICING:** The pricing set forth herein is firm for the life of the Contract, unless specified elsewhere within this Solicitation/Contract by the State. A Vendor's inclusion of price adjustment provisions in its bid, without an express authorization from the State in the Solicitation to do so, may result in bid disqualification. Notwithstanding the foregoing, Vendor must extend any publicly advertised sale price to the State and invoice at the lower of the contract price or the publicly advertised sale price.

**14. PAYMENT IN ARREARS:** Payments for goods/services will be made in arrears only upon receipt of a proper invoice, detailing the goods/services provided or receipt of the goods/services, whichever is later. Notwithstanding the foregoing, payments for software maintenance, licenses, or subscriptions may be paid annually in advance.

**15. PAYMENT METHODS:** Vendor must accept payment by electronic funds transfer and P-Card. (The State of West Virginia's Purchasing Card program, administered under contract by a banking institution, processes payment for goods and services through state designated credit cards.)



**16. TAXES:** The Vendor shall pay any applicable sales, use, personal property or any other taxes arising out of this Contract and the transactions contemplated thereby. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.

**17. ADDITIONAL FEES:** Vendor is not permitted to charge additional fees or assess additional charges that were not either expressly provided for in the solicitation published by the State of West Virginia, included in the Contract, or included in the unit price or lump sum bid amount that Vendor is required by the solicitation to provide. Including such fees or charges as notes to the solicitation may result in rejection of vendor's bid. Requesting such fees or charges be paid after the contract has been awarded may result in cancellation of the contract.

**18. FUNDING:** This Contract shall continue for the term stated herein, contingent upon funds being appropriated by the Legislature or otherwise being made available. In the event funds are not appropriated or otherwise made available, this Contract becomes void and of no effect beginning on July 1 of the fiscal year for which funding has not been appropriated or otherwise made available. If that occurs, the State may notify the Vendor that an alternative source of funding has been obtained and thereby avoid the automatic termination. Non-appropriation or non-funding shall not be considered an event of default.

**19. CANCELLATION:** The Purchasing Division Director reserves the right to cancel this Contract immediately upon written notice to the vendor if the materials or workmanship supplied do not conform to the specifications contained in the Contract. The Purchasing Division Director may also cancel any purchase or Contract upon 30 days written notice to the Vendor in accordance with West Virginia Code of State Rules § 148-1-5.2.b.

**20. TIME:** Time is of the essence regarding all matters of time and performance in this Contract.

**21. APPLICABLE LAW:** This Contract is governed by and interpreted under West Virginia law without giving effect to its choice of law principles. Any information provided in specification manuals, or any other source, verbal or written, which contradicts or violates the West Virginia Constitution, West Virginia Code, or West Virginia Code of State Rules is void and of no effect.

**22. COMPLIANCE WITH LAWS:** Vendor shall comply with all applicable federal, state, and local laws, regulations and ordinances. By submitting a bid, Vendor acknowledges that it has reviewed, understands, and will comply with all applicable laws, regulations, and ordinances.

**SUBCONTRACTOR COMPLIANCE:** Vendor shall notify all subcontractors providing commodities or services related to this Contract that as subcontractors, they too are required to comply with all applicable laws, regulations, and ordinances. Notification under this provision must occur prior to the performance of any work under the contract by the subcontractor.

**23. ARBITRATION:** Any references made to arbitration contained in this Contract, Vendor's bid, or in any American Institute of Architects documents pertaining to this Contract are hereby deleted, void, and of no effect.

**24. MODIFICATIONS:** This writing is the parties' final expression of intent. Notwithstanding anything contained in this Contract to the contrary no modification of this Contract shall be binding without mutual written consent of the Agency, and the Vendor, with approval of the Purchasing Division and the Attorney General's office (Attorney General approval is as to form only). Any change to existing contracts that adds work or changes contract cost, and were not included in the original contract, must be approved by the Purchasing Division and the Attorney General's Office (as to form) prior to the implementation of the change or commencement of work affected by the change.

**25. WAIVER:** The failure of either party to insist upon a strict performance of any of the terms or provision of this Contract, or to exercise any option, right, or remedy herein contained, shall not be construed as a waiver or a relinquishment for the future of such term, provision, option, right, or remedy, but the same shall continue in full force and effect. Any waiver must be expressly stated in writing and signed by the waiving party.

**26. SUBSEQUENT FORMS:** The terms and conditions contained in this Contract shall supersede any and all subsequent terms and conditions which may appear on any form documents submitted by Vendor to the Agency or Purchasing Division such as price lists, order forms, invoices, sales agreements, or maintenance agreements, and includes internet websites or other electronic documents. Acceptance or use of Vendor's forms does not constitute acceptance of the terms and conditions contained thereon.

**27. ASSIGNMENT:** Neither this Contract nor any monies due, or to become due hereunder, may be assigned by the Vendor without the express written consent of the Agency, the Purchasing Division, the Attorney General's office (as to form only), and any other government agency or office that may be required to approve such assignments.

**28. WARRANTY:** The Vendor expressly warrants that the goods and/or services covered by this Contract will: (a) conform to the specifications, drawings, samples, or other description furnished or specified by the Agency; (b) be merchantable and fit for the purpose intended; and (c) be free from defect in material and workmanship.

**29. STATE EMPLOYEES:** State employees are not permitted to utilize this Contract for personal use and the Vendor is prohibited from permitting or facilitating the same.

**30. PRIVACY, SECURITY, AND CONFIDENTIALITY:** The Vendor agrees that it 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/default.html>.

**31. YOUR SUBMISSION IS A PUBLIC DOCUMENT:** Vendor's entire response to the Solicitation and the resulting Contract are public documents. As public documents, they will be disclosed to the public following the bid/proposal opening or award of the contract, as required by the competitive bidding laws of West Virginia Code §§ 5A-3-1 et seq., 5-22-1 et seq., and 5G-1-1 et seq. and the Freedom of Information Act West Virginia Code §§ 29B-1-1 et seq.

**DO NOT SUBMIT MATERIAL YOU CONSIDER TO BE CONFIDENTIAL, A TRADE SECRET, OR OTHERWISE NOT SUBJECT TO PUBLIC DISCLOSURE.**

Submission of any bid, proposal, or other document to the Purchasing Division constitutes your explicit consent to the subsequent public disclosure of the bid, proposal, or document. The Purchasing Division will disclose any document labeled "confidential," "proprietary," "trade secret," "private," or labeled with any other claim against public disclosure of the documents, to include any "trade secrets" as defined by West Virginia Code § 47-22-1 et seq. All submissions are subject to public disclosure without notice.

**32. LICENSING:** In accordance with West Virginia Code of State Rules § 148-1-6.1.e, Vendor 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 agency or political subdivision. Obligations related to political subdivisions may include, but are not limited to, business licensing, business and occupation taxes, inspection compliance, permitting, etc. Upon request, the Vendor must provide all necessary releases to obtain information to enable the Purchasing Division Director or the Agency to verify that the Vendor is licensed and in good standing with the above entities.

**SUBCONTRACTOR COMPLIANCE:** Vendor shall notify all subcontractors providing commodities or services related to this Contract that as subcontractors, they too are required to be licensed, in good standing, and up-to-date on all state and local obligations as described in this section. Obligations related to political subdivisions may include, but are not limited to, business licensing, business and occupation taxes, inspection compliance, permitting, etc. Notification under this provision must occur prior to the performance of any work under the contract by the subcontractor.

**33. ANTITRUST:** In submitting a bid to, signing a contract with, or accepting a Award Document from any agency of the State of West Virginia, the Vendor agrees to 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 Vendor.

**34. VENDOR CERTIFICATIONS:** By signing its bid or entering into this Contract, Vendor certifies (1) that its bid or offer was made without prior understanding, agreement, or connection with any corporation, firm, limited liability company, partnership, person or entity submitting a bid or offer for the same material, supplies, equipment or services; (2) that its bid or offer is in all respects fair and without collusion or fraud; (3) that this Contract is accepted or entered into without any prior understanding, agreement, or connection to any other entity that could be considered a violation of law; and (4) that it has reviewed this Solicitation in its entirety; understands the requirements, terms and conditions, and other information contained herein.

Vendor's signature on its bid or offer also affirms that neither it nor its representatives have any interest, nor shall acquire any interest, direct or indirect, which would compromise the performance of its services hereunder. Any such interests shall be promptly presented in detail to the Agency. The individual signing this bid or offer on behalf of Vendor certifies that he or she is authorized by the Vendor to execute this bid or offer or any documents related thereto on Vendor's behalf; that he or she is authorized to bind the Vendor in a contractual relationship; and that, to the best of his or her knowledge, the Vendor has properly registered with any State agency that may require registration.

**35. VENDOR RELATIONSHIP:** The relationship of the Vendor to the State shall be that of an independent contractor and no principal-agent relationship or employer-employee relationship is contemplated or created by this Contract. The Vendor as an independent contractor is solely liable for the acts and omissions of its employees and agents. Vendor shall be responsible for selecting, supervising, and compensating any and all individuals employed pursuant to the terms of this Solicitation and resulting contract. Neither the Vendor, nor any employees or subcontractors of the Vendor, shall be deemed to be employees of the State for any purpose whatsoever. Vendor shall be exclusively responsible for payment of employees and contractors for all wages and salaries, taxes, withholding payments, penalties, fees, fringe benefits, professional liability insurance premiums, contributions to insurance and pension, or other deferred compensation plans, including but not limited to, Workers' Compensation and Social Security obligations, licensing fees, etc. and the filing of all necessary documents, forms, and returns pertinent to all of the foregoing.

Vendor shall hold harmless the State, and shall provide the State and Agency with a defense against any and all claims including, but not limited to, the foregoing payments, withholdings, contributions, taxes, Social Security taxes, and employer income tax returns.

**36. INDEMNIFICATION:** The Vendor agrees to indemnify, defend, and hold harmless the State and the Agency, their officers, and employees from and against: (1) Any claims or losses for services rendered by any subcontractor, person, or firm performing or supplying services, materials, or supplies in connection with the performance of the Contract; (2) Any claims or losses resulting to any person or entity injured or damaged by the Vendor, its officers, employees, or subcontractors by the publication, translation, reproduction, delivery, performance, use, or disposition of any data used under the Contract in a manner not authorized by the Contract, or by Federal or State statutes or regulations; and (3) Any failure of the Vendor, its officers, employees, or subcontractors to observe State and Federal laws including, but not limited to, labor and wage and hour laws.

**37. PURCHASING AFFIDAVIT:** In accordance with West Virginia Code §§ 5A-3-10a and 5-22-1(i), the State is prohibited from awarding a contract to any bidder that owes a debt to the State or a political subdivision of the State, Vendors are required to sign, notarize, and submit the Purchasing Affidavit to the Purchasing Division affirming under oath that it is not in default on any monetary obligation owed to the state or a political subdivision of the state.

**38. CONFLICT OF INTEREST:** Vendor, its officers or members or employees, shall not presently have or acquire an interest, direct or indirect, which would conflict with or compromise the performance of its obligations hereunder. Vendor shall periodically inquire of its officers, members and employees to ensure that a conflict of interest does not arise. Any conflict of interest discovered shall be promptly presented in detail to the Agency.

**39. REPORTS:** Vendor shall provide the Agency and/or the Purchasing Division with the following reports identified by a checked box below:

☐ Such reports as the Agency and/or the Purchasing Division may request. Requested reports may include, but are not limited to, quantities purchased, agencies utilizing the contract, total contract expenditures by agency, etc.

☐ Quarterly reports detailing the total quantity of purchases in units and dollars, along with a listing of purchases by agency. Quarterly reports should be delivered to the Purchasing Division via email at [purchasing.division@wv.gov](mailto:purchasing.division@wv.gov).

**40. BACKGROUND CHECK:** In accordance with W. Va. Code § 15-2D-3, the State reserves the right to prohibit a service provider's employees from accessing sensitive or critical information or to be present at the Capitol complex based upon results addressed from a criminal background check. Service providers should contact the West Virginia Division of Protective Services by phone at (304) 558-9911 for more information.

**41. PREFERENCE FOR USE OF DOMESTIC STEEL PRODUCTS:** Except when authorized by the Director of the Purchasing Division pursuant to W. Va. Code § 5A-3-56, no contractor may use or supply steel products for a State Contract Project other than those steel products made in the United States. A contractor who uses steel products in violation of this section may be subject to civil penalties pursuant to W. Va. Code § 5A-3-56. As used in this section:

- a. "State Contract Project" means any erection or construction of, or any addition to, alteration of or other improvement to any building or structure, including, but not limited to, roads or highways, or the installation of any heating or cooling or ventilating plants or other equipment, or the supply of and materials for such projects, pursuant to a contract with the State of West Virginia for which bids were solicited on or after June 6, 2001.
- b. "Steel Products" means products rolled, formed, shaped, drawn, extruded, forged, cast, fabricated or otherwise similarly processed, or processed by a combination of two or more or such operations, from steel made by the open heath, basic oxygen, electric furnace, Bessemer or other steel making process.
- c. The Purchasing Division Director may, in writing, authorize the use of foreign steel products if:

1. The cost for each contract item used does not exceed one tenth of one percent (.1%) of the total contract cost or two thousand five hundred dollars (\$2,500.00), whichever is greater. For the purposes of this section, the cost is the value of the steel product as delivered to the project; or
2. The Director of the Purchasing Division determines that specified steel materials are not produced in the United States in sufficient quantity or otherwise are not reasonably available to meet contract requirements.

**42. PREFERENCE FOR USE OF DOMESTIC ALUMINUM, GLASS, AND STEEL:** In Accordance with W. Va. Code § 5-19-1 et seq., and W. Va. CSR § 148-10-1 et seq., for every contract or subcontract, subject to the limitations contained herein, for the construction, reconstruction, alteration, repair, improvement or maintenance of public works or for the purchase of any item of machinery or equipment to be used at sites of public works, only domestic aluminum, glass or steel products shall be supplied unless the spending officer determines, in writing, after the receipt of offers or bids, (1) that the cost of domestic aluminum, glass or steel products is unreasonable or inconsistent with the public interest of the State of West Virginia, (2) that domestic aluminum, glass or steel products are not produced in sufficient quantities to meet the contract requirements, or (3) the available domestic aluminum, glass, or steel do not meet the contract specifications. This provision only applies to public works contracts awarded in an amount more than fifty thousand dollars (\$50,000) or public works contracts that require more than ten thousand pounds of steel products.

The cost of domestic aluminum, glass, or steel products may be unreasonable if the cost is more than twenty percent (20%) of the bid or offered price for foreign made aluminum, glass, or steel products. If the domestic aluminum, glass or steel products to be supplied or produced in a “substantial labor surplus area”, as defined by the United States Department of Labor, the cost of domestic aluminum, glass, or steel products may be unreasonable if the cost is more than thirty percent (30%) of the bid or offered price for foreign made aluminum, glass, or steel products. This preference shall be applied to an item of machinery or equipment, as indicated above, when the item is a single unit of equipment or machinery manufactured primarily of aluminum, glass or steel, is part of a public works contract and has the sole purpose or of being a permanent part of a single public works project. This provision does not apply to equipment or machinery purchased by a spending unit for use by that spending unit and not as part of a single public works project.

All bids and offers including domestic aluminum, glass or steel products that exceed bid or offer prices including foreign aluminum, glass or steel products after application of the preferences provided in this provision may be reduced to a price equal to or lower than the lowest bid or offer price for foreign aluminum, glass or steel products plus the applicable preference. If the reduced bid or offer prices are made in writing and supersede the prior bid or offer prices, all bids or offers, including the reduced bid or offer prices, will be reevaluated in accordance with this rule.

**43. INTERESTED PARTY SUPPLEMENTAL DISCLOSURE:** W. Va. Code § 6D-1-2 requires that for contracts with an actual or estimated value of at least \$1 million, the vendor must submit to the Agency a supplemental disclosure of interested parties reflecting any new or differing interested parties to the contract, which were not included in the original pre-award interested party disclosure, within 30 days following the completion or termination of the contract. A copy of that form is included with this solicitation or can be obtained from the WV Ethics Commission. This requirement does not apply to publicly traded companies listed on a national or international stock exchange. A more detailed definition of interested parties can be obtained from the form referenced above.

**44. PROHIBITION AGAINST USED OR REFURBISHED:** Unless expressly permitted in the solicitation published by the State, Vendor must provide new, unused commodities, and is prohibited from supplying used or refurbished commodities, in fulfilling its responsibilities under this Contract.

**45. VOID CONTRACT CLAUSES –** This Contract is subject to the provisions of West Virginia Code § 5A-3-62, which automatically voids certain contract clauses that violate State law.

**ADDENDUM ACKNOWLEDGEMENT FORM**  
**SOLICITATION NO.:**

**Instructions:** Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

**Acknowledgment:** I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

**Addendum Numbers Received:**

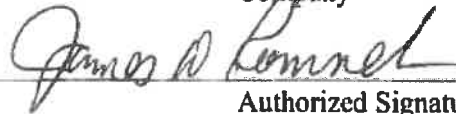
(Check the box next to each addendum received)

<input checked="" type="checkbox"/> Addendum No. 1	<input type="checkbox"/> Addendum No. 6
<input type="checkbox"/> Addendum No. 2	<input type="checkbox"/> Addendum No. 7
<input type="checkbox"/> Addendum No. 3	<input type="checkbox"/> Addendum No. 8
<input type="checkbox"/> Addendum No. 4	<input type="checkbox"/> Addendum No. 9
<input type="checkbox"/> Addendum No. 5	<input type="checkbox"/> Addendum No. 10

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further 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.

SEAL Analytical Inc.

Company



Authorized Signature

July 28, 2021


Date

**NOTE:** This addendum acknowledgment should be submitted with the bid to expedite document processing.

Revised 6/8/2012



**DESIGNATED CONTACT:** Vendor appoints the individual identified in this Section as the Contract Administrator and the initial point of contact for matters relating to this Contract.

  
\_\_\_\_\_  
Technical Sales & Product Manager  
(Name, Title)  
F. Joseph Redovich, Jr.  
\_\_\_\_\_  
(Printed Name and Title)  
6501 W. Donges Bay Road  
\_\_\_\_\_  
(Address)  
262-241-7900  
\_\_\_\_\_  
(Phone Number) / (Fax Number)  
sales@seal-us.com  
\_\_\_\_\_  
(email address)

**CERTIFICATION AND SIGNATURE:** By signing below, or submitting documentation through wvOASIS, I certify that: I have reviewed this Solicitation in its entirety; that I understand the requirements, terms and conditions, and other information contained herein; that this bid, offer or proposal constitutes an offer to the State that cannot be unilaterally withdrawn; that the product or service proposed meets the mandatory requirements contained in the Solicitation for that product or service, unless otherwise stated herein; that the Vendor accepts the terms and conditions contained in the Solicitation, unless otherwise stated herein; that I am submitting this bid, offer or proposal for review and consideration; that I am authorized by the vendor to execute and submit this bid, offer, or proposal, or any documents related thereto on vendor's behalf; that I am authorized to bind the vendor in a contractual relationship; and that to the best of my knowledge, the vendor has properly registered with any State agency that may require registration.

By signing below, I further certify that I understand this Contract is subject to the provisions of West Virginia Code § 5A-3-62, which automatically voids certain contract clauses that violate State law.

SEAL Analytical Inc.  
\_\_\_\_\_  
(Company)

  
\_\_\_\_\_  
(Authorized Signature) (Representative Name, Title)

James D. Romnek, Controller  
\_\_\_\_\_  
(Printed Name and Title of Authorized Representative)

07/28/2021  
\_\_\_\_\_  
(Date)

262-241-7900  
\_\_\_\_\_  
(Phone Number) (Fax Number)

REQUEST FOR QUOTATION  
Discrete Analyzer

---

**SPECIFICATIONS**

1. **PURPOSE AND SCOPE:** The West Virginia Purchasing Division is soliciting bids on behalf of West Virginia Department of Agriculture, R.E.A.D. to establish a contract for the one-time purchase of a Discrete Analyzer.
2. **DEFINITIONS:** The terms listed below shall have the meanings assigned to them below. Additional definitions can be found in section 2 of the General Terms and Conditions.
  - 2.1 **“Contract Item”** means a Discrete Analyzer as more fully described by these specifications.
  - 2.2 **“Pricing Page”** means the pages, contained in wvOASIS, or attached as Exhibit A, upon which Vendor should list its proposed price for the Contract Items.
  - 2.3 **“Solicitation”** means the official notice of an opportunity to supply the State with goods or services that is published by the Purchasing Division.
3. **GENERAL REQUIREMENTS:**
  - 3.1 **Mandatory Contract Item Requirements:** Contract Item must meet or exceed the mandatory requirements listed below.
    - 3.1.1 **Discrete Analyzer**
      - 3.1.1.1 Discrete Analyzer must have a minimum of 30 sample positions and a minimum of 20 reagent positions in the racks.
      - 3.1.1.2 Discrete Analyzer must have real time monitoring of samples and reagents and be able to run multiple tests in any order. Must have a filter wavelength range of at least 340-880nm.
      - 3.1.1.3 Discrete Analyzer must have disposable cuvettes with continuous access to the cuvettes without interrupting test processing. Must be able to apply a minimum of 4 different wavelengths during a run. Must have methods for Ammonia, Nitrate/Nitrite, Orthophosphate, Total phosphate, TKN.

REQUEST FOR QUOTATION  
**Discrete Analyzer**

---

**3.1.1.4** Discrete Analyzer must be able to prepare working standards and spike samples from a stock solution. Must also have auto start-up, shutdown, and dilution capabilities.

**3.1.1.5** Discrete Analyzer must have the ability to heat cuvettes in the range of 25-60 degrees Celsius for specific methods which require heating. Must have a minimum cuvette pathlength of 10mm. Must have the capability to wash cuvettes and perform any necessary system QC.

**3.1.1.6** Discrete Analyzer must have the ability to export data to LIMS.

**3.1.1.7** Discrete Analyzer must have installation and training included. The system must be fully operational upon receipt. Delivery of the instrument may be outside of the facility and the system must have a minimum warranty of one year on all parts and service.

**4. CONTRACT AWARD:**

**4.1 Contract Award:** The Contract is intended to provide Agencies with a purchase price for the Contract Items. The Contract shall be awarded to the Vendor that provides the Contract Items meeting the required specifications for the lowest overall total cost as shown on the Pricing Pages.

**4.2 Pricing Page:** Vendor should complete the Pricing Page by indicating the Model No./Brand Name along with the Unit Price and Extended Amount. Vendor should complete the Pricing Page in full as failure to complete the Pricing Page in its entirety may result in Vendor's bid being disqualified.

Vendor should type or electronically enter the information into the Pricing Page to prevent errors in the evaluation.

**5. PAYMENT:**

**5.1 Payment:** Vendor shall accept payment in accordance with the payment procedures of the State of West Virginia.

REQUEST FOR QUOTATION  
Discrete Analyzer

---

**6. DELIVERY AND RETURN:**

**6.1 Shipment and Delivery:** Vendor shall ship the Contract Items immediately after being awarded this Contract and receiving a purchase order. Vendor shall deliver the Contract Items within 12 weeks after receiving a purchase order. Contract Items must be delivered to Agency at West Virginia Department of Agriculture-Moorefield Field Office, R.E.A.D., 60B Industrial Park Road, Moorefield, WV 26836.

**6.2 Late Delivery:** The Agency placing the order under this Contract must be notified in writing if the shipment of the Contract Items will be delayed for any reason. Any delay in delivery that could cause harm to an Agency will be grounds for cancellation of the Contract, and/or obtaining the Contract Items from a third party.

Any Agency seeking to obtain the Contract Items from a third party under this provision must first obtain approval of the Purchasing Division.

**6.3 Delivery Payment/Risk of Loss:** Vendor shall deliver the Contract Items F.O.B. destination to the Agency's location.

**6.4 Return of Unacceptable Items:** If the Agency deems the Contract Items to be unacceptable, the Contract Items shall be returned to Vendor at Vendor's expense and with no restocking charge. Vendor shall either make arrangements for the return within five (5) days of being notified that items are unacceptable or permit the Agency to arrange for the return and reimburse Agency for delivery expenses. If the original packaging cannot be utilized for the return, Vendor will supply the Agency with appropriate return packaging upon request. All returns of unacceptable items shall be F.O.B. the Agency's location. The returned product shall either be replaced, or the Agency shall receive a full credit or refund for the purchase price, at the Agency's discretion.

**6.5 Return Due to Agency Error:** Items ordered in error by the Agency will be returned for credit within 30 days of receipt, F.O.B. Vendor's location. Vendor shall not charge a restocking fee if returned products are in a resalable condition. Items shall be deemed to be in a resalable condition if they are unused and in the original packaging. Any restocking fee for items not in a resalable condition shall be the lower of the Vendor's customary restocking fee or 5% of the total invoiced value of the returned items.

**7 VENDOR DEFAULT:**

**REQUEST FOR QUOTATION**  
**Discrete Analyzer**

---

**7.1** The following shall be considered a vendor default under this Contract.

**7.1.1** Failure to provide Contract Items in accordance with the requirements contained herein.

**7.1.2** Failure to comply with other specifications and requirements contained herein.

**7.1.3** Failure to comply with any laws, rules, and ordinances applicable to the Contract Services provided under this Contract.

**7.1.4** Failure to remedy deficient performance upon request.

**7.2** The following remedies shall be available to Agency upon default.

**7.2.1** Immediate cancellation of the Contract.

**7.2.2** Immediate cancellation of one or more release orders issued under this Contract.

**7.2.3** Any other remedies available in law or equity.

## **Response to Specifications**

### **STATE OF WEST VIRGINIA**

#### **BID REQUEST FOR:**

#### **AUTOMATED DISCRETE ANALYZER**

**Attn: Jessica S Chambers**

**Jessica.S.Chambers@wv.gov**

**The system offered is the SEAL AQ400 Discrete Automated Multiple Chemistry Analyzer. The quoted Discrete Analyzer from SEAL Analytical meets or exceeds all listed specifications. All specifications are answered.**

The AQ400 system is suitable for the analysis of untreated and treated waste, wastewater, sludge, soil and manure extracts, run-off, ground, surface and brackish waters.

SEAL Analytical are the global leaders in manufacture and supply of Segmented Flow and Discrete Analyzers. We work very closely with the leading Water and Environmental Research Centers around the world. This ensures our hardware, software and method development for the environmental community remain at the technological forefront of development.

The SEAL AQ400 system is using Discrete Analysis (DA). The benefits of the SEAL AQ400 include:

1. Automation of standard curve from one top standard.
2. Automated bracketing of samples with relevant QCs required.
3. Automated sample spiking.
4. Automated test changeover and washout of system.
5. Lowest reagent usage – lower cost per test, reduced waste generated.
6. Flexibility to run any test at any time without hardware changeover or additional purchase.

#### **Installation requirements:**

The AQ400 does not require any special set-up or installation requirements - no fume hood, gas tanks or direct water supply. It can be set up on a standard laboratory bench. Approximately one (1) meter of space will be required for the complete system including system controller.

#### **RESPONSE TO SPECIFICATIONS:**

*The AQ400 from SEAL Analytical meets or exceeds all listed requirements. See confirmation of each listed below. For further clarification, please contact Rachel Timmerman, US Technical Sales Manager, 262-241-7900 or [rtimmerman@seal-us.com](mailto:rtimmerman@seal-us.com)*

The AQ400 Discrete Analyzer comes supplied with everything required for complete installation and training. The AQ400 performs rapid, on demand analysis of a wide range of nutrients in untreated and treated waste, sludge, ground, surface, and brackish waters. Up to 10 different analytes can be programed in a single run – with no limit on the number of runs or different chemistries. The AQ400 methods follow the EPA and Standard Methods methodology replicating the required sample and reagent ratios. A complete method list and the front pages of the requested methods are attached. If more detailed method information is required or more specific

approval information is needed, it can be made available from SEAL Analytical upon request.

The SEAL AQ400 employs a robust, robotic sampling arm working in conjunction with a stepper motor-driven syringe. The syringe is used for aspirating, dispensing and mixing accurate and precise quantities of sample and reagent into miniaturized test tubes, called reaction wells. The sample and reagents are incubated in the reaction wells for a pre-programmed time. A single aliquot is then transferred into the 10 mm optical quality glass cuvette. The absorbance of the reaction is read in the stationary optical bench to assure the best possible signal to noise ratio ensuring highest sensitivity and lowest detection limits.

The SEAL AQ400 provides true unattended operation. Once the run is set up and started no further operator intervention is needed. Each sample is tested only for the chemistries required on it – all programmable from the software. No manual switching is required, all changeovers are automatic. Extra samples can be added at any time during a run with no issues or errors. When all required analyses are completed the analyzer will automatically clean itself out and enter standby mode.

The AQ400 is further automated with available limits for QCs, spikes and standard curve. If any of these go outside of the user defined limits, the system knows what the operator expects and can go back and rerun those QC and associated samples for EPA/NELAC compliant results. If the standard curve is outside of the established limit, it can also be automatically rerun or the run stopped for operator intervention, depending on what the lab would prefer.

## **SPECIFICATIONS**

1. **PURPOSE AND SCOPE:** The West Virginia Purchasing Division is soliciting bids on behalf of West Virginia Department of Agriculture, R.E.A.D. to establish a contract for the one-time purchase of a Discrete Analyzer.

**Understood.**

2. **DEFINITIONS:** The terms listed below shall have the meanings assigned to them below. Additional definitions can be found in section 2 of the General Terms and Conditions.

**Understood.**

- 2.1 **“Contract Item”** means a Discrete Analyzer as more fully described by these specifications.

**Understood.**

- 2.2 **“Pricing Page”** means the pages, contained in wvOASIS, or attached as Exhibit A, upon which Vendor should list its proposed price for the Contract Items.

**Understood.**

- 2.3 **“Solicitation”** means the official notice of an opportunity to supply the State with goods or services that is published by the Purchasing Division.

**Understood.**

### **3. GENERAL REQUIREMENTS:**

- 3.1 **Mandatory Contract Item Requirements:** Contract Item must meet or exceed the mandatory requirements listed below.

**Understood and complies.**

#### **3.1.1 Discrete Analyzer**

- 3.1.1.1 Discrete Analyzer must have a minimum of 30 sample positions and a minimum of 20 reagent positions in the racks.

**Complies and exceeds.** The AQ400 has 26 reagent positions. 20 of these positions are cooled by an on-board Peltier cooling system, while the other 6 are stored at ambient temperature. These reagent wedges can hold up to 40 mL of reagent, standard, diluent, or QC solution. Both the 20 and 6 position reagent trays can be removed from the system for storage when the instrument is not in use. The ample reagent positions allow the AQ400 the ability to run samples



with different matrices in the same run, including preserved samples or samples that have been digested for TP, TN, or TKN.

There are two different sample tray options for the AQ400. One option has 80 sample positions, 60 are for 2 mL cups and 20 are for 5 mL cups. The second option has 120 sample positions, 100 are for 1.2 mL cups and 20 are for 2 mL cups. The quoted system comes with two trays, and the lab can select whether they one of each or two of the same type. The sample trays themselves are made of precision cut, stainless steel and the position numbers are laser etched – not stickers like most competing systems. This ensures that the trays will last the lifetime of the instrument. All trays, both reagent and sample, are keyed so that they cannot be loaded incorrectly to eliminate alignment issues. While both reagent racks are loaded during a single run, only one sample tray will be on the instrument at a time. This allows the analyst to prep the next run while the first is in progress.

**3.1.1.2 Discrete Analyzer must have real time monitoring of samples and reagents and be able to run multiple tests in any order. Must have a filter wavelength range of at least 340-880nm.**

**Complies.** Results from the AQ400 are displayed in real-time within AQ Software. The AQ400 can run any of the listed methods in any order with automatic method changeover. No user interaction is required. Each AQ400 Method is stored within AQ Software. This information includes sample volume, reagent information (name, location, volume required, etc.), reaction times, and detector wavelength settings. An analyst simply loads the samples onto the AQ400, selects which methods are to be ran, and starts the run. The methods are selectable per sample, meaning individual tests will run on the selected samples only to save time and minimize operational expenses. Once the run has started the AQ400 will perform an automatic changeover between each method.

**3.1.1.3 Discrete Analyzer must have disposable cuvettes with continuous access to the cuvettes without interrupting test processing. Must be able to apply a minimum of 4 different wavelengths during a run. Must have methods for Ammonia, Nitrate/Nitrite, Orthophosphate, Total phosphate, TKN.**

**Complies.** The AQ400 utilizes disposable cuvettes, which SEAL labels as Reaction Wells, for the reaction to take place in. The instrument has continuous access to more than 200 reaction wells for

continuous runs without interrupting the test processing.

The AQ00 is equipped with 9 different wavelengths, and can run as many as 15 different tests in a single run, including the listed chemistries: Ammonia, Nitrate/Nitrite, Orthophosphate, Total Phosphorus, and TKN.

**3.1.1.4 Discrete Analyzer must be able to prepare working standards and spike samples from a stock solution. Must also have auto start-up, shutdown, and dilution capabilities.**

**Complies.** The AQ400 will generate an auto-calibration with user-defined calibration points. The operator simply needs to enter the top standard concentration into the software and place the solution onto the instrument. By default, the AQ400 will use DI Water to dilute the standard and generate a calibration curve. However, the operator can designate a method specific diluent to matrix match with any preservation or digestion matrix.

The AQ400 will shut itself down following a completed run, and can be ran overnight/unattended. An analyst has to place the samples and reagents on the system, but beyond that the system will automatically start-up, prime and prep itself, monitor motor functionality, and start the run.

Various dilution options are provided. Programmable pre-dilution of samples is available, predefined by the user, and entered in the sample table. Unique dilutions are selectable per sample and per test. The results are calculated and reported as final concentrations.

Additionally, the SEAL AQ400 auto-dilutor will automatically dilute samples that are over range. If a sample that is undiluted or has a prescheduled dilution goes over range for the test, the software will take the raw absorbance of the result, compare it to the absorbance of the top calibration standard, and, if appropriate, schedule an automatic dilution. This auto dilution factor is user selectable. Should the diluted sample still be over range, the AQ400 will automatically dilute again using the square of the first dilution and analyze the diluted sample again. Unlike some competing systems, these dilutions do not require space to be reserved on the sample wheel.

SEAL's AQ Software also includes a 'Smart-Dilution' option. If this is selected, the analyzer will take a look at the absorbance of the sample, and calculate a dilution factor to attempt to place the diluted sample's absorbance in the middle of the calibration range. If the system performs this dilution, and the sample is still out of range, the

instrument will make a second attempt with a larger dilution factor. All dilutions are performed by a 1000 µL syringe for the best possible accuracy, and all instrument dilutions are prepared in a discrete, unused reaction well, automatically, in the same run. Dilutions can be performed by using various predefined matrices, e.g. DI Water, acidified water, or Kjeldahl digestion matrix. Over range samples can be automatically bracketed with QC sets to validate diluted results.

**3.1.1.5 Discrete Analyzer must have the ability to heat cuvettes in the range of 25-60 degrees Celsius for specific methods which require heating. Must have a minimum cuvette pathlength of 10mm. Must have the capability to wash cuvettes and perform any necessary system QC.**

**Complies.** The default setting for reaction incubation is 37 degrees Celsius, but this can be increased if needed. Temperature of the reaction ring is monitored in the software.

All SEAL Analytical Discrete Analyzers (DAs) are designed specifically for the environmental market. SEAL Analytical does not work with, nor does it manufacture, any clinical analyzers.

This is most evident through how the AQ400 physically does the readings. All of SEAL's DAs come standard with a 10mm, optical glass, flow-through cuvette. (Additional path length options are available and addressed below). This is the EPA recommended size for colorimetric analysis. The cuvette does not move, ensuring each sample is read in the same position to maximize reproducibility. There is not a need to worry about the cuvette aligning itself for each reading – the AQ400 moves the liquid, not the cuvette. The cuvette is thoroughly washed between each sample and a blank reading is taken to ensure the cuvette is clean. This is one of the main factors as to why SEAL AQ400 results are so reproducible. The design is based off decades of experience with Segmented Flow Analyzers – and SEAL has found a way to implement it into their Discrete Analyzers. While an optically pure, glass cuvette is more expensive to make, the one on the AQ400 is not a consumable. It will not need to be replaced over the lifetime of the instrument.

Competing systems, based on clinical design, will use individual styrene cuvettes instead of optically pure glass. Each sample is read in a different well, meaning that not only is the system judging the reproducibility of the chemistry, but also of the manufacturing of those individual wells. There is also the factor in the mechanics of moving each well into the light path for the reading. Ensuring that each one lines up exactly the same is challenging.

The software can be programmed to automatically insert controls at a user defined frequency, and any automatic post-run dilutions or manual reschedules will be bracketed with controls to validate results. The AQ400 is further automated with available limits for QCs, spikes and standard curve. If any of these go outside of the user defined limits, the system knows what the operator expects and can go back and rerun those QC and associated samples for EPA/NELAC compliant results. By having a robust QC setup within the software, AQ Software is able to automatically set up re-runs and dilutions based on rules given to it by an analyst. This helps to ensure hold times are hit, and also allows the instrument to stop itself if QCs are not passing to prevent waste of sample and reagent. The system can be set to automatically turn off the lamp and/or the entire system following a completed run to save energy and lamp-life.

The AQ400 and AQ Software allow for both Automatic and Manual Spike preparation. Either option will result in a Spike Recovery calculation. Automatically spiking the sample on the instrument will not only save analyst time, but will use less volume of sample and standard to do so as the sample will not need to be made in a large volume volumetric flask.

For the Automatic Spike the operator loads a stock spike solution onto the AQ400 and programs the desired spike concentration. The AQ400 will then pull two aliquots of the sample. The first one will be ran as a normal, reference sample. The second aliquot will have the required volume of spike solution added before the necessary reagents. Once the absorbance of each sample is read, the software will calculate the Spike Recovery. For the Manual Spike option the operator loads separate reference and pre-spiked samples onto the analyzer and indicates what the theoretical spike concentration should be. The software then runs both samples as normal, reads the absorbance, and calculates the spike recovery. AQ Software can also run a Spike Duplicate calculation. Using a single reference sample, Spike Recovery will be calculated for both the Spike and the Spike Duplicate. Additionally, the %RPD will be calculated.

#### **3.1.1.6 Discrete Analyzer must have the ability to export data to LIMS.**

**Complies and exceeds.** AQ Software is LIMS compatible, and data can be easily imported or exported directly to and from the software. The structure of the import and export files can be customized within AQ Software to match that of the labs LIMS.

AQ Software allows for the import of sample information, including

Sample ID, dilution requirements, and requested tests, from a LIMS or similar source. The import file is typically a .csv, .txt, or .xlsx file, and can be completely customized by the analyst.

AQ Software allows data to be exported in .csv file format. This file is fully customizable by the operator. Data fields can be selected or deselected for exportation, and the column order and column heading text is user-defined.

**3.1.1.7 Discrete Analyzer must have installation and training included.** The system must be fully operational upon receipt. Delivery of the instrument may be outside of the facility and the system must have a minimum warranty of one year on all parts and service.

**Understood and complies.** The AQ400 Discrete Analyzer comes supplied with everything required for complete installation and training. The quoted price includes a 3 day on site training. This will be done by a SEAL staff Technical Support Chemist (TSC) from our Milwaukee, WI factory location. This SEAL chemist will be well qualified to install the AQ400 and AQ software. All SEAL chemists are also part of our tech support, method development and product development team. They are well versed in all aspects of SEAL analyzers and can provide the highest quality and most in depth installation and training available. All method documentation will be delivered via email after order acknowledgement to allow the lab time to read and prepare for the system. Onsite programming of the software will include all listed chemistries.

The standard warranty from SEAL Analytical is 12 months. This is included with the price of the instrument. The warranty is fully explained on the last page of the attached quote.



State of West Virginia  
West Virginia Dept. of Agr.-Moorefield Field Office  
R.E.A.D., 60B Industrial Park Road  
Moorefield, WV 26836

July 28, 2021

Dear Jessica,

Thank you for choosing to investigate the benefits of our **AQ400 Series** Discrete system. Please find enclosed our quotation as requested.

SEAL Analytical have been producing and supporting discrete analyzers for over twenty-five years. The AQ400 series is the latest instrument we offer which brings our experience and expertise to assist your productivity needs for the laboratory. It is designed and built entirely in the USA – at the SEAL headquarters in Milwaukee. Building on the success of the AQ2, with extra capacity, speed and flexibility, the AQ400 is at the forefront of discrete technology.

The advantage of the AQ400 Discrete analyzer is the automation and flexibility. Some of the automation capabilities of the AQ400 include generating a calibration curve from one standard, pre-dilutions and post-dilutions, and automatic scheduling of quality controls.

While it is not essential that you purchase the computer from us, we do recommend that you do. This allows us to ensure you have a computer with sufficient specifications.

We will be in contact with you in the near future. In the meantime, if I can be of any further service please do not hesitate to contact me.

Yours sincerely,  
**On behalf of SEAL Analytical Inc.**

A handwritten signature in black ink, appearing to read "F. Joseph Redovich Jr." with a stylized flourish at the end.

F. Joseph Redovich Jr.  
Technical Sales & Product Manager



Commercial in confidence

**Quote No: JR-210728-JC AQ400 Quote**

**Issue Date: July 28, 2021**

**Price Quotation for**

**Valid Until: January 28, 2022**

State of West Virginia  
West Virginia Dept. of Agr.-Moorefield Field Office  
R.E.A.D., 60B Industrial Park Road  
Moorefield, WV 26836

Email: jessica.s.chambers@wv.gov  
Phone: 304-558-0246

For the attention of Jessica S Chambers



### **AQ400 Automated Multi-Chemistry Discrete Analyzer Package**

- AQ400 Chemistry Unit, 120V/60Hz (for up to 9 filter wavelengths)
- AQ series Operating Software
- Start-up accessories kit to include -
  - 1 Spare Lamp assembly, 1 Spare Probe flusher
  - 1 Pack Reaction segments, 1 Pack Sample cups,
  - 1 Pack Reagent containers
- 2 Sample Trays (80 or 120 position)
- Operation Manual, Software Manual & Method SOP's
- AQ400 Customer Support Manual
- Integrated Cadmium Reduction Hardware for Nitrate analysis (includes 2 cadmium coils)

Package Price	<b>\$ 51,250</b>
<i>Less Government Discount (10%)</i>	<b>- \$ 5,125</b>
Training and Installation package, 3 Days	<b>included</b>
Warranty, 12 month parts & labor	<b>included</b>
Freight and Handling	<b>\$ 800</b>
<b>Discounted OFFER Price</b>	<b>\$ 46,925</b>

<b>Terms and Conditions:</b>
------------------------------

<b>Terms:</b>	Net 30
<b>Delivery:</b>	3-6 weeks after receipt of order
<b>Freight and Handling:</b>	\$800. FOB Destination.
<b>Sales Tax:</b>	Not Included. It will be payable unless you are exempt.



Commercial in confidence

OPTIONS:
----------

1. Hi Spec Computer: includes 24" flat panel monitor and laser printer	\$ 1,600
2. APC Back-UPS Pro 1000VA	\$ 320
3. 3 month AQ400 maintenance kit (to be used months 3-6)	\$ 93
4. 6 month AQ400 maintenance kit (to be used months 6-9)	\$ 730
5. 9 month AQ400 maintenance kit (to be used months 9-12)	\$ 93
6. Extra Cadmium coil	\$ 195
7. Consumable kit (10 bags reaction segments, 4 bags 2ml sample cups, and 25 reagent Wedges) Contains reaction wells for 18,000 tests, 4000 sample cups	\$ 997
8. Annual Service contract including on site PM visit Please see Service contract brochure for details	Basic \$ 4,510 Premium \$ 6,310

**NOTE:**

*The PC may be purchased by your company; however, you must meet our minimum specifications - available on request.*

*SEAL Analytical will not assume responsibility for damage caused to instrument from power outages or power surges in the laboratory.*

**Technical Support Services**

**Technical Support:**

We provide a telephone/email/fax service desk at our Milwaukee facility from 8:00 AM to 5:30 PM as part of our standard service to our customers. All service calls are logged and an in-house Engineer or Chemist will trouble-shoot the problem by telephone. Our statistics show that over 90% of user questions are diagnosed and corrected by telephone and/or email intervention, without a site visit being necessary.

If this does not resolve the problem, a field-based Technical Specialist is assigned to visit the site.

**Response Time / Repair Time:**

Our typical response time for a Specialist to reach a site would be less than 24 working hours. We use state of the art messaging equipment to communicate with field staff before, during, and after each service episode. All support staff are our own employees, and not contract labor, and therefore would be dispatched from the Milwaukee site.



Commercial in confidence

### Technical Support Service Contracts:

A full range of customer support contracts are available. It is our aim to supply a fully-installed system and provide the application, software and engineering back up to ensure the highest performance from your new analytical system.

### Focus Groups:

SEAL actively supports and sponsors Analyzer User Groups, arranging meetings on a regular basis, typically annually. The Company finds this an invaluable means of ensuring continued high levels of customer satisfaction and a useful forum for prioritizing product developments, and to introduce product enhancements.

### AQ400 Automated Multi-Chemistry Discrete Analyzer



The **AQ400 Analyzer** is a **bench top Analyzer** that has been developed to meet the specific need for a modern, automated discrete analyzer in the environmental laboratory.

This analyzer has been developed to address the needs of laboratories that require high levels of **automation**, a wide range of chemistries, limits of detection that ensure **compliance with regulatory requirements** and the advantages of integration with **LIMS** systems. The AQ400 is a flexible system that meets these requirements and can be configured via the industry specific software to meet the operational needs of laboratories with a wide range of analytical and throughput levels.

### Design & Functional Specifications

The design concept of the SEAL Analyzers is to enhance productivity of analytical services in busy laboratories by streamlining the workflow of samples and information through the total analytical process. Extensive experience in environmental laboratories has shown that the key to increasing productivity is the avoidance of multiple types of equipment and analytical procedures. In a laboratory where the routine range of colorimetric determinants requires the use of a range of instruments with restricted test menu, low throughput and multiple calibration/maintenance needs, the workflow involves several processes which are labor intensive, subject to potential error, and costly to operate.

These include:

- The need to produce separate work-lists/load-lists for the different analyzers, with associated test order entry.
- The splitting of samples and maintaining integrity of identity of the sub-aliquots.
- Separate calibration, operation, and quality control regimens on multiple analyzers.
- Collating results from multiple analyzers for final reports, possibly with multiple interfaces to LIMS.

When these elements are rigorously costed, inclusive of personnel time, instrument maintenance costs, space requirements, duplicated consumables, I.T. costs, etc., it becomes clear that the overall cost of analysis per sample is greatly reduced by consolidating the workflow onto a single nutrients system. Thus, the design specification of the SEAL Analyzers was to develop a family of units based on a standard software platform, utilizing the same range of



Commercial in confidence

chemistries, which have the breadth of test menu, speed of throughput, and flexibility to process a workload that would otherwise require a combination of different contemporary analyzers and manual assay techniques.

Equally, it is a requirement that any analyzer selected meets the analytical performance criteria set out by the US EPA and other Standard bodies. Whereas, many contemporary analyzers in this market are required to operate at the extreme edge of their detection capability to meet these limits, the SEAL Analyzers routinely meet these criteria.

Finally, SEAL recognizes that the environment within which our systems operate is subject to change, whether from new technical demands, regulatory affairs, or changing practices of the Water & Environmental Industry. Therefore, we commit continuing resources to system development, including hardware enhancements, applications, software and chemistry methods.

### **Environmental Policy**

SEAL is a manufacturer of high-quality automated analyzers and supplier of reagent systems for use in the Water, Soils and Environmental analysis sectors. The Company is aware that its products do have an impact on the environment in both the production and end-user stages of the product life cycle. The Company is therefore making every effort to determine the environmental impact of its operation and products and, where possible, implement a policy of reduction.

Specifically:

- Design new reagents and analyzers to take account of environmental issues such as waste production, power consumption, and low heat dissipation.
- Reformulate reagent systems to reduce harmful waste without affecting analytical performance.
- Provide full COSHH safety data on all products.
- Recycle, where practical, in-house produced waste.
- Minimize energy consumption within the factory and in the transport provided to employees.

### **Environmental Issues**

- Discrete analysis by definition uses less than 10% of the reagents used by Continuous Flow systems.

### **AQ400 Training**

The AQ400 system and software design has been strongly influenced by listening to SEAL users and regulatory requirements. As a result, the system is easy and intuitive to use. An on-site training course is conducted at installation covering the following aspects of the system:

- Introduction
- Hardware overview
- Principles of operation
- Daily routine
- System software operation, including:
  - Test parameters, Reagent parameters, Standard definition, QC definition, Scheduling, Routine running
  - Acceptance, Data storage routines LIMS interface
- Analyzer routine maintenance
- Troubleshooting/corrective maintenance
- Method Applications



Commercial in confidence

### **Warranty Policy:**

- Subject to the conditions set out below, the Company warrants that the Goods will correspond with their specification at the time of delivery and will be free from defects in material and workmanship for a period of 12 months from the date of the initial use or 15 months from delivery, whichever is the first to expire.
- The above warranty given by the Company subject to the following conditions:
- The Company shall be under no liability in respect of any defect in the Goods arising from any drawings, design or specification supplied by the Buyer;
- The Company shall be under no liability in respect of any defect arising from fair wear and tear, willful damage, negligence, abnormal working conditions, failure to follow the Company's instruction (whether oral or in writing) (including instructions regarding preventative maintenance), misuse or alteration or repair of the Goods without the Company's approval;
- The Company shall be under no liability under the above warranty (or any other warranty, conditions of guarantee) if the total price of the Goods has not been paid by the due date of payment;
- The above warranty does not extend to parts, materials or equipment not manufactured by the Company, in respect of which the Buyer shall only be entitled to the benefit of any such warranty or guarantee as is given by the manufacturer to the Company.
- Any claim by the Buyer which is based on any defect in the quality or condition of the Goods or their failure to correspond with specification shall (whether or not delivery is refused by the Buyer) be notified by the Company within 7 days from the date of delivery (where the defect or failure was not apparent on reasonable inspection) within a reasonable time within discovery of the defect or failure. If delivery is not refused and the Buyer does not notify the Company accordingly, the Buyer shall not be entitled to reject the Goods and the Company shall have no liability for such defects or failure and the Buyer shall be bound to pay the price as if the Goods had been delivered in accordance with the Contract.
- Where any valid claim in respect of any of the Goods which is based on any defect in the quality of condition of the Goods or their failure to meet specification is notified to the Company in accordance with these Conditions, the Company shall be entitled to replace the Goods (or the part in question) free of charge, at the Company's sole discretion, refund to the Buyer the price of the Goods (or a proportionate part of the price), but the Company shall have no further liability to the Buyer.
- Except in respect of the death or personal injury caused by the Company's negligence, the Company shall not be liable to the Buyer by reason of any representation, or any implied warranty, condition or other term, or any duty at common law, or under the express terms of the Contract, for any consequential loss or damage (whether for loss of profit or otherwise), costs expenses or other claims for consequential compensation whatsoever (and whether caused by the negligence of the Company, its employees or agents or otherwise) which arise out of or in connection with the supply of Goods or their use resale by the Buyer except as expressly provided in these Terms.
- The Company shall not be liable to the Buyer or be deemed to be in breach of the Contract by reason of any delay in performing, or any failure to perform, any of the Company's obligations in relation to the Goods, if the delay or failure was due to any cause beyond the Company's reasonable control. Without prejudice to the generality of the foregoing, the following shall be regarded as causes beyond the Company's reasonable control; Act of God, explosion, flood, tempest, fire or accident; war or threat of war, sabotage, insurrection, civil disturbance or requisition, acts, requisition, regulations, bye laws, prohibition or measures of any kind of the part of any Governmental, Local Authority; import or export regulations or embargo's, strike, lock-outs or other industrial actions or trade disputes (whether involving employees of the Company or of a third party); difficulties in obtaining raw materials, labor, fuel, parts or machinery; power failure or breakdown in machinery.



**SEAL**  
Analytical



# AQ400

**DISCRETE ANALYZER FOR  
ENVIRONMENTAL TESTING**



AQ400 is a flexible analyzer that uses the principle of discrete analysis where each test occurs in a separate or discrete reaction vessel.



# AQ400

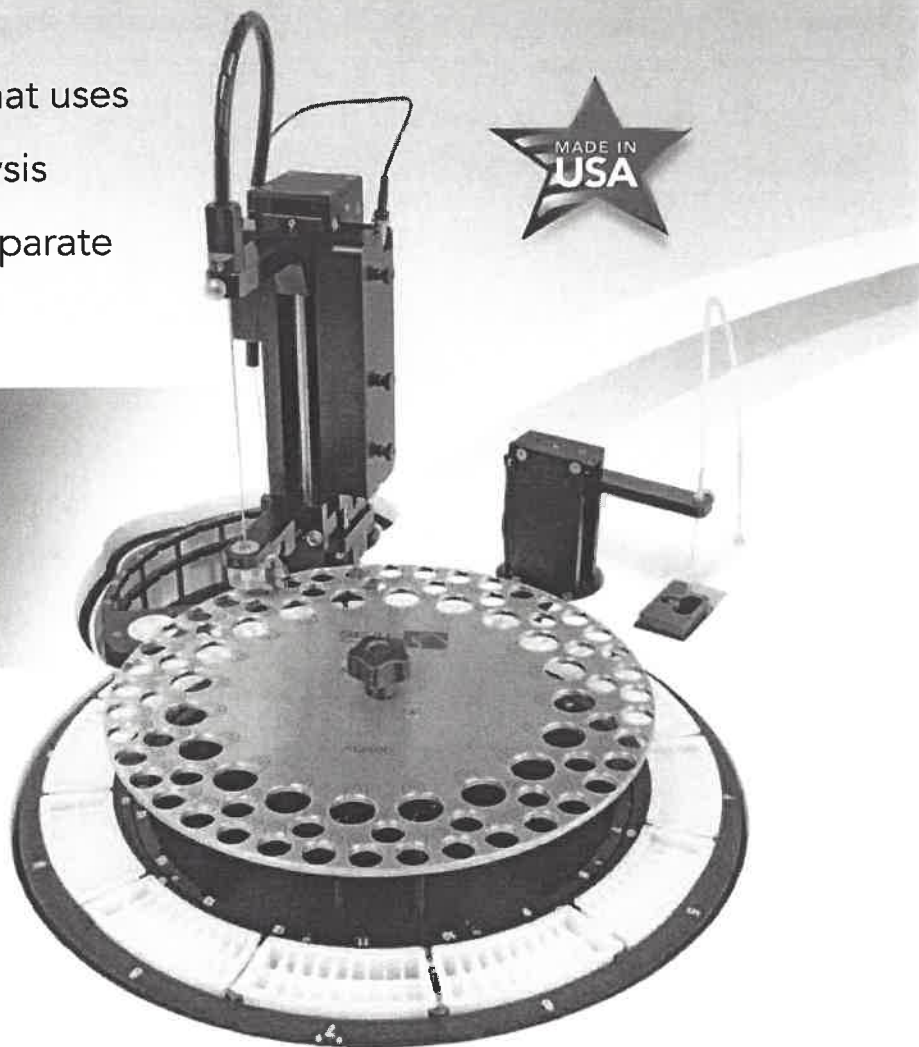
*AQ400 is ideal when many and varied tests are needed on different samples and/or individual results are needed immediately.*

*USEPA, ASTM, ISO and other international regulatory compliant methods are available.*

## METHODS INCLUDE

Alkalinity  
Ammonia  
Chloride  
Cyanides  
Nitrate/Nitrite  
Nitrite  
Phenol  
Phosphate, ortho  
Phosphorus, total  
Silicate  
Sulfate  
Total Kjeldahl Nitrogen

*PLUS MANY MORE*



## HOW DOES THE AQ400 WORK?

The AQ400 robotic sampling arm works in conjunction with a stepper motor-driven syringe that is responsible for aspirating, dispensing and mixing accurate and precise quantities of sample and reagent in miniaturized test tubes called reaction wells.

The sample and reagent mixture are incubated in heated reaction wells until the reaction is complete. A single aliquot is then transferred into a 10 mm path length optical glass cuvette where the absorbance is read. Each sample is read in the same cuvette, in the same position in front of the detector. This is similar to SEAL colorimetric flow systems, known for their high reproducibility and lowest detection limits. The flow through cuvette eliminates the issue of reaction well variability and scratching found in direct read discrete systems. In the SEAL AQ series, liquid is moved not the cuvette – fewer moving parts equal higher stability and reliability of the system.

Once the absorbance is read, the glass cuvette is thoroughly cleaned and checked, ensuring no carryover or cross contamination.

► **As a market leader**, SEAL has over 1,000 applications available and under continual development. Markets include water, wastewater, soil, plant, fertilizer, food and beverage. Please contact us for your specific application.

# AQ400 – The latest in discrete analyzer technology

*Designed specifically for the environmental market*

## ADVANTAGES AND BENEFITS



- ~ 100% optical glass stop-flow cuvette
- ~ 10 mm optimum path length
- ~ Longer path lengths available



- ~ Low cost, disposable wells used for each discrete reaction
- ~ Constant heating and programmable reaction time ensure reaction reaches completion
- ~ Automatic reagent level sensing verifies sufficient reagent volume



- ~ Optional integrated cadmium coil reduction for nitrate/nitrite determination
- ~ Cadmium coil is sealed and valve controlled
- ~ In situ coil regeneration is fully automated



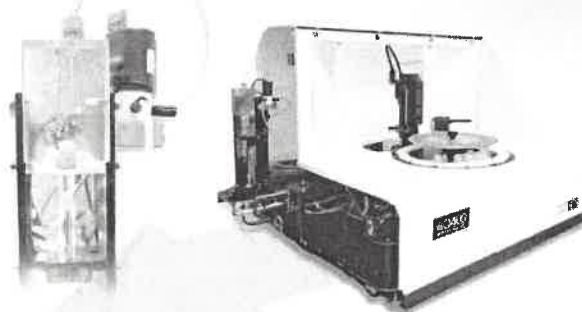
- ~ Unique probe washer for cleaning sample probe between sample and reagent
- ~ Eliminates cross contamination
- ~ Ideal for wastewater



- ~ Highly flexible software designed with user input
- ~ QCPro™ Data Quality System – allows the user to specify QC types, limits and corrective actions

- ▶ **True unattended operation – including ability to run overnight**
- ▶ **Automated standard preparation and dilution of over range samples**
- ▶ **Tests programmable per sample to reduce analysis time**
- ▶ **Add samples after a run has started**
- ▶ **Total volume per test only 500 – 600 µL**
- ▶ **Different size sample trays are available to accommodate different workloads**
- ▶ **Segregated chemical waste and wash minimizes waste disposal**
- ▶ **LIMS compatible – export in .csv format**

### **SIMPLE USER MAINTENANCE**



**The AQ400 can be used as a standalone spectrophotometer.**

*The optional vial adaptor can accept vials of different sizes for reading tests such as COD.*

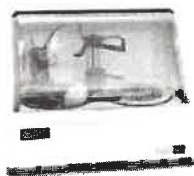


**[www.seal-analytical.com](http://www.seal-analytical.com)**

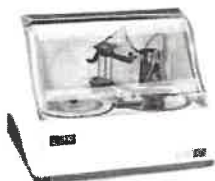


## Colorimetric Nutrient Analyzers

### DISCRETE ANALYZERS



**AQ270**



**AQ300**



**AQ400**

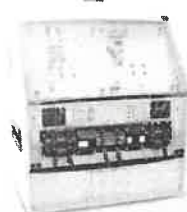
### SEGMENTED FLOW ANALYZERS



**AA100**



**AA500**



**QuAAtro39**

## 50 Years' Experience in Environmental Analysis Built into Every Analyzer

50 years' experience in designing, developing and manufacturing automated wet chemistry analyzers specifically for very low detection levels in environmental applications has helped SEAL to apply the most useful, easy to use features into the SEAL range of Discrete and Segmented Flow analyzers. The SEAL analyzers are widely acknowledged as the best for environmental analysis, giving you everything you need to achieve equal or superior results to the manual and approved laboratory methods the SEAL analyzer replaces.

## Digestion Systems

FOR METALS AND TKN,  
TP DIGESTION



**BD50**



**SmartBlock II**



**DEENA 3**



[www.seal-analytical.com](http://www.seal-analytical.com)

SEAL Analytical is a global company with offices worldwide - contact us at:

SEAL Analytical, Inc.  
6501 West Donges Bay Road  
Mequon, WI 53092  
United States  
Tel: +1 (262) 241 7900  
Fax: +1 (262) 241 7970  
sales@seal-us.com

SEAL Analytical Ltd.  
3 Talisman Business Centre  
Duncan Road  
Park Gate  
Southampton, SO31 7GA  
United Kingdom  
Tel: +44 (0) 1489 864 400  
sales.uk@seal-analytical.com

SEAL Analytical Netherlands  
ROHASYS BV  
Provincienbaan 4  
5121 DL Rijen  
The Netherlands  
Tel: +31 161 240152  
Fax: +31 161 240153  
info@rohasys.com

SEAL Analytical GmbH  
Werkstrasse 5  
D-22844 Norderstedt  
Germany  
Tel: +49 (0)40 60 9292 9-00  
Fax: +49 (0)40 60 9292 9-02  
info.germany@seal-analytical.com

SEAL Analytical Shanghai  
Room 413, 12th Building,  
No. 128 Xiangyin Road,  
Shanghai, 200433  
China  
Tel: +86 21 3362 5002  
Fax: +86 21 3362 5002

SEAL Analyzers are monitoring environmental samples in every corner of the globe. They are manufactured in the USA, Germany and the Netherlands. Engineering and chemistry support is provided from SEAL global facilities in USA, Germany, England, the Netherlands and China along with a worldwide network of specialist distributors.

## COMPREHENSIVE SUPPORT

We offer comprehensive applications, technical service and software support.

### INCLUDING

- ▶ A choice of preventative maintenance and service contracts to meet your specific requirements
- ▶ In-house and online training
- ▶ Guaranteed availability of genuine consumables and spare parts
- ▶ Adaptation of methods to specific requirements such as matrix, range or detection limit
- ▶ Continuous in-house development of software to incorporate new customer requested features

## Robotic Handling Systems

SEAL Robotic MiniLab systems for automating sample pretreatment in the laboratory — improving your sample handling efficiency. Typical applications include BOD, pH, COD, Alkalinity, and conductivity measurements with options such as decapping/capping, sample splitting, and filtration. Call us about your laboratory needs and we will design a robot to suit you.



**SEAL MiniLab**



# ENVIRONMENTAL METHODS LIST – USEPA

Method Detection Limits are calculated using USEPA procedure 40 CFR, Part 136, Appendix B

00/ANALYTE	METHOD DESCRIPTION	SEAL METHOD	MDL	Range	EQUIVALENCE
ALKALINITY	Buffered methyl orange color reduction	EPA-100-A	6.5 mg CaCO <sub>3</sub> /L	10 – 100 mg CaCO <sub>3</sub> /L	EPA 310.2 (1974)
		EPA-101-A	8.0 mg CaCO <sub>3</sub> /L	15 – 200 mg CaCO <sub>3</sub> /L	
		EPA-102-A	16 mg CaCO <sub>3</sub> /L	50 – 500 mg CaCO <sub>3</sub> /L	
AMMONIA	Alkaline phenate method with hypochlorite and sodium nitroprusside (indophenol blue)	EPA-103-A	0.004 mg N/L	0.02 – 2.0 mg N/L	EPA 350.1, version 2 (1993) Std. Methods 4500-NH <sub>3</sub> G (19 <sup>th</sup> , 20 <sup>th</sup> )
		EPA-129-C	0.04 mg N/L	0.2 – 10 mg N/L	
AMMONIA	Alkaline phenate method with hypochlorite and sodium nitroprusside (indophenol blue). This is a brackish method.	EPA-104-A	0.07 mg N/L	0.2 – 5.0 mg N/L	EPA 350.1, version 2 (1993) Std. Methods 4500-NH <sub>3</sub> G (19 <sup>th</sup> , 20 <sup>th</sup> )
		EPA-148-C	0.002 mg N/L	0.02 – 1.0 mg N/L	
AMMONIA	Alkaline salicylate method with hypochlorite and sodium nitroprusside	EPA-150-C	0.005 mg N/L	0.1 – 5.0 mg N/L	EPA 350.1, version 2 (1993) Std. Methods 4500-NH <sub>3</sub> G (19 <sup>th</sup> , 20 <sup>th</sup> )
		EPA-153-C	0.011 mg N/L	0.2 – 10 mg N/L	
		EPA-105-C	0.3 mg Cl/L	2.0 – 100 mg Cl/L	
CHLORIDE	Mercuric thiocyanate reaction in the presence of ferric nitrate	EPA-124-C	0.4 mg Cl/L	5.0 – 200 mg Cl/L	Std. Methods 4500-Cl <sup>-</sup> E (18 <sup>th</sup> , 19 <sup>th</sup> , 20 <sup>th</sup> )
		EPA-108-C	0.0005 mg/L	0.003 – 0.5 mg Cr(VI)/L	
CHROMIUM, Hexavalent	Hexavalent chromium reaction with diphenylcarbazide	EPA-109-A	0.011 mg/L	0.3 – 5.0 mg Cr(VI)/L	Std. Methods 4500-Cr B (20 <sup>th</sup> )
		EPA-140-A	2 Color Units	5 – 150 Color Units	
COLOR	Platinum-cobalt standard comparison (480 nm)	EPA-147-A	2 Color Units	2 – 150 Color Units	Std. Methods 2120 B (18 <sup>th</sup> , 19 <sup>th</sup> , 20 <sup>th</sup> )
COLOR	Platinum-cobalt standard comparison (450nm)				Std. Methods 2120 B (18 <sup>th</sup> , 19 <sup>th</sup> , 20 <sup>th</sup> ) Std. Methods 2120 C (21 <sup>st</sup> ed).
CYANIDE	Chloramine-T with pyridine barbituric acid color reaction (Manual distillation required)	EPA-130-C	0.7 µg CN/L	2.0 – 250 µg CN/L	EPA 335.4, version 1 (1993) Std. Methods 4500-CN E (18 <sup>th</sup> , 19 <sup>th</sup> , 20 <sup>th</sup> )
		EPA-133-A	0.4 µg CN/L	2.0 – 300 µg CN/L	
CYANIDE	Amenable to chlorination (Without distillation)				Std. Methods 4500-CN H (20 <sup>th</sup> )

Copyright © 2020 SEAL Analytical  
Reproduction or distribution of this document is expressly forbidden without written permission from SEAL Analytical





## ENVIRONMENTAL METHODS LIST – USEPA

Method Detection Limits are calculated using USEPA procedure 40 CFR, Part 136, Appendix B

00ANALYTE	METHOD DESCRIPTION	SEAL METHOD	MDL	Range	EQUIVALENCE
<b>HARDNESS, Total</b>	Calmagite indicator reaction	EPA-106-C	10 mg CaCO <sub>3</sub> /L	25 – 400 mg CaCO <sub>3</sub> /L	EPA 130.1 (1971)
<b>NITROGEN, Total Kjeldahl (TKN)</b>	Kjeldahl digests (Hg catalyst) are reacted with alkaline salicylate in the presence of hypochlorite and sodium nitroprusside (Digestion required)	EPA-125-A	0.03 mg N/L	0.1 – 4.0 mg N/L	EPA 351.2, version 2 (1993)
		EPA-110-A	0.2 mg N/L	0.5 – 24 mg N/L	
	Kjeldahl digests (Cu catalyst) are reacted with alkaline salicylate in the presence of hypochlorite and sodium nitroprusside (Digestion required)	EPA-111-A	0.07 mg N/L	0.2 – 4.0 mg N/L	
<b>NITROGEN, Total Kjeldahl (TKN)</b>		EPA-136-A	0.12 mg N/L	0.5 – 25 mg N/L	EPA 351.2, version 2 (1993)
		EPA-127-C	0.003 mg N/L	0.012 – 2.0 mg N/L	
<b>NITRATE + NITRITE</b>	Cadmium coil reduction followed by sulfanilamide reaction in the presence of N-(1-naphthylethylenediamine) dihydrochloride	EPA-126-C	0.007 mg N/L	0.04 – 5.0 mg N/L	EPA 353.2, version 2 (1993) Std. Methods 4500-NO <sub>3</sub> -F (18 <sup>th</sup> , 19 <sup>th</sup> , 20 <sup>th</sup> )
		EPA-114-A	0.03 mg N/L	0.25 – 15 mg N/L	
	Nitrate is chemically reduced to nitrite by alkaline hydrazine sulfate, in the presence of copper(II).	EPA-141-A	0.005 mg N/L	0.02 – 1.5 mg N/L	
<b>NITRATE + NITRITE</b>		EPA-142-A	0.03 mg N/L	0.2 – 5.0 mg N/L	EPA 353.1(1978) Std. Methods 4500-NO <sub>3</sub> -H (18 <sup>th</sup> , 19 <sup>th</sup> , 20 <sup>th</sup> )
	Cadmium coil reduction followed by sulfanilamide reaction in the presence of N-(1-naphthylethylenediamine) dihydrochloride (imidazole buffer used)	EPA-132-A	0.004 mg N/L	0.012 – 2.0 mg N/L	
<b>NITRATE + NITRITE</b>					N/A
	Vanadium(III) chloride reduction followed by sulfanilamide reaction in the presence of N-(1-naphthylethylenediamine) dihydrochloride	EPA-160-A	0.004 mg N/L	0.025 – 1.0 mg N/L	
<b>NITRATE + NITRITE</b>					40 CFR, Part 136.3
<b>NITRITE</b>	Sulfanilamide reaction in the presence of N-(1-naphthylethylenediamine) dihydrochloride	EPA-115-C	0.0008 mg N/L	0.015 – 1.5 mg N/L	EPA 353.2, version 2 (1993) Std. Methods 4500-NO <sub>3</sub> -F (18 <sup>th</sup> , 19 <sup>th</sup> , 20 <sup>th</sup> )
		EPA-137-A	0.0001 mg N/L	0.0009 – 0.2 mg N/L	
<b>NITRITE</b>					Std. Methods 4500-NO <sub>2</sub> -B (18 <sup>th</sup> , 19 <sup>th</sup> , 20 <sup>th</sup> )
	Sulfanilamide reaction in the presence of N-(1-naphthylethylenediamine) dihydrochloride (no buffer used)	EPA-116-C	0.0002 mg N/L	0.001 – 0.2 mg N/L	
		EPA-112-C	0.0005 mg N/L	0.015 – 1.5 mg N/L	

Copyright © 2020 SEAL Analytical

Reproduction or distribution of this document is expressly forbidden without written permission from SEAL Analytical



## ENVIRONMENTAL METHODS LIST – USEPA

Method Detection Limits are calculated using USEPA procedure 40 CFR, Part 136, Appendix B

00ANALYTE	METHOD DESCRIPTION	SEAL METHOD	MDL	Range	EQUIVALENCE
<b>PHENOLICS</b>	Sample distillates are reacted with alkaline ferricyanide and 4-aminoantipyrine (Manual distillation required)	EPA-117-C	0.002 mg Phenol/L	0.005 – 0.25 mg Phenol/L	EPA 420.4, version 1 (1993)
<b>PHOSPHATE, Ortho</b>	Acidic molybdate/antimony with ascorbic acid reduction (phosphomolybdenum blue)	EPA-156-C	0.0004 mg P/L	0.003 – 0.2 mg P/L	EPA 365.1, version 2 (1993) Std. Methods 4500-P F (18 <sup>th</sup> , 19 <sup>th</sup> , 20 <sup>th</sup> )
		EPA-118-C	0.0015 mg P/L	0.005 – 1.0 mg P/L	
		EPA-145-C	0.005 mg P/L	0.05 – 5 mg P/L	
		EPA-146-A	0.013 mg P/L	0.125 – 12.5 mg P/L	
		EPA-119-A	0.003 mg P/L	0.01 – 1.0 mg P/L	
<b>PHOSPHORUS, Total (TP)</b>	Acidic molybdate/antimony with ascorbic acid reduction (Manual persulfate digestion required)	EPA-134-A	0.006 mg P/L	0.05 – 5.0 mg P/L	EPA 365.1, version 2 (1993) Std. Methods 4500-P B, F (18 <sup>th</sup> , 19 <sup>th</sup> , 20 <sup>th</sup> )
<b>PHOSPHORUS, Total Kjeldahl (TKP)</b>	Kjeldahl digests (Hg catalyst) are reacted with acidic molybdate/antimony with ascorbic acid reduction	EPA-120-A	0.007 mg P/L	0.04 – 3.2 mg P/L	EPA 365.4 (1983)
<b>PHOSPHORUS, Total Kjeldahl (TKP)</b>	Kjeldahl digests (Cu catalyst) are reacted with acidic molybdate/antimony with ascorbic acid reduction. Method range depends on digestion protocol	EPA-135-A	0.009 mg P/L	0.04 – 3.2 mg P/L	N/A
<b>SILICA (Reactive silica)</b>	Acidic molybdate, no reduction (molybdo-silicic acid)	EPA-121-A	0.1 mg silica/L	0.25 – 25 mg silica/L	Std. Methods 4500-SiO <sub>2</sub> C (20 <sup>th</sup> )
<b>SILICA (Reactive silica)</b>	Acidic molybdate with ANSA reduction (silico-molybdenum blue)	EPA-122-C	0.0042 mg silica/L	0.1 – 10.0 mg silica/L	Std. Methods 4500-SiO <sub>2</sub> D (20 <sup>th</sup> )
<b>SULFATE</b>	Barium chloride turbidimetric method	EPA-123-A	1.0 mg/L	5.0 – 40 mg/L	ASTM D516-90, 02
<b>SULFATE</b>	Barium chloride turbidimetric method with use of gelatin as suspension agent	EPA-165-A	0.09 mg/L	5.0 – 40 mg/L	ASTM D516-11

Copyright © 2020 SEAL Analytical

Reproduction or distribution of this document is expressly forbidden without written permission from SEAL Analytical



## SEAWATER METHODS LIST

Method Detection Limits are calculated using USEPA procedure 40 CFR, Part 136, Appendix B

ANALYTE	METHOD DESCRIPTION	SEAL METHOD	MDL	RANGE	EQUIVALENCE
PHOSPHATE, Ortho	Acidic molybdate/antimony with ascorbic acid reduction (phosphomolybdenum blue)	SEA-156-C	0.015 $\mu\text{M}$ (0.46 $\mu\text{g P/L}$ )	0.1 – 7.0 $\mu\text{M}$ (3.1 – 217 $\mu\text{g P/L}$ )	EPA 365.1, version 2 (1993) Std. Methods 4500-P F (18 <sup>th</sup> , 19 <sup>th</sup> , 20 <sup>th</sup> )
SILICA (Reactive silica)	Acidic molybdate with ANSA reduction (silicomolybdenum blue)	SEA-122-C	0.011 mg silica/L	0.1 – 10.0 mg silica/L	Std. Methods 4500-SiO <sub>2</sub> D (20 <sup>th</sup> )

Copyright © 2020 SEAL Analytical

Reproduction or distribution of this document is expressly forbidden without written permission from SEAL Analytical



## AGRICULTURE METHODS LIST

Method Detection Limits are calculated using USEPA procedure 40 CFR, Part 136, Appendix B

ANALYTE	METHOD DESCRIPTION	EXTRACT	SEAL METHOD	MDL	RANGE
<b>AMMONIA</b>	Alkaline phenate method with hypochlorite and sodium nitroprusside (indophenol blue)	2 M KCl	AGR-210-C	0.021 mg N/L	0.2 – 10 mg N/L
<b>NITRATE + NITRITE</b>	Cadmium coil reduction followed by sulfanilamide reaction in the presence of N-(1-naphthyl)ethylenediamine dihydrochloride	2 M KCl	AGR-231-A AGR-232-C	0.015 mg N/L 0.022 mg N/L	0.06 – 5.0 mg N/L 0.2 – 10 mg N/L
<b>NITRATE + NITRITE</b>	Cadmium coil reduction followed by sulfanilamide reaction in the presence of N-(1-naphthyl)ethylenediamine dihydrochloride	2 M KCl	AGR-231-A	0.015 mg N/L	0.06 – 5.0 mg N/L
<b>PHOSPHATE, Ortho</b>	Acidic molybdate/antimony with ascorbic acid reduction (phosphomolybdenum blue) for o-phosphate	Bray's P1 or P2, or similar extract	AGR-201-A	0.015 mg P/L	0.05 – 5.0 mg P/L
<b>PHOSPHATE, Ortho</b>	Acidic molybdate/antimony with ascorbic acid reduction (phosphomolybdenum blue) for o-phosphate	Modified Morgan's or similar acetate/acetic acid extract	AGR-202-A	0.01 mg P/L	0.2 – 8.0 mg P/L
<b>PHOSPHATE, Ortho</b>	Acidic molybdate/antimony with ascorbic acid reduction (phosphomolybdenum blue) for o-phosphate	Olsen 0.5 M sodium bicarbonate extract	AGR-203-A	0.01 mg P/L	0.1 – 5.0 mg P/L
<b>PHOSPHATE, Ortho</b>	Acidic molybdate/antimony with ascorbic acid reduction (phosphomolybdenum blue) for o-phosphate	2 M KCl	AGR-204-A	0.04 mg P/L	0.1 – 5.0 mg P/L
<b>SULFATE</b>	Barium chloride turbidimetric method	KH <sub>2</sub> PO <sub>4</sub> , or similar extraction	AGR-290-A Rev 1	0.75 mg SO <sub>4</sub> /L	5.0 – 40 mg SO <sub>4</sub> /L



SEAL Analytical is continually developing methods. Please note that others may exist.  
If you do not see your chosen method on this list, please consult your SEAL Analytical Technical Support Team at:

SEAL Analytical Ltd. 3 Talisman Business Centre Duncun Road Park Gate Southampton SO31 7GA United Kingdom Tel: +44 0 1489 864400	SEAL Analytical, Inc 6501 West Donges Bay Road Mequon, WI 53092 United States Tel: +1 262 241 7900 Fax: +1 262 241 7970	SEAL Analytical Netherlands ROHASYS BV Provinciebaan 4 5121 DL Rijen The Netherlands Tel: +31 161 240152 Fax: +31 161 240153	SEAL Analytical GmbH Werksstrasse 5 22844 Norderstedt Germany Tel: +49 40 609 29 29 20 Fax: +49 40 609 29 29 02	SEAL Analytical Shanghai Fortune International Plaza Silver Building, Room 614 No. 43, Guo Quan Road Shanghai 200433 Tel: +86 21 3362 5002 Fax: +86 21 3362 5002
--	--	--	--	--

Copyright © 2020 SEAL Analytical  
Reproduction or distribution of this document is expressly forbidden without written permission from SEAL Analytical