



# TA Instruments - Waters L.L.C.

Facsimile

Date: 11/15/2018

To: Crystal Rink

Company: West Virginia DOT

Phone: (304) 558-2402

Fax: (304) 558-3970

From: Tony Williams

Company: TA Instruments

Phone: (302) 562-1608

Fax: (302) 427-4001

No. of Pages: 18

Subject: Solicitation CRFG-0803-DOT 1900000035-3

Bid Response Dynamic Shear Rheometer

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\_\_\_\_\_  
\_\_\_\_\_

RECEIVED  
2018 NOV 15 AM 9:43  
WV PURCHASING  
DIVISION

**ADDENDUM ACKNOWLEDGEMENT FORM**  
**SOLICITATION NO.: DOT1900000035**

**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 checked="" 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.

TA Instruments  
Company

  
Authorized Signature

11/14/2018  
Date

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

|  |  |  |
|--|--|--|
|  | Purchasing Division<br>2019 Washington Street East<br>Post Office Box 50130<br>Charleston, WV 25305-0130 | State of West Virginia<br>Request for Quotation<br>19 - Highways |
|--|--|--|

| <b>Proc Folder:</b> 505542<br><b>Doc Description:</b> ADDENDUM 2 DYNAMIC SHEAR RHEOMETERS (7719001)<br><b>Proc Type:</b> Central Purchase Order |                        |                         |         |
|---|------------------------|-------------------------|---------|
| Date Issued   | Solicitation Closes    | Solicitation No         | Version |
| 2018-11-07  | 2018-11-15<br>13:30:00 | CRFQ 0803 DOT1900000035 | 3       |

|  |  |  |  |
|--|--|--|--|
| <b>BID RECEIVING LOCATION</b><br>BID CLERK<br>DEPARTMENT OF ADMINISTRATION<br>PURCHASING DIVISION<br>2019 WASHINGTON ST E<br>CHARLESTON WV 25305<br>US |  |  |  |
|--|--|--|--|

|   |  |
|---|--|
| <b>VENDOR</b><br>Vendor Name, Address and Telephone Number:<br><i>TA Instruments</i><br><i>159 Lukens Dr</i><br><i>New Castle DE 19720</i><br><i>(302) 427-4000</i> |  |
|---|--|

|   |
|---|
| <b>FOR INFORMATION CONTACT THE BUYER</b><br>Crystal Rink<br>(304) 558-2402<br>crystal.g.rink@wv.gov |
|---|


|  |                        |
|--|------------------------|
| Signature X  FEIN # | DATE <i>11/14/2018</i> |
|--|------------------------|

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

**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.

Tony Williams Territory Representative  
 (Name, Title)  
Tony Williams  
 (Printed Name and Title)  
159 Lukens Drive New Castle DE 19720  
 (Address)  
(302) 427-4000 /  
 (Phone Number) / (Fax Number)  
twilliams@tastruments.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.

TA Instruments  
 (Company)  
 Territory Representative  
 (Authorized Signature) (Representative Name, Title)  
Tony Williams Territory Representative  
 (Printed Name and Title of Authorized Representative)  
11/14/2018  
 (Date)  
(302) 427-7054  
 (Phone Number) (Fax Number)

**ADDENDUM ACKNOWLEDGEMENT FORM**  
**SOLICITATION NO.: CRFQ DOT1930000035**

**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.**

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*(Check the box next to each addendum received)*

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| <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.**

TA Instruments  
Company

[Signature]  
Authorized Signature


11/14/2018  
Date

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

Exhibit A Pricing Page

CRFQ DOT1900000035

| Item Number | Quantity | Unit of Measure | Description              | Total Bid Amount |
|-------------|----------|-----------------|--------------------------|------------------|
| 1           | 1        | Each            | Dynamic Shear Rheometers | \$ 37,156,50     |

| Vendor Information |   |
|--------------------|---|
| Contact Person:    | Tony Williams   |
| Address:           | 159 Lukens Dr<br>New Castle DE 19720  |
| Phone:             | (302) 427 7054 ; (302) 562 1608   |
| Email:             | twilliams@tastruments.com   |
| Fax:               |   |
| Signature:         |  |



Quote # QUO-10379-D6P1X9

Quote Date : 11/14/2018

Valid Until : 12/05/2018

**This Quote Was Prepared For :**

Crystal Rink  
West Virginia DOT  
Contract Admin Div Mats  
312 Michigan Ave  
Charleston, West Virginia 25311-2299  
Phone: (304) 558-2402  
Email: crystal.g.rink@wv.gov

**This Quote Was Prepared By :**

Name: Tony Williams, Sr. Technical Representative  
Phone: 302-427-7054  
Email: TWilliams@tainstruments.com

2018 END OF YEAR OFFER  
PO RECEIVED BY DECEMBER 5TH 2018 GET 3 YEAR WARRANTY FOR FREE  
~\$10K VALUE

|                           |           |
|---------------------------|-----------|
| Extended List Price Total | \$127,300 |
| Discount Total            | \$0       |
| Total Amount              | \$127,300 |

*All prices are offered in US Dollar*

**Dynamic Shear Rheometer**

|     |                              |  |                     |                    |
|-----|------------------------------|--|---------------------|--------------------|
| 1.1 | <b>Part #:</b><br>533001.901 | <b>HR-1 Discovery Hybrid Rheometer</b> | <b>Unit Price :</b> | <b>\$55,900.00</b> |
|     |                              |  | <b>Qty:</b>         | <b>1.00</b>        |
|     |                              |  | <b>Discount :</b>   | <b>\$30,745.00</b> |
|     |                              |  | <b>Ext Price :</b>  | <b>\$25,155.00</b> |

HR-1 Discovery Hybrid Rheometer: New Discovery Hybrid Rheometer represents the latest technological breakthroughs from the world's leader in rheology. It combines a patented drag cup motor, a second generation magnetic bearing, force rebalance transducer technology (FRT), and True Position Sensor (TPS) into a single-head Hybrid rheometer. The HR-1 model offers a torque range of 10 nN.m to 150 mN.m, ultra-high resolution of 10 nanoradians, high angular velocity to 300rad/s, and normal force up to 50N. It includes popular patented Smart Swap (r) geometries, a wide range of Smart Swap(r) temperature systems and options, and new TRIOS Software for performing Flow, Step Transient (Creep and Stress Relaxation), and Oscillation experiments. TRIOS comes standard with a comprehensive data analysis package that includes curve fitting, user defined models, TTS, and viscoelastic transformations.

|     |                              |   |                     |                    |
|-----|------------------------------|---|---------------------|--------------------|
| 1.2 | <b>Part #:</b><br>533213.901 | <b>Dry Asphalt System for DHR &amp; AR-G2</b> | <b>Unit Price :</b> | <b>\$12,500.00</b> |
|     |                              |   | <b>Qty:</b>         | <b>1.00</b>        |
|     |                              |   | <b>Discount :</b>   | <b>\$6,875.00</b>  |
|     |                              |   | <b>Ext Price :</b>  | <b>\$5,625.00</b>  |

Dry Asphalt System for DHR & AR-G2: The DHR & AR-G2 Dry Asphalt Environmental system is a Smart Swap option. It includes an actively heated and cooled upper parallel plate, and a lower stepped Peltier Plate. The maximum use temperature of the upper heating system is 150 °C. Lower temperature limit depends on cooling option (purchased separately). Unique patent pending design provides zero heat flow calibration for matched upper and lower plate temperatures during experiments. System includes upper heater, stepped Peltier, upper Smart Swap geometry shaft, two 25 mm and two 8 mm stainless steel parallel plates, a trimming tool, a set of asphalt sample molds, and environmental cover. For AR-Series instruments, add DHR to AR Quick-Connect Plumbing Adapter (P/N: 533230.901).

|     |                              |   |                     |                   |
|-----|------------------------------|---|---------------------|-------------------|
| 1.3 | <b>Part #:</b><br>4Q4500.901 | <b>Peltier Circulator TCube Edge Model 5A,<br/>Rheometer Fittings</b> | <b>Unit Price :</b> | <b>\$4,500.00</b> |
|     |                              |   | <b>Qty:</b>         | <b>1.00</b>       |
|     |                              |   | <b>Discount :</b>   | <b>\$2,475.00</b> |
|     |                              |   | <b>Ext Price :</b>  | <b>\$2,025.00</b> |

Peltier Circulator Thermocube TCube Edge Model 5A, Rheometer Fittings (115/230VAC, 50/60Hz). Includes fittings, circulation fluid, and tubing for use with DHR, AR and ARES-G2 Peltier Plate and Peltier Concentric Cylinder systems, and for use with DHR/AR UHP system along with Combined Manifold (P/N554104.901). Temperature ranges as follows: DHR/AR Peltier Plate -30 to 200°C; DHR/AR Peltier Concentric Cylinders Jacket -10 to 150°C; DHR/AR Peltier Plate with UHP 3 to 150°C; ARES-G2 Peltier Plate -30 to 170°C; ARES-G2 APS -10 to 150°C.

|     |                              |  |                     |                   |
|-----|------------------------------|--|---------------------|-------------------|
| 1.4 | <b>Part #:</b><br>554104.901 | <b>DHR &amp; AR-Series Combined UHP and Peltier<br/>Manifold</b> | <b>Unit Price :</b> | <b>\$2,320.00</b> |
|     |                              |  | <b>Qty:</b>         | <b>1.00</b>       |
|     |                              |  | <b>Discount :</b>   | <b>\$1,276.00</b> |
|     |                              |  | <b>Ext Price :</b>  | <b>\$1,044.00</b> |



DHR & AR-Series Combined UHP and Peltier Plate Manifold: Mounts directly to DHR or AR Rheometer frame and allows a single chilling circulator to provide heat sink to Peltier plate while simultaneously supplying cooling liquid to Upper Heated Plate UHP Temperature System. Manifold for use over the temperature range of 5 °C to 90 °C and is ideal for routine asphalt binder testing. NOTE: Requires chilling circulator with water circulation fluid controlled at 2 °C.

|     |                           |  |              |            |
|-----|---------------------------|--|--------------|------------|
| 1.5 | Part #:<br><br>554024.901 | DHR & AR-Series Automated Asphalt<br>Temperature Calibration Kit | Unit Price : | \$1,460.00 |
|     |                           |  | Qty:         | 1.00       |
|     |                           |  | Discount :   | \$803.00   |
|     |                           |  | Ext Price :  | \$657.00   |

DHR & AR-Series Automated Asphalt Temperature Calibration Kit: includes an Ohm meter for use with the NIST traceable Cannon DSR Temperature Probe. A calibration wizard in Rheology Advantage Software (5.7) fully automates rheometer temperature calibration. Note: Requires PC with USB port and Rheology Advantage Software Version 5.7 and customer supplied temperature probe (available from Cannon Instruments Co, P/N: 9728-v95).

|     |                           |                                     |              |            |
|-----|---------------------------|-------------------------------------|--------------|------------|
| 1.6 | Part #:<br><br>250000.001 | DHR & AR Rheometer Filter/Regulator | Unit Price : | \$1,410.00 |
|     |                           |                                     | Qty:         | 1.00       |
|     |                           |                                     | Discount :   | \$775.50   |
|     |                           |                                     | Ext Price :  | \$634.50   |

DHR & AR Rheometer Filter/Regulator

|     |                           |                               |              |          |
|-----|---------------------------|-------------------------------|--------------|----------|
| 1.7 | Part #:<br><br>201260.001 | DSR TEMPERATURE PROBE 0°-80°C | Unit Price : | \$820.00 |
|     |                           |                               | Qty:         | 1.00     |
|     |                           |                               | Discount :   | \$451.00 |
|     |                           |                               | Ext Price :  | \$369.00 |

DSR TEMPERATURE PROBE 0°-80°C

|     |                           |   |              |            |
|-----|---------------------------|---|--------------|------------|
| 1.8 | Part #:<br><br>999800.529 | DHR & AR-Series Installation & Training Fee | Unit Price : | \$2,200.00 |
|     |                           |   | Qty:         | 1.00       |
|     |                           |   | Discount :   | \$1,210.00 |
|     |                           |   | Ext Price :  | \$990.00   |

DHR & AR-Series Installation & Training Fee: Installation will be provided according to ISO 9000 procedure by one of our highly trained Service Engineers (average experience level of our field Service Engineers is over 15 years). The ISO 9000 procedure insures consistency and high quality throughout the installation process. IQ/OQ procedures are available for an additional fee. The installation will include calibration with a traceable standard and a certificate of calibration. Basic Training is also provided on the equipment after it is installed in your laboratory.

|     |                           |  |              |            |
|-----|---------------------------|--|--------------|------------|
| 1.9 | Part #:<br><br>554024.901 | DHR & AR-Series Automated Asphalt<br>Temperature Calibration Kit | Unit Price : | \$1,460.00 |
|     |                           |  | Qty:         | 1.00       |
|     |                           |  | Discount :   | \$803.00   |
|     |                           |  | Ext Price :  | \$657.00   |

DHR & AR-Series Automated Asphalt Temperature Calibration Kit: includes an Ohm meter for use with the NIST traceable Cannon DSR Temperature Probe. A calibration wizard in Rheology Advantage Software (5.7) fully automates rheometer temperature calibration. Note: Requires PC with USB port and Rheology Advantage Software Version 5.7 and customer supplied temperature probe (available from Cannon Instruments Co, P/N: 9728-v95).

**Extended Warranty**

|     |            |   |              |                    |
|-----|------------|---|--------------|--------------------|
| 2.1 | Part #:    | <b>Lifetime Support Plan (LSP) for DHR1/DHR2,<br/>AR1500ex/2000ex</b> | Unit Price : | <b>\$5,070.00</b>  |
|     | 999800.609 |   | Qty:         | 2.00               |
|     |            |   | Discount :   | <b>\$10,140.00</b> |
|     |            |   | Ext Price :  | <b>\$0.00</b>      |

Lifetime Support Plan (LSP) for DHR-1/DHR-2, AR1500ex/AR2000ex: The LSP is a comprehensive support plan, designed to provide improved instrument performance, increased uptime, and reduced cost of ownership. For the modest annual subscription fee, LSP subscribers receive an annual Performance Maintenance Visit (PMV), priority phone & email support, complete repair coverage (including service parts, labor, & travel), accessory coverage, a 10% discount on consumable purchases, and free tuition to regularly scheduled Theory and Applications training courses. This comprehensive support plan is available only for new instruments at the time of purchase, or prior to the end of the warranty period. LSP coverage is initiated at the end of the warranty period, and with annual renewal of the subscription, continues for the life of the instrument.

|                           |                    |
|---------------------------|--------------------|
| Extended List Price Total | \$10,140.00        |
| Discount Total            | \$0.00             |
| <b>Total Amount</b>       | <b>\$10,140.00</b> |

*All prices are offered in US Dollar*

**General Notes**

1. All prices are offered in US Dollar.
2. The system described above requires a computer/controller that meets the minimum specifications as described in the appropriate TA Instruments' installation requirements document. To view the requirements document, please visit <http://www.tainstruments.com/support/installation-requirements/>.
3. Estimated shipping date (after receipt of formal purchase order and credit approval) is 12/12/2018.
4. This offer also includes at no additional charge the following items:
  - i. Guaranteed response times for phone calls, shipment of parts, and equipment repair
  - ii. Free Hotline Telephone support from 8:30 am to 4:30pm (EST) Monday through Friday provided by our Applications Lab Staff
  - iii. Free technical support at <http://www.tainstruments.com/support/aplications/applications-hotline/>
  - iv. Theory & Applications course and various e-training Quickstart course options. For more information, and to register, please visit <http://www.tainstruments.com/training/>
5. Review the attached Terms & Conditions for information about the warranty for the instrument(s) on this quote.
6. Payment Terms: Net 10 Days From Invoice Date
7. Incoterms: FCA - Free freight (carrier) ShipPnt
8. Ship Via: BEST WAY

- The amount displayed does not include tax charges; these will be added to your invoice as applicable. If your organization qualifies as tax-exempt, please submit your tax-exempt certificate with your order.

**To Place An Order, Please Contact:**

Name: Ms. Liz Munzer  
Phone: 302-427-1024  
Fax: 302-427-4041  
Email: [purchaseorders@tainstruments.com](mailto:purchaseorders@tainstruments.com)

TA Instruments - Waters L.L.C.  
159 Lukens Dr.  
New Castle, DE 19720  
USA

## TA General Sales Terms and Conditions

1. Unless otherwise provided for on the face of this document, title to the goods shall pass to Buyer and the Seller's liability as to delivery, shall cease upon making delivery of goods to the carrier at the shipping point in good condition, the carrier acting as Buyer's agent.
2. SELLER HEREBY DISCLAIMS ALL WARRANTIES, EXPRESSED OR IMPLIED (INCLUDING ANY WARRANTY OF FITNESS OR MERCHANTABILITY), EXCEPT AS EXPRESSLY STATED HEREIN AND IN ANY WARRANTY POLICY STATEMENTS ATTACHED HERETO. IN THE EVENT OF A BREACH OF ANY SUCH WARRANTIES, BUYER'S EXCLUSIVE REMEDIES SHALL BE THE REMEDIES SET FORTH HEREIN AND IN ANY SUCH WARRANTY STATEMENT. Subject to the exceptions and upon the conditions specified herein or on the face hereof or in any warranty policy statement(s) attached hereto. Seller agrees to correct, either by repair or, at its election by replacement, any defects of material or workmanship which develop within one (1) year after installation, or 18 months from shipment (whichever comes first), of the instrument to the original purchaser, provided that investigation and factory inspection by the Seller discloses that such defect developed under normal and proper use. The exceptions and conditions mentioned above are the following.
  - a. Some components and accessories by their nature are not intended to and will not function for the warranty period. If any such component or accessory manufactured by Seller and part of the item sold fails to give reasonable service for a reasonable period of time, Seller will, at its election replace or repair such component or accessory. What constitutes reasonable service and what constitutes a reasonable period of time shall be determined solely by Seller after Seller is in possession of all the facts concerning operation conditions and other pertinent factors and after such component or accessory has been returned to Seller, transportation prepaid.
  - b. With respect to consumables and supplies for the equipment, Seller shall replace at its expense any consumables or supplies that are or become unusable for use prior to the expiration date stated on the package (or, if no expiration date is stated, a reasonable period after shipment, as determined solely by Seller), provided that such consumables and supplies were shipped, handled and stored in accordance with Seller's instructions.
  - c. All items claimed defective must be returned to Seller, transportation charges prepaid, and will be returned to Buyer with the transportation charges prepaid. Seller will be released from all obligations under its warranty in the event repairs or modifications are made by persons other than its own, or service personnel authorized by it, unless such repairs by others are made with the written consent of Seller.
  - d. The Seller is not obliged to incorporate into the equipment any design, engineering, or performance change development after delivery of equipment to the original purchaser.
3. Seller expressly disclaims any liability to its customers, dealers and representatives, and to users of its products, and to any other person or persons for special or consequential damages of any kind and from any cause whatsoever arising out of or in any way connected with the sale, handling, repair, maintenance or replacement or arising out of or in any way connected with the use of said products.
4. No employee, agent or representative of Seller is authorized to make any written or oral statements on behalf of Seller that are inconsistent or in conflict with, or would modify or expand, any warranty made or remedy described herein (or any warranty policy statement) and purchaser is not entitled to rely on any such statements unless they are reduced to writing and signed by the Seller.
5. No claim of any kind, whether as to goods delivered or for non-delivery of goods, shall be greater in amount than the purchase price of the goods in respect of which such damages are claimed, and failure to give notice of claim within ninety (90) days from date of delivery or the date fixed for delivery, or as otherwise provided herein, in paragraph 2, shall constitute waiver by Buyer of all claims in respect to such goods. No charges or expenses incident to any claims will be allowed unless approved by an authorized representative of Seller. Goods shall not be returned to Seller without Seller's permission.
6. The terms of payment applicable to this order are Seller's regular terms of those specifically quoted to Buyer. In the event Buyer fails to fulfill the terms of payment, or in case Seller shall have any doubt at any time as to Buyer's financial responsibility, Seller may decline to make further deliveries except upon receipt of cash or satisfactory security. All bills not paid at maturity will be subject to a late payment service charge of the 18% per annum on the outstanding amount owing.
7. Buyer shall reimburse Seller for all taxes, excise duties, or other charges which Seller may be required to pay to any Government (national, state or local) upon the sale, production or transportation of the products sold hereunder.
8. No liability on part of the Seller shall result from delay in performance of this agreement, directly or indirectly caused by fire, explosion, accidents, flood, labor trouble or shortage, war, act of or authorized by any Government, inability to obtain suitable material, equipment, fuel, power or transportation, or act of God or arising from contingencies, happenings, or causes beyond the control of the party affected. Items so affected by any such circumstances may be eliminated without liability, but this agreement shall otherwise remain unaffected.
9. Seller warrants that the use or sale of the product delivered hereunder will not infringe the claims of any United States patent covering the product itself, but does not warrant against infringement by reason of the use thereof in combination with other products or in the operation of any process, and does not warrant against infringement that may arise from conforming the warranted product to specification furnished by Buyer to Seller.
10. This contract is not assignable or transferable by Buyer, in whole or in part, except with the written consent of Seller. Seller may assign its rights under this Agreement.
11. Seller warrants that all goods covered hereunder will have been produced in compliance with the requirements of the Fair Labor Standards Act of 1938, as amended.
12. Upon request and at its discretion the Seller will furnish such technical advice or assistance as is available in reference to the use of its product by Buyer. However, Seller does so solely on the condition that qualified persons employed by Buyer will evaluate such advice or assistance with regard to suitability for Buyer's purposes. It therefore is expressly understood that Buyer use of such advice or assistance will be at Buyer's own risk. Seller assumes no obligation or liability for such use or the results obtained.
13. The laws of the State of Delaware shall govern this contract.
14. In the event of inability for any reason to supply the total demands for the material specified herein, Seller may allocate its available supply among any or all purchasers, as well as departments and divisions of the Seller, on such basis as it may deem fair and practical, without liability for any failure of performance which may result therefrom.
15. In the event that an annual purchase contract covering the goods to be purchased hereunder is in effect between the Seller and Buyer at the date of this transaction, the terms and conditions contained therein will control this transaction with respect to those goods so covered to the extent that the terms and conditions contained in such annual purchase agreement are inconsistent with the terms and conditions of this Agreement or certain terms and conditions that are in addition to those contained in this Agreement.
16. Except as otherwise provided in paragraph 13, this agreement (and any warranty policy statement attached hereto) contain all the terms and conditions with respect to the sale and purchase of the material named herein, and no modification of these terms and conditions shall be of any force unless such modification is reduced to writing and signed by the party claimed to be bound thereby.

TA Instruments - Waters L.L.C., 159 Lukens Drive, New Castle, DE 19720 302 427 4050 [www.tainstruments.com](http://www.tainstruments.com)

This quotation is expressly conditioned upon, and subject to all terms and conditions set forth within



**Technical Response from TA Instruments: Dynamic Shear Rheometer  
Solicitation CRFQ-0803-DOT1900000035-3**

**Agency: West Virginia DOT, DIVISION OF HIGHWAYS**

**Office of Procurement**

**Contracting Officer: Crystal Rink**

[crystal.g.rink@wv.gov](mailto:crystal.g.rink@wv.gov)

**Phone: (304) 558-2402**

**Source: TA Instruments, 159 Lukens Drive, New Castle, DE 19720**  
**Contact: Tony Williams, (302) 427-7054, [twilliams@tainstruments.com](mailto:twilliams@tainstruments.com)**

HR-1 Discovery Hybrid Rheometer offered by TA Instruments meets or exceeds the technical specifications outlined in WV Oasis Solicitation Number DOT1900000035, except where noted in the technical discussion below.

TA Instruments is a wholly owned subsidiary of Waters Corporation, a USA based, S&P 500 Company with annual sales in excess of \$900 million. All our rheometers are manufactured in the USA in New Castle, DE. This strong financial position allows a substantial investment in R&D and new product development. TA Instruments has introduced 18 new products in the last 24 months and continues to be the industry's innovation and market leader.

In addition to the unique features of the HR-1 Hybrid rheometer that are discussed below, TA Instruments is the world's market share leader, with over a 50% market share, in both Thermal Analysis and Rheology. TA Instruments also maintains the market leading position in customer support and satisfaction (as measured by independent customer surveys). TA Instruments is very well positioned to provide the highest quality of product, service and support to West Virginia DOT and its researchers.

**Bid Response:**

TA Instruments has quoted a DHR-1 with upper and lower temperature control, heat exchanging fluid bath and required plates for measuring asphalt rheological properties. Also included is the required accessories for performing temperature calibration and installation/training. TA Instruments has also included a one-year manufacturer's warranty with 2 years of extended warranty including yearly PMV, free service visits and replacement parts. In the end WV DOT will have no upkeep or certification costs for the first 3 years of ownership.



## Technical Discussions

Included in the Bid Package is a list of asphalt labs that use TA instruments rheometers, it shows that TA Instruments rheometers have a significant following in asphalt rheology that is growing with advent of our new rheometers.

TA Instruments is able to meet all the technical specifications listed in the bid request except for two minor differences. These are listed below

- 3.1.1.25 Test Plates: The DSR shall utilize a precision quick connect coupling system which provides one handed quick connect coupling of the upper test plate to the instrument. The quick connect coupling system shall be of high precision taper design such that rezeroing of the gap is not necessary after upper test plate removal for cleaning. Systems utilizing a screw-on mechanism or draw rod for affixing upper test plates will not be considered.

**TA Instruments Response:** TA Instruments' rheometers use a drawrod geometry connection to eliminate any moment of inertia created during the rotation of the upper fixture and to minimize modulus in accuracies that arise from compliance in the geometry-motor connection when working with stiff samples i.e. asphalt.

- 3.1.1.3.1 The DSR Environmental Chamber shall control temperature using a lower plate chamber with integrated Peltier elements and an upper hood with integrated Peltier elements.

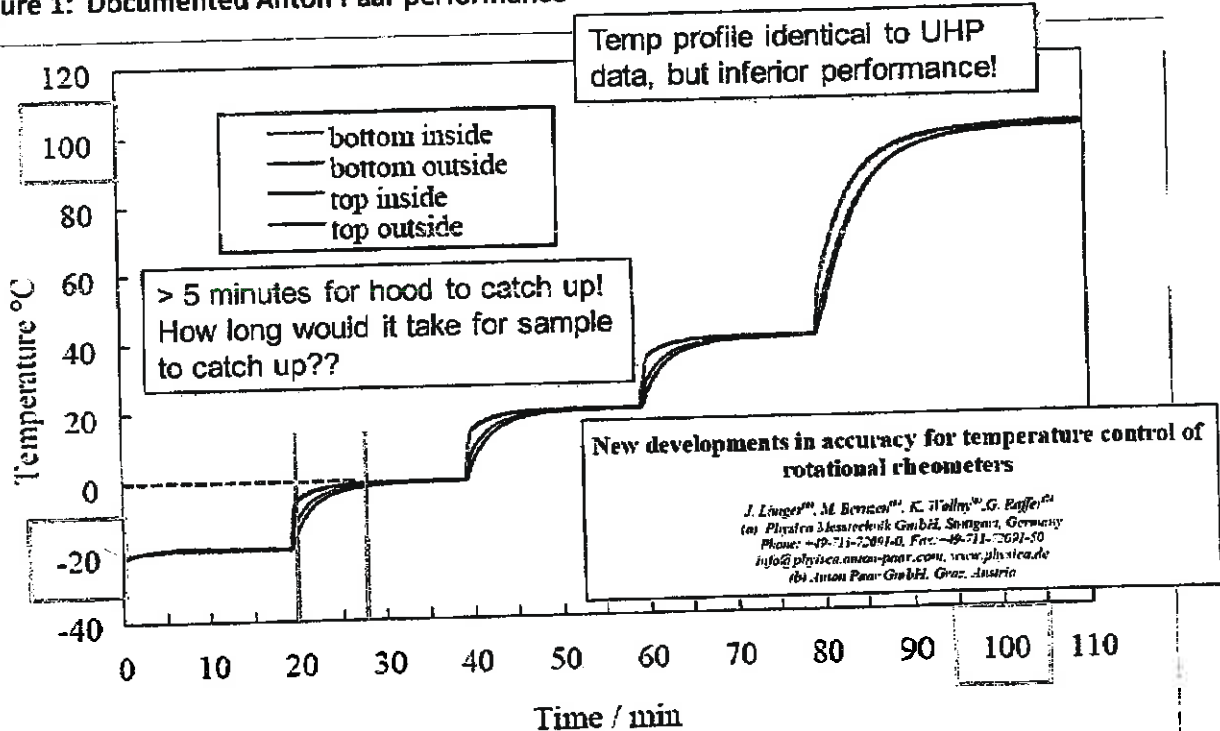
**TA Instruments Response:** All vendors are going to use heating exchanging baths to control temperature on their Peltier plats and hoods. This is a very real occurrence. We also use fluid to cool the electrically controlled Peltier units to allow proper operation. TA Instruments Upper Heated Plate (UHP) system uses patented heat spreader technology to ensure a uniform gap-independent heat transfer to the sample, eliminating any possibility of vertical or radial temperature gradients. The system is designed to be responsive and is field proven to be adept at changing temperatures – for example, heating the plates to clean at the end of a test, or cooling the plates to load the next sample. As such, the time for step changes in temperature are quick and do not present an onerous requirement on the customer or have an meaningful impact on sample test throughput.



As stated above all options available on the market for DSR temperature control utilize some form of fluid circulation to control the sample temperature. This includes Peltier plates and the Upper Heated Plate. Note that the Dry Asphalt accessory offered by TA does not have any exposed circulation fluid unlike legacy "wet asphalt" systems where the sample temperature was set by the fluid circulation temperature. With this system, the Peltier controlled fluid circulation temperature is only used to cool the fixtures, not control the temperature of the sample. As a result, the dry asphalt system is faster, offers uniform temperature control, very low possibilities for leaks and failure, and improved sample-to-sample repeatability and is in use at several DOTs and asphalt producer labs across the country.

I would also like to point out a short coming of the Anton Paar system hooded system. Below is a figure showing the performance of the hooded peltier system used by Anton Paar. This is a document released by Anton Paar showing the variability in its temperature control within the hooded enclosure.

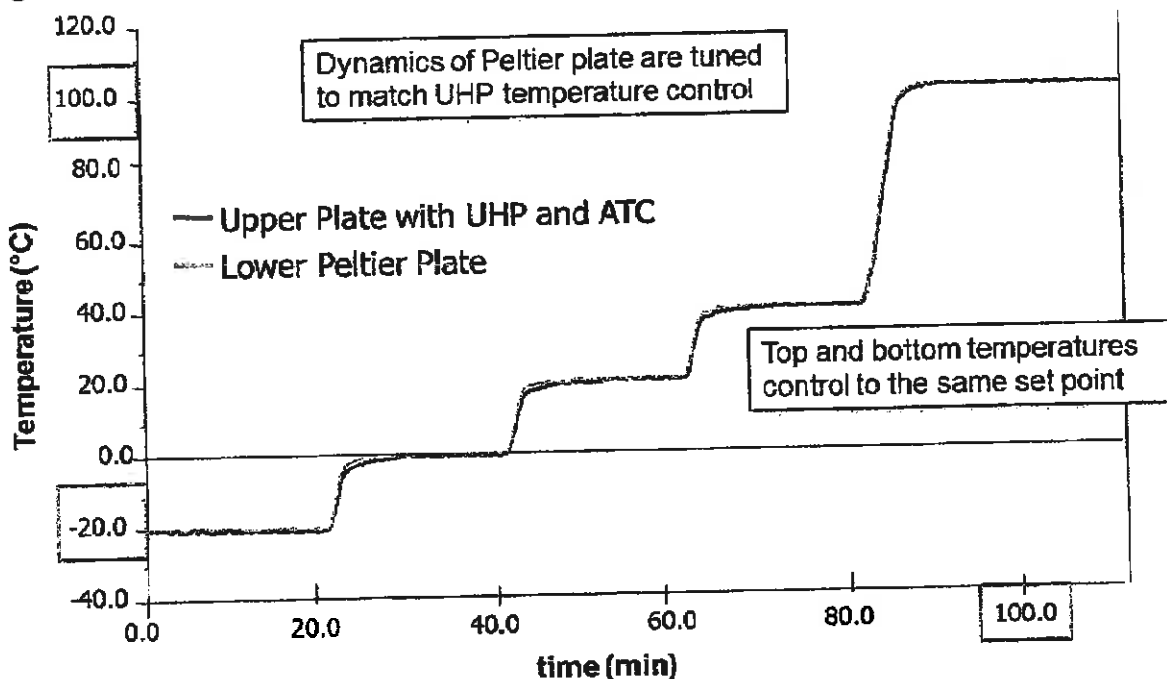
Figure 1: Documented Anton Paar performance





TA Instruments controls temperature at the surface of the upper and lower plates therefore we achieve the desired performance shown in Figure 2.

Figure 2: Documented TA Instruments performance of peltier plate and UHP



Thanks for your time and please contact me if you have any questions.

Tony Williams  
TA Instruments Representative





## A Partial List of TA Instruments DHR and AR-series Rheometer Users in the Asphalt Industry

**City of Los Angeles**  
Leon Vayner  
AR2000ex

**Alabama DOT**  
AR1500EX Dry UHP

**Mississippi DOT**  
AR2000 Dry UHP

**Auburn - National Center for Asphalt Technology**  
AR2000EX UHP Dry

**NJ DOT**  
Jude Kianka  
AR1500ex - Dry Asphalt system

**Delaware DOT**  
Karl A Zipf  
AR2000 with peltier

**SGS Control Services Inc**  
Mr. Walter Copeland  
East Alton, IL

**Nebraska Department of Roads**  
Lincoln, NE  
AR-2000ex w/ dry asphalt system  
AR-1500ex w/ dry asphalt system

**BP**  
Don Rubis  
Naperville, IL

**BP**  
Ms. Wanda Heidelberg  
Whiting, IN

**Hudson Asphalt**  
Pat Mitchell  
Providence RI

**Road Science**  
Jim Barnat

**Tulsa, OK**  
Six AR-2000 with dry asphalt system  
Several AR-2000ex with dry asphalt system

**Valero**  
Sunray, TX  
Two AR-500  
AR-1000

**Deep SouthTex Terminal**  
Tulsa, OK  
AR-1500ex with dry asphalt system

**Federal Highway**  
Vancouver WA  
AR 2000 UHP

**Iowa State**  
Chris Williams  
AR1500EX

**Flint Hills Resources**  
5 AR2000EX's with UHP they are happy.

**Payne and Dolan**  
Wisconsin  
3 AR2000's with UHP.

**Mathy Construction**  
Gerald Reinke  
3 AR2000's with ETC and UHP  
DHR-3 with ETC

**MN DOT**  
AR2000 with ETC

**University of MN**  
AR2000 with ETC

**Akzo Nobel R&D**  
Brewster, NY  
AR2000ex dry asphalt system

**Western Research Institute**  
Laramie, WY



**Steve Salmans**  
AR-G2  
ARES Classic

**Asphalt Institute**  
Lexington, KY  
Mike Anderson  
DHR