Mississippi State University
Notice of Proposed Sole Source Purchase

156-49

Mississippi State University anticipates purchasing the item(s) listed below as a sole source purchase. Anyone objecting to this purchase shall follow the procedures outlined below.

1. Commodity or commodities to be purchased (make, model, description):

**EcoSEC GPC System with a UV-8320 Detector and Wyatt miniDawn TREOS (3 angle), laser light scattering detector**

1. Explanation of the need to be fulfilled by this item(s) and why it is the only one that can meet the specific needs of the department:

**The PI is requesting this specific instrument in order to analyze polymeric materials to be prepared in the lab. This instrument is capable of not only providing information pertaining to the size of the polymers but also the shape of the polymers. This instrument is also useful to other researchers in the institution who are working on macromolecules including proteins.**

**Wyatt is the only company that sells this instrument. The instruments by other companies are not multi-angle and therefore will not give information pertaining the shape of the polymer. It should be noted that Agilent does sell a dual-angle instrument; however, the Multi-Angle Light Scattering (MALS) detector must make static light scattering measurements at 3 or more angular locations, simultaneously, in order to quantify molar mass of macromolecules in solution from 200 Da to 10 MDa and rms radius from 10 nm to 150 nm. Therefore the dual angle instrument from Agilent is insufficient.**

**For the reasons stated above, the Wyatt miniDawn TREOS (3 angle), laser light scattering detector is the only one that meets the specifications.**

1. Name of company/individual selling the item and why that source is the only possible source that can provide the required item(s):

**Tosoh/Wyatt**

**Sales Person: Vaughn Williams**

**Tosoh has collaborated with Wyatt who provides the Light scattering instrument. Wyatt is the only company who sells a true multi-angle light scattering detector. Other companies’ detectors are either single or dual angle and are not as useful to obtain the desired information for our system, specifically the shape of the polymer.**

1. Estimated cost of item(s) and an explanation why the amount to be expended is considered reasonable:

**The estimated total cost of the instrument is $74,000, which is very reasonable. Other quote for a similar instrument is $75,000. That company’s only sells a dual angle light scattering detector.**

1. Explanation of the efforts taken by the department to determine this is the only source and the efforts used to obtain the best possible price:

**The PI has spent 4 months negotiating with several companies; however, as mentioned before, only Wyatt sells the required multi-angle light scattering detector. The Wyatt detector to be purchased is a fully refurbished demo unit, fully warrantied as a new instrument.**

**Below is detailed information on the Wyatt light scattering detector.**

Any person or entity that objects and proposes that the commodity listed is not sole source and can be provided by another person or entity shall submit a written notice to:

Don Buffum, CPPO
Director of Procurement & Contracts
dbuffum@procurement.msstate.edu
**Subject Line must read “Sole Source Objection”**

The notice shall contain a detailed explanation of why the commodity is not a sole source procurement. Appropriate documentation shall also be submitted if applicable.

If after a review of the submitted notice and documents, MSU determines that the commodity in the proposed sole source request can be provided by another person or entity, then MSU will withdraw the sole source request publication from the procurement portal website and submit the procurement of the commodity to an advertised competitive bid or selection process.

If MSU determines after review that there is only one (1) source for the required commodity, then MSU will appeal to the Public Procurement Review Board. MSU will have the burden of proving that the commodity is only provided by one (1) source.

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**Sole-Source Justification for Wyatt Technology Corporation’s**

**miniDAWN TREOS - Optilab T-rEX Multi-Detection Set**

## MALS Detector

The miniDAWN TREOS model, designed for use with a wide range of GPC, FPLC, HPLC, SEC or field-flow fractionation (FFF) instrumentation, is a member of the fourth generation of MALS detectors developed by WTC. This instrument uniquely meets our needs because it, with the associated ASTRA data acquisition and analysis software, uniquely combine advanced technical features to meet the following requirements which are deemed necessary to perform the measurements expected with acceptable accuracy, precision and repeatability:

1. The Multi-Angle Light Scattering (MALS) detector must make static light scattering measurements at 3 or more angular locations, simultaneously, in order to quantify molar mass of macromolecules in solution from 200 Da to 10 MDa and rms radius from 10 nm to 150 nm.
2. The instrument and software must have been validated through citation in at least twenty peer-reviewed publications.
3. The MALS instrument must provide, or be field-upgradeable to provide, a Dynamic Light Scattering detection module (DLS is also known as QELS or PCS).
	1. This module must be capable of making measurements at a 90scattering angle with respect to the laser beam of the MALS instrument, performing DLS detection in the same flow cell as the MALS detectors.
	2. The MALS instrument with DLS module must provide dynamic light scattering and static light scattering measurements simultaneously.
	3. DLS detection must be available and reliable in chromatographic and non-chromatographic flow mode, stop flow mode, and when using the MALS detector with a cuvette or scintillation vial.

Wyatt’s optional WyattQELS module fulfills this requirement.

1. The MALS instrument must be equipped with a rear laser monitor that measures the intensity of the laser beam prior to entering the flow cell, in order to calculate any necessary compensation to the scattering signal for laser source intensity fluctuations and drift related to ambient temperature changes, laser device aging, dust or any other mechanism. This rear monitor ensures consistent molar mass measurements over long and short periods.
2. The MALS instrument must be equipped with a forward laser monitor to measure the intensity of light transmitted through the flow cell, in order to correct the scattering signal for absorbance of the laser beam by the sample as well as diagnose the presence of bubbles or large contaminants in the flow cell.
3. The MALS instrument must provide, or be upgradeable to provide, a means of removing particles adhering to the MALS flow cell interior surfaces so as to minimize detector noise due to light scattering from these particles, and to prolong time between manual maintenance. The device must be remotely controlled by software and function by applying a radio frequency ultrasonic field to the flow cell’s external surface via a direct mechanical contact. Wyatt’s COMET accessory fulfills this requirement.
4. The MALS instrument must have an onboard computer with a touch screen display to allow one to visualize rapidly any of the detector outputs including all light scattering, UV absorption, 3rd-party RI or viscometry, etc. as well as critical status indicators such as temperature or leak detector status. Such a display allows one to confirm the system is operating properly and to diagnose problems.
5. The MALS instrument must be calibrated using a uniform fluid such as toluene, commonly available with high quality and repeatability, rather than calibrated against a molar mass standard, because the latter technique depends on precise knowledge of concentration and refractive index increment of the standard in each specific solvent. As a consequence of the uniform fluid calibration method, absolute rather than relative results will be obtained. Wyatt’s ASTRA software fulfills this requirement.
6. The MALS instrument must provide, or be field-upgradeable to provide, a batch operation option whereby one may remove the flow cell and replace it with a 20mL scintillation vial. This option enables one to perform Zimm Plots (analysis of concentration dependence) or kinetic studies, to prevent congealing or precipitation of sample in the flow cell, or simply to facilitate use of a different solvent than that being used in a chromatography system normally used in conjunction with the MALS detector. Wyatt’s batch conversion kit fulfills this requirement.
7. The MALS instrument must further provide, or be field-upgradeable to provide, a batch operation option whereby one can remove the flow cell and replace it with a cuvette requiring as little as 10-30 µL. Wyatt’s microCuvette kit fulfills this requirement.
8. The MALS instrument must provide a laser driver that quenches mode-hopping proclivities of the diode laser light source.
9. The MALS detector must be capable of user-installed upgrades with new firmware releases.
10. The MALS instrument and software must operate so as to prolong laser lifetime by automatically reducing laser drive current when the instrument is idle, and restoring power for measurements.
11. The MALS instrument must allow the user to reduce its laser intensity by 1% - 90%, either from the front panel display or from the control software. This capability eliminates detector saturation due to very high concentrations of very large macromolecules or nanoparticles.
12. The MALS detector and software must provide a means of accepting external signals from a GPC, FPLC, HPLC, SEC or FFF system in order to utilize autoinject triggers and UV analog signals. This permits synchronization between any brand of liquid chromatography system and the MALS detection, as well as utilization of the UV signal for determination of concentration and conjugate or copolymer composition.
13. The MALS instrument must be capable of interfacing to commercially available hardware and software suitable for carrying out automated composition-gradient or concentration-gradient measurements, acquiring and analyzing the data to determine molar mass, rms radius, second virial coefficient, third virial coefficient, dn/dc (differential refractive index), reaction kinetics, and the affinity and stoichiometry of macromolecular interactions.

The miniDAWN TREOS is required, to the exclusion of others, for our research because of our need to properly and reproducibly characterize the absolute molar mass and size of macromolecules eluting from a GPC, FPLC, HPLC size-exclusion chromatography or FFF system and in batch mode.  No other MALS instrument is compatible with these requirements. This instrument is only available from Wyatt Technology Corp. At least ten peer-reviewed publications cite data obtained with the miniDAWN TREOS.

## Software

The ASTRA software used to acquire and analyze data from the Wyatt MALS and dRI instruments meets our needs because it, with the above instruments, uniquely combines advanced technical features to meet the following requirements which are deemed necessary to perform the measurements expected with acceptable accuracy, precision and repeatability:

1. The software must work seamlessly with multiple relevant online detectors. ASTRA does so for all Wyatt detectors plus analog data acquisition from up to four additional 3rd-party detectors, e.g. a UV detector.
2. The software must permit remote monitoring and control of the instruments. This allows users to increase productivity by working on other tasks while MALS-dRI measurements are ongoing. ASTRA does so for all Wyatt instruments + analog signals.
3. The software must correct the data for interdetector band-broadening such that molar mass is displayed as being uniform across the elution volume of known monodisperse macromolecules. This feature is essential in order to obtain correct molar masses and conformations when two or more detectors are connected in series to a liquid chromatography system. ASTRA’s band-broadening correction does so and is protected by a US patent.
4. The software must provide for the determination of molar masses and sizes in the eluting macromolecules, stating with each measured value the associated uncertainties (or error bars in graphs). ASTRA uniquely does so.
5. The software must account for changes in all relevant solvent properties, e.g. solvent refractive index or viscosity, due to changes in temperature. ASTRA provides this correction.

In addition, the vendor must provide with purchase of the instrument set, a free site license for analysis of data acquired with these instruments. Wyatt Technology does provide an unlimited ASTRA site license for analysis of data acquired with its instruments.

## Multi-Instrument Combination

The miniDAWN TREOS and Optilab T-rEX constitute an extremely versatile, integrated instrument set, capable of performing (with ASTRA software and, as applicable, additional online detectors) the following range of macromolecular analyses over the entire range of molar mass, size and temperature:

* Molar mass distributions (differential, fitted and cumulative)
* Molecular size distributions (differential, fitted and cumulative)
* Molecular conformation
* Polymer branching
* Second virial coefficient
* Protein conjugate or co-polymer composition (with triple UV-MALS-RI detection)

Analysis reports may be configured by the user to provide any or all of the available information and data. The versatility of the miniDAWN TREOS and Optilab T-rEX, with ASTRA analyses, makes this instrument and software set unique in the marketplace.

In addition to these unique features, WTC provides unparalleled service, training and support. Its Light Scattering University MALS training course is consistently rated by attendees as the best instrument training they have ever attended. Customers regularly express a high degree of satisfaction with application support, provided by an expert staff including a high proportion of PhD scientists. WTC support personnel are based in Santa Barbara, CA, and are very well positioned to provide the highest quality of product service and support to {*end user name here*}. For these reasons it is highly desirable to engage with WTC as a vendor of choice.