

Mississippi State University

Notice of Proposed Sole Source Purchase

267-037

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):

Manufacturer upgrade to add AutoStage hardware module to bench-top indentation plastometer for automated property testing for materials characterization.

2. Explanation of the need to be fulfilled by this item(s), how is it unique from all other options, and why it is the only one that can meet the specific needs of the department:

The Center for Advanced Vehicular Systems (CAVS) at Mississippi State University possesses a bench-top indentation plastometer produced by Plastometrex. This first-of-its-kind system uses Profilometry-based Indentation Plastometry (PIP) to obtain material properties from very small amounts of material relative to conventional mechanical testing. Additionally, the plastometer at MSU is capable of conducting high-temperature property measurements and, at the time of installation, was only the 5th system in the world with this capability. Benefits of the PIP system were previously summarized in MSU Sole Source Notice 223-38 for purchase of the system from Plastometrex in 2022 and are summarized below for reference.

CAVS has a strong track record in developing new cutting-edge materials as well as manufacturing processes. These novel materials must be tested in order to measure their mechanical properties (e.g. strength, ductility, toughness) and determine the effectiveness of the manufacturing process. Such testing conventionally requires producing a large amount of material, careful sample extraction, and lengthy preparation prior to testing each sample individually. This process can be labor-intensive, error-prone, financially expensive, and highly time-consuming. Through the PIP method, the system at CAVS allows for the measurement of a large number of samples with significantly lower material, financial, and time costs. The addition of a high-temperature stage further extends these capabilities to also include temperature-dependent data.

CAVS is currently involved in multiple projects funded through the Department of Defense (DoD), particularly the U.S. Office of Naval Research (ONR), Naval Surface

Warfare Center Carderock Division (NSWCCD), U.S. Army Engineer Research and Development Center (ERDC), and the U.S. Army Research Laboratory (ARL), with these agencies displaying keen interest in the development and testing of new materials and manufacturing processes. There is now an increasing emphasis on the use of Artificial Intelligence (AI) and Machine Learning (ML) in the development of such novel materials. These approaches are heavily data driven and hence require a large volume of tested data for training in order to properly serve their function as design tools. Generation of the requisite large amounts of data through individual tests is often prohibitive and becomes a hurdle in the development process. The bench-top indentation plastometer upgrade would enable CAVS to deliver the necessary amounts of testing data from a very large number of samples within a very short turnaround time.

The small amount of material required for PIP analysis extends our material testing capabilities on two key fronts. First, certain new manufacturing processes are meant for production of small amounts of material (such as high-strength protective coatings or small machine components), rendering the extraction of large individual samples for conventional testing completely impossible. Second is the ability to better test functionally graded materials, wherein different locations within the same piece of material are designed to have different material properties. As such, testing larger samples would be inaccurate and non-representative due to the fact that different points within a single larger sample can have significantly different properties. The bench-top PIP system can provide reliable data using less than 1/32nd inch worth of material, opening the possibility for measuring thinner materials as well as probing multiple spots for local behavior within functionally graded materials to capture property variations within a single sample.

The subjective and manual nature of the current PIP procedure presents a significant bottleneck in materials characterization, which the requested upgrade would address by allowing automated testing of multiple locations as well as multiple samples simultaneously. In addition to greatly enhancing productivity, the proposed AutoStage functionality is crucial for providing high-throughput material characterization, which is instrumental for project outcomes.

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

Company Information:

Name: Plastometrex
Address: 204 Cambridge Science Park, Milton Road, Cambridge,
Cambridgeshire, CB4 0GZ, England
United Kingdom
Phone: +44 744 400 1329
Website: plastometrex.com

Plastometrex is the only source for the hardware that is used to operate the bench-top indentation plastometer they produce. The plastometer is a novel system for which a patent was granted on 25th of August 2021 (patent# GB 1908656.0). Thus, there are currently no other products on the market that perform the same function as this system.

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

The upgrades will include the necessary hardware needed for automated positioning, testing, and property mapping, with a quoted cost of \$43,599.00. Installing this upgrade is less than half the price of a new system with AutoStage capability, even after deep academic discounts.

The quoted price also includes an academic discount of \$15,319.00 on the listed price of \$58,918.00.

5. 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:

Given that the patent for the technology used in the plastometer system was granted in August 2021 to Plastometrex, there are no other vendors that offer testing systems that are capable of providing the same results, rendering Plastometrex the only source for such systems. Plastometrex are the only providers of hardware upgrades for their plastometer system.

The subtotal for the upgrade is \$58,918.00. After conferring with the manufacturer for discounts, the quoted price of \$37,909.00 includes an academic discount of \$15,319.00, which is a discount of 26%.

(For a breakdown of the specific item prices, please see attached quote, Reference Number: 20260818-152453730).

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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