

STATEMENT OF REQUIREMENTS

Title: Field deployable X-Ray Diffraction System

I. BACKGROUND INFORMATION

The Structures Group in the Engineering Laboratory at NIST develops science-based tools, standards, and performance prediction methods to enhance the resilience of buildings and infrastructure against extreme events like wind, fire, earthquakes, and blasts. The Structures Group is seeking an X-Ray Diffraction (XRD) system that is portable and field deployable. The XRD system and any applicable software should be specifically designed for stress measurements on engineering materials, such as steel, in laboratory and outdoor environments. The Structures Group requires a system that can make measurements at a wide range of orientations relative to the object being measured.

II. Purpose/Objectives: The purpose of this requirement is to obtain a portable x-ray diffraction system meeting, or exceeding, the technical specifications below. The system will be used in both laboratory and outdoor settings on meter-scale structural members, with the physical and software components required for multiaxial stress measurements of steel. This equipment is required for fulfilling the project goals of the Performance Based Design for Structures in Fire project, part of the Fire Risk Reduction in Buildings program in the Engineering Laboratory at NIST.

III. Minimum Requirements

The Contractor shall provide an XRD system that meets or exceeds all technical specifications identified below for minimum requirements. All items must be new. Used or remanufactured equipment will not be considered for award. Experimental, prototype, or custom items will not be considered. The use of "gray market" components is not authorized for sale in the U.S. by the Contractor is not acceptable. All line items shall be shipped in the original manufacturer's packaging and include all original documentation and software, when applicable. Provision of the XRD system shall be inclusive of delivery, installation and training, as described further below.

Description: Field Deployable X-Ray Diffraction system

Quantity: One (1)

A. Technical Specifications

- a. The system shall be capable of measuring and computing axial (1-1), shear (1-2), and transverse (2-2) stress components in iron and steel materials.
- b. Able to export raw intensity vs. two-theta (or similar) peak profile data.
- c. Must be portable indoors and outdoors via protective pack-out boxes or similar.
- d. Must include means of securing to horizontal *and* vertical surfaces.
- e. Must include a form of enclosure or radiation shielding.
- f. Must include any necessary alignment fixtures / guides for proper system setup and measurement.
- g. Must include zero-stress and low/high-stress standards for calibration and alignment verification.
- h. Must include means for emergency stop of x-ray generation.
- i. Must include a visible hardware indicator showing when the x-ray tube is active or the shutter is open.

- j. Must be able to operate using standard single phase, 115V or 120V electrical power.'
- k. System is electrically wired (including plug termination) to be powered by an existing 120V receptacle.
- l. A one-year manufacturer's warranty.

INSTALLATION

The system shall be installed by the Contractor no later than 14 days after delivery at a time mutually agreed upon by the Contractor and the NIST Contracting Officer's Representative (COR). Installation, at a minimum, shall include set-up and hook-up of the system and demonstration of all specifications. Onsite installation shall take place at the NIST Final Equipment Destination identified above. All installation requirements are identified below:

1. System is electrically wired (including plug termination) to be powered by an existing 120V receptacle.
2. System is appropriately aligned, calibrated, and levelled for multiaxial stress measurement in iron and steel.

TRAINING

The contractor shall conduct one training session for up to five users at NIST. The training shall provide a thorough demonstration of all system/solution functions, maintenance, data administration, and basic troubleshooting. The training shall be completed at NIST Monday – Friday during the operating hours of 9 AM – 5 PM immediately after installation/set-up has been completed or at a mutually agreed upon time between the contractor and the COR to be scheduled no later than five days after installation. The Contractor shall also perform on-site measurements demonstrating that no damage or misalignment issues arose during transportation and installation.

WARRANTY

The contractor shall warrant the entire system for a period of a minimum of one year and the warranty shall be in accordance with terms in FAR 52.212-4.

IV. OPTIONAL REQUIREMENTS

The following specifications are optional items, that if exercised, shall be exercised in accordance with FAR 52.217-7 Option to Increase Quantity as a Separately Priced Line Item. Options may be exercised at time of award, per FAR 52.217-4 Evaluation of Options Exercised at Time of Award. **The minimum installation, training, and warranty requirements stated above apply to the optional requirements.** If options are *not* exercised at time of award, the options will *not* be exercised at all.

Option 1

Description: Cobalt X-ray tube

Quantity: 1

A. Technical Specifications:

- a. Includes any necessary housings for in-machine use and storage, if not already included with the package that meets the minimum requirements.
- b. Includes suitable zero and non-zero stress standards for verification of alignment / calibration with the x-ray tube stated under this optional CLIN, if not already included in the package that meets the minimum requirements. .

Option 2Description: Liquid cooling system for X-ray tube

Quantity:1

A. Technical Specifications:

- a. Liquid cooling loop for X-ray tube including all required hoses, connections, and chiller.

Option 3Description: Powered translation and rotation stages

Quantity:1

A. Technical Specifications:

- a. Powered X-Y-Z translation stages.
- b. Powered rotational stage that enables automated multidirectional stress measurements.

Option 4

Description: Copper X-ray tube

Quantity:1

A. Technical Specifications:

- a. Same as Optional line-item no. 0002 for a Cobalt X-Ray tube; for copper.

Option 5Description: Iron X-ray tube

Quantity:1

A. Technical Specifications:

- a. Same as Optional line-item no. 0002 for a Cobalt X-Ray tube; for iron.

Option 6Description: Manganese X-ray tube

Quantity:1

B. Technical Specifications:

- a. Same as Optional line-item no. 0002 for a Cobalt X-Ray tube; for manganese.

Option 7Description: Vanadium X-ray tube

Quantity:1

B. Technical Specifications:

- a. Same as Optional line-item no. 0002 for a Cobalt X-Ray tube; for vanadium.

Option 8Description: Titanium X-ray tube

Quantity:1

A. Technical Specifications:

- a. Same as Optional line-item no. 0002 for a Cobalt X-Ray tube; for titanium.

V. DELIVERY TERMS

Delivery shall be F.O.B Destination and shall occur within 120 days After Receipt of an Order (ARO).

FOB Destination means: The contractor shall pack and mark the shipment in conformance with carrier requirements, deliver the shipment in good order and condition to the point of delivery specified in the purchase order, be responsible for any loss of and/or damage to the goods occurring before receipt and acceptance of the shipment by the consignee at the delivery point specified in the purchase order; and pay all charges to the specified point of delivery.

Delivery shall be made to the NIST Shipping and Receiving address identified below. The delivery will then be directed to the equipment's final destination, also identified below.

NIST Shipping & Receiving
100 Bureau Drive
Building 301
Gaithersburg, MD 20899-0001

NIST Final Equipment Destination:
National Institute of Standards and Technology
100 Bureau Drive
Building 226, Room B151
Gaithersburg, MD 20899

VI. INSPECTION & ACCEPTANCE

In addition to the inspection and acceptance terms articulated in 52.212-4, the Government reserves the right to perform such performance tests and evaluations as defined below to verify specified system performance. Such tests and evaluations, if performed, shall be conducted within the environment that the system is to be operated. The Contractor has the right to be present during the tests and evaluations, if performed, at the Contractor's expense.

Performance Tests:

1. A visual and performance demonstration inspection shall be conducted to verify that delivered equipment meets all technical requirements identified in this document. Inspection shall be completed within 10 business days after delivery, installation, and training have all been completed.

The Government shall have sole discretion to require repair or replacement of damaged and/or nonconforming supplies at no cost to the Government. The Government at any time prior to acceptance may reject the equipment due to identified defects and/or nonconformance. The vendor is responsible for latent defects discovered any time after final inspection. However, the extent of its liability shall be prorated over the useful life of the equipment.

VII. PAYMENT SCHEDULE

Advance payment is not authorized. The Contractor must invoice in the arrears according to the payment schedule. The Contractor shall be paid, in accordance with Net 30-day payment terms, upon receipt and acceptance of a proper invoice, in accordance with the following schedule:

1. 100% after delivery, installation and training have been completed by the Contractor and has been inspected and accepted by the COR of a fully installed system, AND
2. After receiving an invoice submitted properly, in accordance with the purchase order terms and conditions.

NOTE: Partial shipments and partial invoices will not be accepted, unless otherwise requested and accepted by the Contracting Officer prior to award offer. Proposed payment schedules shall be submitted with vendor's response to the RFQ for consideration.

VIII. MISCELLANEOUS INFORMATION

Safety: The Contractor employee must be responsible for knowing and complying with all installation safety prevention regulations. Such regulations include, but are not limited to, general safety, fire prevention, and waste disposal.

Security: NIST is a restricted campus. An identification badge is required for access for entry into buildings and is shown to the armed Security Police when entering the campus.

Regular Business Hours. Regular business hours are Monday through Friday, 9:00 am to 5:00 pm eastern time, excluding Federal holidays and NIST closures.

Identification Badges: Contractor employees must comply with NIST identification and access requirements. Each Contractor employee must wear a visible identification badge provided by the NIST Security Office.

Vehicle Registration: All Contractor employees must register their vehicles with the NIST Security Office to gain access to the campus. A valid driver's license, Government-furnished civilian ID, proof of insurance and current registration must be presented to the NIST Security Office, at which time a NIST vehicle pass will be issued. The pass must be displayed on the vehicle in accordance with NIST Security Office instructions.

Truck Access: All Trucks are to enter NIST via "F" Gate along Muddy Branch Rd. between 6:00 am and 3:30 pm daily, and at the main gate off of W. Diamond Ave. between 3:30 pm and 4:30 pm. No deliveries will be allowed after 4:30 pm. "Trucks" include such vehicles as pick-ups with storage compartments, delivery trucks, delivery vans, and tractor center. At Gate F, trucks will be registered, inspected, and the drivers will be granted access. Any truck which exits the installation will have to be re-inspected upon re-entry at Gate F. A vehicle dashboard placard will be placed within the truck. Placards change daily.

NIST Truck Inspection Stations hours are:

6:00am -3:30pm at Gate F

3:30 pm – 4:30pm at "A" Gate – (Main gate)