

INVITATION FOR BIDS OFFICE OF PROCUREMENT & CONTRACTS

1. INSTRUCTIONS FOR BIDDERS

- a. Sealed bids will be received in the Office of Procurement & Contracts, Mississippi State University, for the purchase of the items listed herein.
- b. All bids must be received in the Office of Procurement & Contracts on or before the bid opening time and date listed herein. Delivery of bids must be during normal working hours, 8:00 a.m. to 5:00 p.m. CST, except on weekends and holidays when no delivery is possible.
- c. Bidders shall submit their bids either electronically or in a sealed envelope. To submit electronically, follow the instructions below. Bids CANNOT be emailed.
 - Sealed bids should include the bid number on the face of the envelope as well as the bidders' name and address. Bids should be sent to: 245 Barr Avenue, 610 McArthur Hall, Mississippi State, MS 39762.
 - ii. At this time we only accept non-ITS bids electronically. For electronic submission of bids, go to: <u>portal.magic.ms.gov.</u> and use the RFX number on the next page as your reference number.
- d. All questions regarding this bid should be directed to the Office of Procurement & Contracts at 662-325-2550.

2. TERMS AND CONDITIONS

- a. All bids should be bid "FOB Destination"
- Bidders must comply with all rules, regulations, and statutes relating to purchasing in the State of Mississippi, in addition to the requirements on this form. General Bid Terms and Conditions can be found here: <u>https://www.procurement.msstate.edu/procurement/bids/Bid General Terms Ma</u> <u>y 2019 V2.pdf</u>
- c. Any contract resulting from this Invitation for Bid shall be in substantial compliance with Mississippi State University's Standard Contract Addendum: <u>https://www.procurement.msstate.edu/contracts/standardaddendum.pdf</u>

Bid Number/RFX Number: 23-15/RFX#3160005667 Opening Date: February 14, 2023 @2:00 p.m. Description: Composite Ply Cutter

Vendor Name:
Vendor Address:
Telephone Number:
Days the Offer is Firm:
Authorized Signature:
Name:
Title:

ltem	Quantity	Description	Unit Price	Total Price
1	1	Composite Ply Cutter, NC Controlled		

1.0 Scope

This equipment specification describes the requirements for the manufacture, inspection, procurement, installation and performance of a computerized composite ply cutting system consisting of a controller, vacuum cutting area, cutting knives, inkjet printer, material dispenser and software as defined within.

The equipment described in this specification shall be capable of cutting and labeling a variety of composite ply shapes from carbon fiber and glass fabric prepreg, unidirectional tape and film adhesive materials. It is the intent of Mississippi State University to purchase a standard system with minimal customization. Note that this statement of work, by itself, does not constitute a purchase order.

2.0 Applicable Documents

ACI Documents

N/A

Customer Documents

N/A

Industry Specifications, Standards and Handbooks

The equipment shall incorporate in its design, configuration, construction and accessories any features that will permit the Purchaser to comply with all applicable regulations, standards or other requirements of the Federal Department of Labor, Williams-Steiger Occupational Safety and Health Act of 1970 placed upon an employer for the design, configuration and construction of the machine and its accessories.

In addition, the following standards shall also be met, if applicable. The latest issues and revisions shall apply.

- EIA Standard RS-267-C Axis and motion nomenclature for numerically controlled machines.
- EIA Standard RS-274-D Interchangeable variable block data positioning, format for contouring, and contouring/positioning numerically controlled machines.
- EIA Standard RS-281-B Electrical and construction standards for numerical machine control.
- ISO 230-2;1997, Test code for machine tools Part 2: Determination of accuracy and repeatability of positioning numerically controlled axes - As amended in Appendix A sections A1.3 and A1.8.
- ISO/DIS230-5.3, Test code for machine tools Part 5: Determination of noise emission.
- NFPA 79 Electrical Standard for Industrial Machinery
- National Electric Code
- FPA 70E Standard for Electrical Safety in the Workplace
- NEC 2005 NFPA 70: National Electric Code International Electric Code Series

Abbreviations, Acronyms and Terms used in this document are in accordance with ASME Y14.38M, Abbreviations and Acronyms.

3.0 Requirements

3.1 Quotation Requirements

The Supplier shall notify Mississippi State University via email or direct contact of any concerns, objections, and/or comments he has relative to this specification. The Supplier shall provide mechanical and electrical prints of a similar machine produced by the Supplier, if possible. These documents will remain property of the Supplier.

This specification will not cover all the design details or unique features of the equipment; therefore, the Suppliers quotation shall fully describe his proposed equipment and shall provide the following information:

- A complete equipment specification, with notes on special or optional features, equipment drawings or photographs, proposed control system details, proposed operator panel layout, and any other data that permits a full technical evaluation.
- The quotation shall contain a total price for the equipment as required to meet this specification, with any exceptions noted. Each requested option shall be priced separately.
- 3.2 General Requirements

An overall responsibility shall be accepted by the Supplier for the design, manufacture, performance, and reliability of the equipment as defined in this specification. This responsibility shall provide for a turn-key installation and service during the warranty period.

Mississippi State University will use the proposed equipment for the use of manufacturing aerospace components in an aerospace manufacturing environment. The equipment will be installed in an industrial atmosphere and operated under aerospace controlled containment area shop environmental conditions. The Supplier has the choice of configuration and the functional operational of the machine, except where specifically stated in this specification.

The equipment, including all auxiliaries, shall be arranged so that filters, access panels, doors, lubrication reservoirs, etc., are located for ease of maintenance service and housekeeping. Any adjustments and service, which fall into the category of normal operator functions, shall be possible without special tools, the removal of bolted-down covers, assistance from any maintenance personnel, as well as being accessible from a suitable working surface.

Main electrical disconnect and all utility shutoff valves shall be supplied by the Supplier and shall be accessible at floor level. There shall be only one source of supply for each utility required. All energy sources shall be equipped with lockable energy isolation devices.

Chemical Products

The Supplier shall submit an SDS (Safety Data Sheet) for any chemical products that are to be shipped with the equipment. Equipment and chemical products included in the order shall not ship without local Environmental Health and Safety review and approval. Examples include lubrication and hydraulic oils, coolant, cleaning fluids, touch-up paint and grinding media.

Environmental Health and Safety

Supplier/Manufacturers representatives or sub-contractors sent to Mississippi State University by the Supplier/Supplier must have completed the required OSHA training and follow the applicable OSHA requirements found in 29 CFR 1910 or 29 CFR 1926. No PPE is required at the Advanced Composites Institute, but safety shoes and safety glasses are strongly suggested on the shop floor during installation.

Upon award, seller shall provide to Mississippi State University a copy of their "Certificate of Insurance" with their quotation for onsite work, if any is to be performed, at the Starkville, MS facility

NEC 2005 NFPA 70 National Electric Code requires field marking that shall warn electrical workers of potential electrical arc flash hazards when working on the equipment when power is present. All equipment containing electrical control panels shall be considered to have an arc flash hazard risk category of "2 or less". It is the responsibility of the supplier to ensure that the equipment shall meet this requirement.

All live components located inside enclosures, junction boxes, etc. such as: disconnect switches, fuses, starters, terminal blocks, and any other component operating at 50 volts RMS AC or 60 volts DC or more shall be guarded against contact with either Lexan or plexiglass shielding. The protective shield shall have small holes to allow maintenance personnel to probe the component without having to remove the shielding for trouble shooting the component, as applicable per NFPA 79.

NEC 2005- NFPA 70 National Electric Code Article 409 or JEC 60204-1 concerning Industrial Control Panels shall be complied to by the Supplier.

Utilities and Facility

Utilities shall be provided by Mississippi State University. The supplier must clearly document the minimum requirements to support the proposed machine.

The work cell shall only require a single point of connection for each of the required utilities.

The native power at Mississippi State University is 480 VAC, 3 PH power. Any transformers to modify power supply shall be supplied by the Supplier. Final available power connections in the installation cell

will be noted by Mississippi State University at the time of the Supplier's response to this specification. At the time of release for this specification, final connections have not been established.

A 100 PSI airline will be provided at the installation point. The air supply will be filtered of oil and humidity. Supplier shall provide all filters, regulators, moisture traps and lubricators required for air operated mechanical systems or air-cooling systems. If required, a vacuum line will be available capable of supplying a minimum of 22 hg vacuum, dead head gage.

3.3 Machine Requirements

The machine shall be a computer-controlled gantry type machine with controlled vacuum table. The machine will be used to cut a single layer of composite material, therefore a "single-ply cutting" unit is desired. A static (non-conveyor) cutting machine is the requested configuration. The dimensional configuration of the table shall be of the dimensions below:

Minimum Width	Minimum Length (Cutting Zone + Pick Zone as applicable)	Configuration
6 ft.	12 +3/-0 ft.	Static Table

The supplier shall quote as an option an automated material cloth feeder/rack assembly to interface with the proposed system. The holder shall have a locking device to prevent bar from turning when not in use. Maximum roll weight is 200 pounds. Maximum roll size is 62 inches wide no greater than 18 inches in diameter. Standard core diameters are 4-12 inch

The axis configuration shall meet the requirements of EIA RS 267-C. Supplier shall identify axis labeling and direction. The Supplier shall provide all safety devices, interlocks, and software required to ensure 100% safety around the complete machine area. The cutting surfaces shall be compatible with carbon and glass epoxy fabrics, prevent contamination, and shall be replaceable by Purchaser's maintenance personnel within one 8-hour shift. The vacuum system shall be monitored, and loss of vacuum shall trigger a machine interlock.

Supplier shall specify cutting surface requirements, cost of cutting surface replacement and replacement procedure. Height of the cutting surface shall be 36 inches from floor within the Supplier's standard tolerances.

Cutting surface shall be of a fiber reinforced belt-style material; shall be durable, and easy to clean. Porous plastic tabletops are not desired.

Vacuum system must have the capability to be mounted outside of the secured area that the cutting machine will be located. If applicable, Supplier shall quote all plumbing and wiring necessary for external installation of the vacuum blower unit. If the vacuum unit is self-contained within the plycutter unit, external vacuum will not be requested.

X and Y axes may be either rack and pinion, or timing belt drives. If not, Supplier shall describe the method used to the Purchaser for approval. The machine shall be capable of static (drag knife) and driven roller cutting. The cutter shall generate smooth cut edges. The cutting blade shall be easily replaceable by shop operators. Any tools or equipment necessary for replacing a blade must be provided. The machine shall be equipped with multiple tool holders (2 minimum). The control shall provide the capability for changing blades and tool holders during a cutting cycle.

A Pen plotter shall be provided. The pen plotter shall have the capability to print at any orientation that the nesting system supports. The pen plotter shall have the programmable capability to create man readable characters. The pen plotter must be capable of printing on the "poly" paper backing.

Quote as an option an Inkjet printer system: The ink jet shall have the capability to print at 0/90° or +45 /-45 orientations minimum. The ink jet shall have the programmable capability to create human readable characters. The ink jet shall have the programmable capability to print oversize characters for readability. Inkjet shall be capable of printing on the "poly" paper backing. Supplier to quote the type of replacement inkjet cartridge compatible with the unit.

The cutting machine shall possess several emergency stop and machine pause mechanisms (i.e., pushbuttons, cables, beam brakes, pressure pads, etc.) readily accessible from any point where an operator can access. Mississippi State University prefers interlocks that stop machine motion and allow the operator to restart cutting at the point where the machine was paused. Please note that Mississippi State University DOES NOT desire light curtain interlocks for this machine.

All linear axes shall have over-travel switches mounted far enough ahead of the machine slides mechanical limitation to prevent damage should the slide be driven onto the switch at its fastest speed.

Maximum backlash or lost motion on the linear slides shall be less than .002 inch. Positioning accuracy of the linear axes shall be +/-.015 inch, with a repeatability of +/- .015 inch. Profile accuracy shall be 0.020 inch minimum. The minimum positioning increment of each linear axis will be .002 inch. All axes shall be furnished with encoder feedback or an equivalent or superior feedback device.

The Supplier shall quote to Mississippi State University the cost of a turn-key installation at the Buyer's facility in Starkville, Mississippi. Mississippi State University shall provide all necessary utilities such as power, air, water, etc. within 10 feet of the machine installation site. The Supplier shall be responsible for shipping the machine from their facility to the Buyer's facility, off load the equipment and move it into the facility, install and start-up the equipment.

3.4 Machine Control System

The controller shall be fully capable of controlling all machine functions as well as the knife, printer and all other peripheral equipment required to form a complete cutting system. The system software shall at a minimum include the following features:

- Capability to manage (add, delete, modify order) a queue of NC nest programs for downloading to the cutting machines.
- Ability to ingest an AutoCAD .dxf nest file.
- Ability to program overcut and lead-in for each tool holder.
- Ability to map layers to tools
- Ability to interpret text and polylines as "marker/pen" items.
- The files to be cut will have both polylines and single-line text to be marked on the backing. The software shall **not** interpret the text as polylines.
- Capable of spline interpolation.
- Capable of automatic speed optimization shall be included to automatically program the maximum speed of cut within given contouring accuracy limits.
- Capable of directly programming head pressures.
- Capable of programming maximum theta axis rotation before lift/plunge action.
- Capable of performing nesting of composite ply shapes to maximize material utilization.
- Capable of re-nesting plys at the HMI to allow operators to perform recut operations.
- License key shall be distributed in the form of a "hard" key, such as a USB dongle or equivalent. Software keys are not acceptable. A minimum 130-day trial key shall be distributed at machine purchase. After completion of purchase, a permanent key shall be issued. No maintenance agreement for software required for machine operation shall be acceptable. Mississippi State University shall maintain a permanent software license after completion of purchase that does NOT require a maintenance contract (REQUIRED - BIDS THAT DO NOT MEET THIS REQUIREMENT WILL NOT BE ACCEPTED).

Quote as an option an additional offline seat of software to post-process files prior to sending to HMI. This offline seat is desired to have a floating license. If an offline seat is chosen, the requirement for the HMI to perform composites nesting may be waived.

A closed air circuit with heat exchanger to the outside of the cabinets is desired for all electronic control switchboards. Sensitive electronics on the cutting table should be sealed to prevent inclusion of carbon-composite fabric offcuts that could damage circuitry.

Help files shall be supplied on the HMI. The help files shall contain, but not be limited to:

- An index
- Start-up procedures for the machine
- Operator instruction for the machine
- Instructions for aligning, cleaning, and replacing all blades.
- Maintenance procedure for leveling and alignment of all machine axes
- Setup procedure (general)
- Troubleshooting guides or aids
- Scheduled maintenance procedure.

If applicable, the control system shall have a line conditioner or transformer for the incoming power. AC control systems shall be equipped with transient voltage surge suppression (TVSS) devices. If any AC devices are present, then they will have RC networks. All DC devices will have diodes.

3.5 General Alignment and Accuracy Requirements and Test Procedures

The machine accuracy test shall consist of the supplier's standard quality control checks and a cutting demonstration on Mylar material of a Mississippi State University supplied nest file. The intent is to demonstrate the capability to accept a cutting program and cut one kit from material provided by Mississippi State University. Cut plys will be evaluated for cut quality, dimensional accuracy and clarity of printing.

3.6 Training

Training of Mississippi State University designated personnel by the Supplier shall take place at the Purchasers facility by the Supplier. The training of the Purchasers personnel shall consist of the following: the system description, equipment capabilities, programming, routine maintenance, operator training, setup, and mechanical and electrical maintenance. Training will occur at startup of the equipment and consist of operator, programmer, and an electrical and mechanical maintenance overview to acquaint maintenance and operations personnel with the equipment

3.7 Guarantee and Warranty

The Supplier shall warrant all equipment in this specification to be free of defects in material and workmanship, and be in conformity with the requirements of this SOW for a minimum of 1 year, (12 months), from the date of final acceptance at the Purchaser's plant. If the equipment fails to meet any portion of this warranty, then the Supplier shall repair or replace the equipment in whole or in part. Quote as an option the price of a 2 year, (24 month), warranty. If, within the warranty period, the services of the Supplier are required, the Supplier shall supply, at its cost and expense, supply services and parts as are necessary to return the machine to its warranted condition in the shortest possible time.

If, within the guarantee period, the services of the Supplier are required, services shall be supplied as necessary to return the machine to its specified condition in the shortest time possible. The Supplier shall incur all expenses associated with such services.

3.8 Documentation

All documentation shall be forwarded to the Purchaser upon shipment of the equipment to the Purchaser's plant. All documentation shall be in English. The Supplier shall produce at a minimum the following documentation for the subject equipment:

- Two (2) sets of electrical, electronic, mechanical, pneumatic, process, and lubrication diagrams/schematics.
- Two (2) hard copies of the interface logic and One (1) copy of the software on standard CD. The Supplier shall specify the format to be used on the software.
- Two (2) copies each of all manuals relating to the drives, CNC control, etc.
- Two (2) copies each of an "Engineering Drawing" manual
- This manual shall contain the machine mechanical, electrical, pneumatic, and process components used on the machine. All component literature that comes with the component shall be supplied.
- A parts list indicating all the commercial part numbers and description.

Components that require "Support Software" to operate them shall have the necessary software package and the associated hardware supplied that is necessary to operate the component. All necessary information shall be provided with the Machine Documentation Package to allow Maintenance Personnel to troubleshoot the component if required.

3.9 Shipping

The Supplier shall be responsible for transporting the equipment to the Purchaser's facility. Equipment to be delivered to a suitable site designated by the Purchaser. The Supplier shall be responsible for ensuring that the equipment is properly covered, blocked, and secured for transportation. The Supplier shall provide a field service engineer, at no additional charge to the Purchaser, to install and qualify the equipment purchased.