



MISSISSIPPI STATE
UNIVERSITY™

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, in Bully Buy, or in a sealed envelope. Bids CANNOT be emailed
 - a. Sealed bids should include the bid number on the face of the envelope as well as the bidders' name and address. Bids should be mailed to : 245 Barr Avenue, 610 McArthur Hall, Mississippi State, MS 39762.
- 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"
- b. 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:
https://www.procurement.msstate.edu/procurement/bids/Bid_General_Terms_May_2019_V2.pdf
- c. Any contract resulting from this Invitation for Bid shall be in substantial compliance with Mississippi State University's Standard Contract Addendum:
<https://www.procurement.msstate.edu/contracts/standardaddendum.pdf>

Bid Number: MSU2025031

Opening Date: November 4, 2025 at 2:00 p.m.

Description: Wind Tunnel

Vendor Name: _____

Vendor Address: _____

Telephone Number: _____

Email Address: _____

Days the Offer is Firm: _____

Authorized Signature: _____

Name: _____

Title: _____

Item	Quantity	Description	Unit Price	Total Price
	1	Low Speed Wind Tunnel for Droplet Size		
	1	High Speed Wind Tunnel for Droplet Size		

Specifications for Fabrication and Installation of a Low- and High-Speed Wind Tunnel to Determine Droplet Size

GENERAL REQUIREMENTS:

Fabrication, installation, and verification of functionality and accuracy of a low-speed and separate high-speed wind tunnel to determine droplet size and evaluate off-target movement of pesticides. Bids submitted should provide for turnkey operation once completed. The successful bidder is responsible for visiting the site before submitting a bid to observe existing conditions. No compensation will be provided for conditions that would be visible during an on-site visit for person(s) experienced in performing this type of work.

Permits:

Where governing regulations and imposed codes and standards require notices, permits, licenses, inspections, tests, and similar items or actions to proceed with the required work lawfully, the successful bidder shall obtain items and take those actions in accordance with the regulations of the governing authority. The costs of such permits, licenses, inspections, etc., are the obligation of the successful bidder.

Installation:

It shall be the responsibility of the successful bidder to complete work following the manufacturer's recommendations and industry standards. Additional procedures and materials may be required than is indicated herein. If any item specified herein conflicts with the applicable codes and recommendations, the successful bidder shall bring it to the attention of the Contracting Officer for immediate resolution.

Submittals:

Provide the manufacturer's descriptive literature/shop drawings for all materials to MAFES for review. The descriptive literature shall be annotated/highlighted to show its conformance with contract requirements. Any work and material completed before approval from MAFES is at the successful bidder's own risk.

Quality Control:

The work performed under this contract shall be subject to continuous audit by MAFES. Quality control is the exclusive responsibility of the successful bidder, with all required manufacturer's inspection requirements being performed.

Safety:

The successful bidder shall protect the work, the site, and all existing property and structures within the limits of the fabrication activities or that may be affected thereby until acceptance of the work. Any property damage shall be repaired at the successful bidder's expense to pre-damaged condition to the satisfaction of MAFES. Safety and health matters, as they relate to the work, are the exclusive responsibility of the successful bidder. The successful bidder shall furnish, erect, and maintain barricades, warning lights, signs, and guards or take other precautions as may be required by law or local authorities for protection and security. The successful bidder will provide a safety plan for the project. All fabrication and installation shall comply with applicable federal, state, and local code requirements as well as current industry standards (i.e., UBC, UPC, NFPA, UL, ASTM, ACI, NEC, NEMA, etc.) and health and safety codes, in effect at the time of contract award.

Temporary Facilities:

Temporary utilities (water and electricity) may be furnished to the successful bidder by MAFES if so requested. The successful bidder shall maintain and protect all such utilities during fabrication and shall repair or replace any items damaged through its negligence. Should the successful bidder require any power or utility shutdowns during fabrication, the successful bidder shall obtain approval for such shutdown from MAFES three working days before the need.

Materials and Equipment:

The material and equipment to be furnished under these contract documents shall be the standard products of manufacturers regularly engaged in the production of such materials and equipment and shall be the manufacturer's latest standard design.

All materials and equipment to be incorporated in the work shall be handled and stored by the manufacturer, fabricator, and/or supplier before, during, and after shipment in a manner to prevent warping, twisting, breaking, chipping, rusting, and any injury, theft or damage of any kind to the materials and equipment. All materials and equipment furnished by the successful bidder shall be subject to inspection and approval by MAFES.

Cleanup:

The installation site shall be kept clean and free of debris at all times. Upon completion of the project and before the final inspection, the successful bidder shall remove from the premises all unused material, trash, and debris resulting from the work.

Warranty:

- Provide a one-year warranty for areas repaired.
- Provide material's warranty
- All fabrication and installation shall comply with applicable federal, state, and local code requirements as well as current industry standards (i.e., UBC, UPC, NFPA, UL, ASTM, ACI, NEC, NEMA, etc.) at the time of contract award.

Project Schedule:

The contract time for this project is 270 calendar days from the successful bidder's notice to proceed.

TECHNICAL AND COST BID REQUIREMENTS:

- Provide a technical and cost bid for the design, fabrication, installation, and verification of functionality and accuracy of a high-speed wind tunnel and a separate low-speed wind tunnel. Each wind tunnel must provide accurate determination of droplet size and ability to evaluate off-target movement of pesticides. Bids submitted should provide for turnkey operation once completed. Each tunnel should include:
 - Control and monitoring systems for operation and data collection
 - A wind tunnel control and monitoring system that will provide a user control system to set fan speed, control spray nozzle traversal, and activate liquid spray, as well as monitor and record air and liquid flow parameter data to an integrated data acquisition system.
 - A uniform airflow outlet nozzle with integrated airspeed and temperature measurement sensors for a high-speed wind tunnel and a low speed wind tunnel.
 - A test section area for a high-speed wind tunnel, including a traversing system for a flow diagnostic laser system.
 - An air scrubber system for each wind tunnel system. The scrubber system will provide entrapment and filtration for all air flow and sprays in the test area and attached sections.
 - A low-speed wind tunnel with a test section 50 ft in length and a cross section of 4ft x 4ft
 - A spray system and a spray boom traversing mechanism with speed and position control, which can be monitored and controlled through an interface with LabVIEW software.
 - A laser diagnostics test area
 - The successful bidder will perform flow checks at the outlet of the atomization test section.
 - The successful bidder will evaluate turbulence intensity and flow uniformity at the outlet area and develop a report of performance.

Wind Tunnel Project Details Requirements:

1. High-speed wind tunnel requirements.
 - a. A turnkey project satisfying all local and state requirements.
 - b. All sections exposed to spray will be waterproof, all air in the outlet sections will be filtered for vapors, all fluids will be collected and channel to a storage container.
 - c. Provide engineered drawings for review by MAFES to ensure that the drawings satisfy the project's needs and requirements. Upon acceptance by MAFES, the drawings will be provided (both electronically and in hard copy) to MAFES. CAD drawings will be provided to MAFES to complete the package.
 - d. Position and anchor the high-speed wind tunnel. The unit will be arranged to accommodate all components of the wind tunnel and air scrubber within the building. The unit will be firmly mounted but anchored to minimize vibration created by operating

the unit. The unit will be mounted to facilitate use and reduce the need for employees to work in awkward positions.

- e. Connect the building electrical service to the 200 HP, 480 V motor with a variable frequency drive for interface and control. The successful bidder is responsible for installing all conduit, electrical wiring, and associated material to satisfy the electrical code and power the wind tunnel motor. The successful bidder will provide all material and labor for all electrical components.
- f. The wind tunnel setup will include the wind tunnel, a test area to control conditions around the exit jet, a scrubber to collect spray for disposal, a filter system to contain vapors and fumes, and a traversing mechanism to locate the lasers at a desired height and distance from the nozzle location.
- g. All components of the system are expected to be exposed to several levels of moisture. All materials will be rust-resistant, have rust-preventive coatings, and/or be painted.
- h. The facility parameters include a 1 ft. 1 ft. jet centered 6 ft. above ground and with a maximum speed of 200 mph. The scrubber is required to collect spray particles for disposal, control mist inside the test area and filter vapors and fumes. The support equipment should include a traversing mechanism that fits inside a 12 x12 ft area; the movement is not required to be automated.
- i. Installation of the outlet nozzle, so that the spray discharge is within the capture region of the scrubber. The successful bidder will connect the electronic controls and air velocity monitoring sensors to LabView control software and data acquisition systems. The successful bidder is responsible for installing all conduit, electrical wiring, and associated material to satisfy the electrical code. The successful bidder will provide all material and labor for all 120v components.
- j. The outlet nozzle test area will also include an electronically controlled traverse mechanism that provides for secured support and vertical movement of the spray boom and liquid dispersal system. This mechanism shall allow for precise control of the speed of the vertical traverse as well as for precision placement of the boom at any point across the height
- k. The design should include three main sections:
 - i. First is a test volume control area. The section will include track rails on the walls to move the traversing mechanism. The traversing mechanism should move the lasers in a height range of 2 ft. The tunnel exit area should be inserted into the section 2 ft, and the closest position of the traverse is 2 ft from the jet exit. The material for these sections will consist of structural steel for the frame, with standard sheet metal siding on the inside. The traversing mechanism should be fabricated of structural steel with stainless steel or aluminum parts for the motion rollers and position hardware. The floor will be fiberglass grating supported by painted structural steel. The area entry should be enclosed to control and capture/filter mist and vapor/fumes. The section should be watertight to control and capture the spray solutions, which will be diverted to a containment area for extraction and disposal.
 - ii. The second section consists of the jet expansion, diffuser, and mist control, spanning a 12 ft square area and 18 ft in length (with 10 ft and 8 ft sections). The main jet diffuser will be located in the center, with an exit area of 64 ft² (8 ft² square); the diffuser should spread and drop the jet's pressure evenly at the exit. For 200 mph jet, the diffuser should drop it to no more than 5 mph. The section should be watertight to control and capture the spray solutions, which will be diverted to a containment area for extraction and disposal.
 - iii. The third section is the scrubber, which will also be located inside the building. The scrubber will have a screen in front and a Louver system to help capture the liquid spray. The base of the section is a collection basin and should include a suction pump to remove the fluids for disposal. The scrubber materials should

be made of painted steel sheet metal; all structural steel should be coated with corrosion-resistant materials. The collection basin should be made of stainless steel for corrosion resistance. The section should be watertight to control and capture the spray solutions, which will be diverted to a containment area for extraction and disposal.

- iv. The spray system should be integrated into the control system. The computer and data acquisition systems should be included in the bid.
1. The successful bidder may utilize other fabrication materials provided they provide equal or better structural integrity and corrosion resistance properties.
2. Low-speed wind tunnel requirements.
 - a. A turnkey project satisfying all Local and State requirements.
 - b. All sections exposed to spray will be waterproof, all air in the outlet sections will be filtered for vapors, all fluids will be collected and channel to a storage container.
 - c. Provide engineered drawings for review by MAFES to ensure the drawings satisfy the project's needs and requirements. Upon acceptance by MAFES, the drawings will be provided (both electronically and in hard copy) to MAFES. CAD drawings will be provided to MAFES to complete the package.
 - d. Position and anchor the low-speed wind tunnel fan and power unit. The unit will be positioned to allow all parts of the wind tunnel and air scrubber to be inside the building while also providing access to the system's perimeter. The unit will be firmly mounted but anchored to minimize vibration created by operating the unit. The unit will be mounted to facilitate ease of use and reduce the need for employees to work in awkward positions.
 - e. Connect electrical service to the low-speed wind tunnel motor and variable frequency drive. The successful bidder is responsible for installing all conduit, electrical wiring, and associated material to satisfy the electrical code. The successful bidder will provide all material and labor for all electrical components
 - f. The wind tunnel setup should include the wind tunnel inlet, motor, round to square transition, flow conditioning section, circuit length, and exit test area, atomization test section to control conditions around the exit jet with an integrated traversing mechanism to locate the lasers at a desired height and distance from spray nozzle and, a scrubber to collect spray for disposal. The entrance and exit test areas will include an integrated spray nozzle traversal assembly and spray system.
 - g. All components of the system are expected to be exposed to several levels of moisture. All materials will be rust-resistant, have rust-preventive coatings, and/or be painted. All tunnel circuit sections should be water tight and include a fluid collection system.
 - h. The facility parameters include a 4 ft. x 4 ft. jet centered 4 ft. above ground and with a maximum speed of 20 mph. The facility will include a test circuit 50 ft long. The scrubber is required to collect spray particles for disposal and control mist inside the test area. The support equipment should consist of a traversing mechanism that fits within an 8 x 8 ft area; the movement is not required to be automated.
 - i. Design: The design includes four main components.
 - i. Fan Inlet, Outlet Expansion, and Flow Conditioning Sections. The provided fan should be an axial fan with sufficient size and horsepower to achieve desired wind speeds. An inlet section that provides uniform air intake while providing screening or other protective measures to restrict debris or personnel from accessing the fan entry port is required. The flow conditioning section will be

positioned at the fan exit and designed to provide adequate geometry and length, allowing the development of uniform airflow at the outlet leading into the atomization test section. Additionally, flow conditioning screens positioned near the fan inlet and/or outlet should be provided to enhance airflow uniformity.

ii. Nozzle Duct and Exit Test Area and Integrated Spray Nozzle Traversal Assembly. The low-speed nozzle outlet test section will have a minimal functional test area of 4 ft x 4 ft. The air velocity at the outlet will span the range of 1 to 20 mph. The geometry of the nozzle should be such that edge effects are minimized. Automated sensors should be mounted within the nozzle outlet test area to measure, monitor, and record air velocity and temperature. The sensors should be of sufficient number and placement to provide a representative measure of air velocity at the exit test area. Electronic gauges, which convert the pitot analog data into electronic data, shall be integrated into the high-speed tunnel's data acquisition system and electronic control station, implemented in LabView. The nozzle outlet section should utilize lightweight, structural materials, where possible, that are coated or painted as needed to prevent rust and corrosion. Turbulence intensity at the nozzle outlet face should not exceed 5%; however, this metric can be adjusted with valid reason and prior approval from MAFES. The integrated spray nozzle traversal assembly should provide for a minimal range of traverse of approximately 4 ft, allowing for movement of the fluid line and nozzle assembly across the entire height of the nozzle exit test area. The traversal assembly shall be attached securely to the face of the nozzle exit test area and be fabricated such that there is minimal structural interference with the exiting air jet. Continuous traversal speed should allow for a range from 0.1 to 2 inches per second.

iii. Atomization Test Section and Integrated Laser Traversing Mechanism. The atomization test section should be located immediately after the 4 ft x 4 ft nozzle duct exit area and should have a minimum working area of 8 ft square by 8 - 10 ft long, with the length established to provide sufficient distance for the laser traverse and scrubber components. The material for these sections should consist of structural steel for the frame, with standard sheet metal siding on the inside. The traversing mechanism should be fabricated of structural steel with stainless steel parts for the motion rollers and position hardware. The bottom should be fiberglass grating supported by painted structural steel. The area entry will be enclosed to control and capture/filter mist and vapor/fumes. The section should be watertight to control and capture the spray solutions, which will be diverted to a containment area for extraction and disposal.

iv. Scrubber for Spray Material Collection. The scrubber will also be located inside the building. The scrubber should have a screen in front and a Louver system to help capture the liquid spray. The louver should cover the entire inside area. The base of the section is a collection basin and should include a suction pump to remove the fluids for disposal. The scrubber materials should be made of painted steel sheet metal; all structural steel should be coated with corrosion-resistant materials. The collection basin should be made of stainless steel for corrosion resistance. The section should be watertight to control and capture the spray solutions, which will be diverted to a containment area for extraction and disposal.

v. Spray system. The computer and data acquisition systems should be included in the bid.

j. The successful bidder may utilize other fabrication materials provided they provide equal or better structural integrity and corrosion resistance properties.