Agricultural Research Council
Plant Health and Protection
P/Bag X134, Queenswood, Pretoria 0121

SUPPLY, INSTALLATION AND COMMISSIONING OF SOIL PASTEURISATION EQUIPMENT

BID SPECIFICATION CRITERIA

- **PROJECT LOCATION**

1. Agricultural Research Council - Plant Health and Protection
   Vredenburg Research Farm (Western Cape)
   Winery Way
   Stellenbosch, 7600
   33°56'55.2" S 18°50'10.9" E

- **ARC-PHP SUPPLY CHAIN MANAGEMENT REPRESENTATIVE**

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BID SPECIFICATION CRITERIA: SUPPLY, INSTALLATION AND COMMISSIONING OF SOIL PASTEURISATION EQUIPMENT

1. TECHNICAL SPECIFICATIONS: VREDENBURG RESEARCH FARM (WESTERN CAPE)

1.1. BACKGROUND AND REQUIREMENTS FOR THE SYSTEM

A new pasteuriser is required at ARC-PHP Vredenburg campus in Stellenbosch. This pasteuriser will be used mainly to pasteurise soil and pots for the purpose of glasshouse trials. The purpose of pasteurisation is to eliminate a variety of plant pathogens and other microorganisms, as well as unwanted seeds that might be present in the soil. The supplied equipment must therefore be robust, accurate, and of a high standard to ensure reliability and long service. For the most part, soil will be pasteurised in 13 cm diameter plastic pots that each contain ~800 g of soil, but in some cases larger pots will be used, or buckets containing up to ~20 L of soil. The pasteuriser must be able to accommodate a maximum capacity of at least 720 x 13 cm diameter pots filled with soil per batch. On average, the pasteuriser will be used twice every 1–2 weeks. Specifications for the equipment required are detailed below. These requirements are based on our current system which is depicted in Figures 1–3.

Figure 1. Closed pasteuriser with trolley tracks raised.

Figure 2. Open, loaded pasteuriser with one set of trolley tracks lowered.

Figure 3. Open pasteuriser with one trolley pulled out onto the tracks. The trolley is loaded with steel trays containing 13 mm diam. pots with soil.

1.2. TECHNICAL SPECIFICATIONS

Please Note:
Quantities and pricing should be added to the following template so as to enable fair comparison between bids. Any modifications, additions or changes to the proposed specifications listed should be clearly indicated, together with a brief motivation, in a different coloured font under each point or where applicable.

NO.	TECHNICAL SPECIFICATION: [VREDENBURG]	QTY.	UNIT PRICE	TOTAL COST
1	**SCHEMATIC DRAWINGS AND RECORDS UPON COMPLETION**			
1.1	A detailed layout/schematic drawings of the instrument needs to be supplied upon completion of the project. This is to allow easier maintenance of the system by any qualified supplier that were not involved in the construction or design of the system. This layout should further indicate the: 1. Electrical and water connections to the machine 2. Interior parts and connections 3. Mechanical operation during working			
1.2	Certification of key features on completion: Bidders are also to demonstrate key features, supply appropriate certification documentation and/or evidence that the required specifications herein have been met. These must include: 1. Temperature distribution test and report.			
1.3	Manuals, training and guarantees: Upon completion of work, all instruction manuals (electronic copies), controller software keys/access codes, passwords, written guarantees and warranties of newly installed equipment and materials must be provided. Training of ARC-PHP staff (5 people) in operation and basic maintenance of the machine must also be undertaken.			
1.4	A written maintenance and service plan needs to be included detailing the following: 1. Expected lifetimes of key parts 2. Schedule for cleaning or maintenance of specific parts 3. Servicing intervals 4. Must be linked to 5.2			
2.	**PASTEURISATION BOX**			
2.1	1. The pasteurisation box and doors should be constructed of durable stainless steel that is strong enough to maintain structural integrity of the pasteurisation box, does not corrode, and does not warp, despite frequent exposure to steam and water. 2. Maximum capacity of at least 720 x 13 cm diam. pots while			

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	allowing for adequate steam penetration of soil in each pot. 3. Doors that lock securely during operation. 4. Doors must seal during operation without allowing steam to escape. Any rubbers or other materials used as seals should be resistant to frequent exposure to steam, moisture and high temperatures. 5. If doors are hinged, durable hinges should be used that can carry the weight of doors without warping over time. 6. Doors and walls of the pasteurisation box should be insulated to prevent heat loss and improve energy efficiency. 7. The box should be fitted with the necessary drainage (connected to existing services) and steam outlets (must be directed to outside the room e.g., through the roof).			
2.2	A two-trolley system should be used for the easy loading and off-loading of the pasteurisation box, unless a more efficient system is proposed. 1. Two trolleys with racks to carry removable trays. Each trolley should be able to accommodate 36 stainless steel trays. 2. 72 stainless steel trays, each tray with a capacity of 10 x 13 cm pots must be supplied. 3. Trays and trolleys should be constructed in such a manner as to allow adequate steam penetration into soil of all pots even when fully loaded. 4. Trolleys, trays, and/or the pasteurisation box should be constructed in such a manner that water condensing against any surfaces in the pasteuriser does not drip or flow into any of the pots or trays, which can cause some pots to be wetter than others. 5. Tracks should be included to allow for easy movement of trolleys in and out of the pasteurisation box (i.e., no steps or raised joins or gaps). 6. The trolleys, tracks and trays should be constructed of durable stainless steel that can withstand frequent exposure to steam and water, as well as carry the necessary weight without warping or compromising the integrity of any part of the machine. 7. When fully loaded, trolleys should still be able to be moved in and out of the pasteurisation box by a maximum of two people. 8. Trolleys and tracks should be constructed in such a manner as to prevent trolleys from falling off tracks (e.g. u-channel). 9. Heavy duty trolley wheels should be strong enough to carry the weight of the trolley as well as trays and filled pots and must be durable and resistant to corrosion. 10. Trolley tracks should not interfere with opening and closing of pasteurisation box doors.			

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3	**TEMPERATURE RANGE AND RETENTION TIME CONTROL**			
3.1	1. A controller should be included through which the temperature and soak/dwell times for each pasteurisation cycle can be set easily. 2. During operation the controller should display the cycle progress at least in terms of duration, elapsed time and current temperature. 3. The controller should be password protected to prevent unauthorised changes to settings. 4. Temperature and duration data for completed cycles should be stored and downloadable in an easily readable format (e.g. Microsoft Office .xlsx or .csv). 5. The controller should be connected to the local network to access data of current and completed cycles, but a network connection should not be required for operation of the pasteuriser. Proposed solution must be specified (e.g. wireless connectivity to enable data to be downloaded remotely via a browser link). 6. The controller should be able to resume incomplete cycles in case of interruptions of 5 minutes or less. 7. The controller must be located in the same room as the pasteuriser and must be able to withstand exposure to high humidity and heat. 8. The controller should display at least the following error messages when necessary: • Interrupted cycle • Incomplete cycle • Failure to reach set temperature • Inadequate water supply			
3.2	Audible alarm should be supplied to indicate any malfunction (e.g. interrupted cycles, overheating) and where pre-requisite conditions are not met to successfully run a cycle (e.g. water supply not available).			
3.3	The pasteuriser should be able to maintain set temperatures ranging from 50–100 °C for periods of up to 1 h with variation of 2 °C above or below the set temperature for the duration of the retention time. 1. Temperature range: 50–100 °C 2. Retention times: up to 1h for the entire temperature range 3. The heat should be evenly distributed across the pasteurisation space – there should be no cold spots. 4. Temperature setpoints and retention times should be programmable.			
3.4	Steam and heat generation should be done in an energy-efficient manner. 1. Steam supply system must comply with safety regulations as applicable: • If steam pressure vessel is used a pressure equipment 'certificate of manufacturing' must be supplied). • If an element system is used all electrical components			

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	(e.g. element) must be appropriately insulated. 2. If applicable to heating system, incorporate return air cowling to recycle hot air back through heating element/boiler. 3. If applicable to heating system, use fan forced circulation of air/steam mixture to accelerate heat up time. 4. Steam supply system has to be insulated to prevent heat loss. 5. If applicable, any ducting should be insulated to prevent heat loss during transfer of steam to pasteurisation box.			
3.5	Movable corrosion resistant probes should be installed to monitor soil temperatures in the middle of the pots or buckets, regardless of the pot or bucket size. 1. Probes should be at least 20 cm in length. 2. Probes should be firmly secured in pots, but easily transferable to other pots of different sizes when needed. 3. The number of probes needed might depend on the pasteurisation system used. 4. At least two probes must be supplied (i.e. one per trolley).			
4	**GENERAL REQUIREMENTS**			
4.1	1. Connection to the existing electrical supply needs to be included. 2. A Certificate of Compliance (COC) needs to be supplied for electrical connections or alterations.			
4.2	1. Connection to the existing water supply and drainage needs to be included. 2. A single stage in-line filter (10” housing with replaceable PP spun fibre filter) must be provided on the water supply inlet (i.e. between the unit and the municipal water supply). 3. An appropriately sized full-bore ball shut-off valve must be fitted to enable easy replacement of these filters. 4. Should the system require softening of the water supply, this should be included and details specified.			
4.3	The space allocated for the entire system (pasteuriser, steam supply system and trolley tracks) is inside an enclosed room. The entire system needs to fit in this allocated space. Depending on the system provided, some modifications will be considered for approval. 1. The available space currently measures: 4.5 x 3 x 3 m (L x W x H) 2. If necessary, additional floor space of up to 4.5 x 0.7 m can be freed up through the removal of concrete benches currently built into the wall and floor (to be included in quotation if applicable). Should this modification be required, all rubble should be removed and walls replastered and repainted. 3. Any structural changes to the current space need to be included in the quotation. 4. Construction and installation should be done without structural			

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	changes to the entrances of the room.			
4.4	The machine should be fully functional once delivered and installed.			
5	**MAINTENANCE, SERVICE AND REPAIR**			
5.1	All parts required for maintenance, service and repair must be available locally.			
5.2	A three-year service plan should be included in this quotation. Please provide a detailed list of the activities that will be undertaken under this plan (e.g. cleaning, preventative maintenance, replacement of filters, etc.).			

- **ARC-PHP VREDENBURG CAMPUS REPRESENTATIVE**

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  Mobile: 082 787 5216
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2. BIDDING CRITERIA

2.1. GENERAL

1. Bidders must provide a detailed quote and costing describing the type of steam generating system proposed (incl. kW), components to be used (i.e., control system, number of probes, materials, etc.) and design features incorporated (e.g. trolley system, safety features and failsafe's, etc.), as well as purchase and fabrication lead times and installation timelines.
2. It is desired that bidders provide a detailed written proposal or pre-recorded presentation (e.g. MS PowerPoint) outlining their proposed system and how it will address the needs as stated in the initial background paragraphs. The presentation should address aspects of operation, serviceability, energy efficiency, running cost per cycle and life expectancy of components.
3. Sub-contracting will be permitted. Full details of proposed sub-contractors to be provided with the bid so far as possible. The appointed contractor will remain responsible for ensuring all work carried out by sub-contractors is to a standard in accordance with the specifications/requirements described herein. Selection and appointment of sub-contractors to be done by the appointed contractor, the ARC-PHP will not appoint sub-contractors.
4. Bidders are expected to attend a compulsory site visit on a specified date to be communicated.
5. The bidder must give a detailed price breakdown on the template provided with changes and additions clearly marked with a brief motivation.
6. A two-envelope tendering system will be followed. The bidding price must be in a separate envelope.
7. The bidder shall guarantee the installation, workmanship, materials and mechanical equipment used under this project for a period of twelve months.
8. Bidders to clearly indicate any improvements to the proposed specifications, where those changes will increase the overall functionality, safety, efficiency and usability of the system, and/or a cost saving.
9. The ARC has the right to choose or omit certain aspects of the quotation.
10. The specifications listed herein may contain errors or omissions. Bidders should familiarise themselves with the requirements of the system and scope of work required prior to submitting their bids.
11. A contingency amount equivalent to 10% of the total project value should be clearly included in the bid pricing. The ARC reserves the right to not spend this contingency, or only part of it. Variation orders to be drawn from this contingency must be pre-approved by the ARC project manager/representative prior to being actioned.

2.2. FUNCTIONALITY CRITERIA

NO	FUNCTIONALITY CRITERIA / EVALUATION QUESTIONNAIRE	POINTS ALLOCATED	WEIGHT
1.	**Project team experience:** (Technical capability of the team) Company's general experience, level of education and training and positions held in each discipline of the team. The bidder must include resumes of the key project personnel (as below) and sub-contractors that will be assigned to this work. • The foreman must have at least a Higher Certificate (NQF Level 5) in Mechanical Engineering or related field (Welding, Stainless steel fabrication, pipe fitting, etc.) recognised by the South African Qualifications Authority (SAQA) with a minimum of 3 years relevant experience (i.e. pasteurisation system fabrication and installation). • Qualified electrician that will issue the Electrical Certificate of Compliance. • Technician(s) with relevant experience (i.e. pasteurisation system fabrication and installation). Minimum NQF level 3.		**30%**
	All 3 key personnel listed comply with the above requirements.	5	
	2 key personnel listed (including the foreman) comply with all of the above requirements.	4	
	2 key personnel listed (including the foreman but who has less than 3 years of experience).	3	
	Only the foreman listed but who has less than 3 years of experience.	2	
	Personnel do not comply with the above or information not given.	1	
2.	**Company experience and past performance:** Bidders must list, and support with original reference letters or Completion Certificates issued by past clients, projects involving the installation and/or fabrication of pasteurisation and/or sterilisation equipment. This should include projects that were executed from a minimum value of R400 000, and which are not older than ten years. The ARC evaluation committee has the right to contact these companies. Letters/completion certificates should be on the client's company letterhead and must include the following information: • Name of the business (client's company) • Location of the project, your company's role in the project and contract value. • The total project/contract value if part of a broader project. • Elaborate on the project - industry served, purpose of installation. • Contact person, contact numbers, and email address.		**40%**
	Completion of **4** or more projects involving design, component fabrication and installation of pasteurisation equipment that are not older than **10 years**.	5	

	Completion of at least **3** projects involving design, component fabrication and installation of pasteurisation equipment that are not older than **10 years**.	4	
	Completion of at least **2** projects involving design, component fabrication and installation of pasteurisation equipment that are not older than **10 years**.	3	
	Completion of at least **1** project involving only installation of pasteurisation and/or sterilisation equipment that is not older than **10 years**.	2	
	No information on past projects supplied.	1	
3.	**Technical approach, methodology and work plan**: Detail to be included in the bid: i. A work plan to complete the project (preferably within 4 calendar months after receipt of formal appointment letter). ii. Work breakdown with logical sequence of activities, including timelines. iii. Manufacturing capacity and resources to be used. iv. Quality management (i.e., milestones, inspections, etc.). v. Risk mitigation (i.e., identification of possible delays or problems and proposed solutions).		**30%**
	Provision for all **5** aspects (work breakdown, timeline, resources, quality management, risk mitigation) clearly explained and demonstrated within the bid document (e.g., with detailed GANTT chart, activity tables, etc.).	5	
	Provision for **4** aspects (work breakdown, timeline, resources, quality management, risk mitigation) clearly explained and demonstrated within the bid document (e.g., detailed GANTT chart, activity tables, etc.).	4	
	Provision for **3** aspects (work breakdown, timeline, resources, quality management, risk mitigation) explained and demonstrated within the bid document (e.g., detailed GANTT chart, activity tables, etc.).	3	
	Provision for only **2** aspects (work breakdown, timeline, resources, quality management, risk mitigation) demonstrated within the bid document (e.g., detailed GANTT chart, activity table, etc.).	2	
	Provision for only **1** aspect (work breakdown, timeline, resources, quality management, risk mitigation) demonstrated within the bid document (e.g., detailed GANTT chart, activity table, etc.), or no plan provided.	1	

2.3. TOTAL SCORE FOR FUNCTIONALITY

Bids that do not obtain a minimum score of 60% for functionality will be disqualified and will not be evaluated further on price and Specific goals.

2.4. FINAL SCORING

Final evaluation will be based on BBBEE score and pricing. 80% will be allocated to pricing and 20% will be allocated to specific goals in terms of the PPPFMA.