

**TERMS OF REFERENCE**

**Supply of equipment to phase-out methyl bromide in horticultural crops in Argentina**

**1. GENERAL INFORMATION**

These terms of reference shall be used for the preparation of bids for the supply of the following equipment required to phase-out 551 metric tons of Methyl Bromide consumed by the strawberries, flowers and protected vegetables agricultural sub-sectors in Argentina:

**1.1 Twenty (20) mobile compact steam producing units (of which ten (10) are firm orders, and ten (10) subject to further confirmation before February 2002) for soil pasteurization, composed each one of:**

- X A tubular boiler producing 1000 kg/hr of steam at a working pressure of not less than 3 kg/cm<sup>2</sup> and at a temperature not lower than 142° Celsius, overheated up to 160° Celsius. The boiler shall use water at room temperature, as per specifications described later. Boilers shall be designed for using hard water properly corrected by a magnetic mobile field device and shall be designed for easy cleaning of calcium deposits.
- X One power generator having the necessary power output and voltage to operate the above boiler independently from the power grid
- X One mobile platform in which the boiler, a power generator, a 400 liters fuel tank and a intermediate 1500 liters water reservoir is firmly mounted
- X Gas-oil and water pumps to fill these tanks from external sources
- X Manuals
- X One winding hose cart with 1x70 meters steam hose of internal diameter of 70 mm to be connected to a steam distributor from one end and at the boiler steam outlet at the other end

**1.2 Ten (10) sets (of which five (5) are firm orders, and five (5) subject to further confirmation before February 2002) composed of two plaques each, designed to be handled by a tractor, for the purpose of soil pasteurization by applying steam to flat soil surfaces, as per specifications described in 3.5**

**1.3 Ten (10) sets (of which five (5) are firm orders, and five (5) subject to further confirmation before February 2002) composed of five plaques designed to be handled by a tractor, for the purpose of soil pasteurization by applying steam to soil ridges, as per specifications described in 3.6**

Each compact monoblock mobile unit complying with the specifications described later shall include all required components in order to pasteurize agricultural soil.

Overseas suppliers shall deliver DDU to the different sites described in Chapter 5. The Contractor shall be responsible for costs, fees and charges in respect of the export and transit of the equipment and technical documentation, but not for customs duties, taxes or

license fees in the Project Area, which are the responsibility of the Project Counterpart. The Contractor shall also obtain, at his own risk and expense, any export license or other governmental authorization(s) necessary for the export of the equipment and technical documentation. The Government of Argentina will authorize a free customs clearance.

National Suppliers shall deliver to the sites described later. The National Contractor shall be responsible for payment at its own cost of all local and national taxes, assessments, liens and charges which will be due to be paid by the Contractor as a result of this Contract.

## 2. THE PROJECT

Methyl Bromide is a soil fumigant, which has been included in the list of substances that deplete the Ozone layer, and is subject to a phase-out schedule according to the Montreal protocol and subsequent amendment ratified by the Government of Argentina.

The objective of the project approved by the executive Committee of the Montreal Protocol Multilateral Fund is to eliminate the use of 551 tons of methyl bromide in strawberry, farms (1100 open field hectares) and in the flowers and vegetables production (728 greenhouses hectares). All farms are 100% local ownership and the export component is nil.

The alternatives selected for phasing-out methyl bromide in the strawberry, flowers and protected vegetables production sector in Argentina are:

**a) Chemicals: Metam Sodium.** This chemical has been proven successful in replacing methyl bromide in the demonstration project in Argentina. It has been effective in controlling the main soil-borne pests and diseases, without provoking a dramatic change in production methods. It is presently the cheapest one and the easiest to use.

**b) Physical alternatives: Steam pasteurization.** The use of steam to pasteurize the soil has been shown somewhat more complicated to practice. The application of steam pasteurization [in the demonstration project] has presented good results, but special equipment is necessary in order to accomplish them. However, when soil is heavily infested with weeds and nematodes, as it is the case of some horticultural products in Argentina (*including the production of strawberries in some key regions*), the use of steam [as an alternative to methyl bromide] ends up being almost essential.

In the strawberry sector, the phasing out scheme involves the replacement of methyl bromide by Metam sodium in an area of 790 ha, and the utilization of to steam in an area of 310 ha. The area to be treated with steam consists of 310 ha in the Province of Santa Fe [Coronda] (*due to heavy weed problems*). The area of 130 ha used for nurseries, [located in the Provinces of Mendoza, Tucuman, and Rio Negro] would require also steam. In order to reduce the project costs, it has been considered that the owners of nurseries would adopt the technology [on a later stage] own their own costs.

In the flowers and vegetables sectors, the phasing out scheme involves the replacement of methyl bromide by Metam sodium in an area of 428 ha, and the utilization of steam in an area of 300 ha. totaling therefore 728 ha, (*as pointed out under par. 14., above*). Due to the high cost of use of steam, the area to be treated with steam pasteurization (300 ha) is part of the area used essentially for the production of flowers (*ornamentals and cut-flowers*), which have a high retail price. They are located basically in the Provinces of Buenos Aires, Mendoza-San Juan, Santa Fe, and Tucumán (*Table. 1., refers*). The replacement of MB by Metam sodium is planned to be carried out mainly where the production of other protected vegetables takes place. The production is located in the Provinces of Buenos Aires, Chaco-Formosa, Corrientes, Mendoza-San Juan, Salta-Jujuy, Santa Fe, Tucumán and other Provinces where MB is applied in very small areas also used for production of protected vegetables.

### 3. SCOPE OF SUPPLY

For the purpose of implementing the phase-out of Methyl Bromide, the contractor shall supply:

**(A) Twenty (20) mobile compact monoblock units for soil pasteurization with steam, each one composed of the following elements:**

- A 1000 kg/hr, 3 bar steam generator which includes the following essential components: boiler, operation control elements and switchboard panel, burner, fuel and water pumps, 1500 liters water tank, 400 liters fuel tank, safety systems, etc. as specified in 3.1
- A 380 Volts/50 Hz three phase power generator having the required output for full operation of the boiler and its accessories, as specified in 3.2
- A trailer with air brakes, lights and all accessories required by Argentinean authorities to grant traffic permit. The above steam and power generators with all of accessories shall be firmly mounted on the platform of the trailer as specified in 3.3
- A winding hose cart with 1x70 meters of 70 mm (internal) diameter reinforced flexible hoses for conducting steam at a continuous pressure 3 bar and 160° Celsius as specified in 3.7
- A complete set of documents as per specifications detailed in 3.4

**(B) Ten (10) sets of pasteurization boxes for flat soil treatments built in aluminium composed of two boxes (plaques), covering a total soil surface of 17.1 m<sup>2</sup>. Pasteurization sets shall be operated by a tractor as specified in 3.5**

**(C) Ten (10) sets of pasteurization boxes for ridges treatments built in aluminium composed of five boxes (plaques), covering a total surface of 18 m<sup>2</sup> Pasteurization sets shall be operated by a tractor as specified in 3.6**

#### 3.1 Steam generator specifications

<u>Type of boiler:</u>	Monoblock, horizontal with fire tubes
<u>Output:</u>	Minimum 1000 kg/hr of steam at 160° Celsius (with over heater) at an operating pressure of 3 bar.
<u>Steam quality:</u>	Minimum 98%
<u>Heating surface</u>	As required
<u>Testing pressure</u>	6 bar
<u>Security coefficient</u>	Steel security coefficients used in design and calculations shall be a minimum of 50%
<u>Codes:</u>	Boiler shall be built in accordance with the latest edition and addenda of the A.S.M.E. Boiler and Pressure Vessel Code or European equivalent. It shall be registered by the corresponding authorities
<u>Design temperature</u>	250° Celsius
<u>Efficiency:</u>	Minimum 86% fuel to steam efficiency
<u>Dimensions</u>	Not larger than 4.4 m length, 2.2m tall, and 1.6 m width. Shall fit in the trailer with all accessories specified in the scope of supply. Boiler and accessories shall be assembled in a sky shoe type metal structure
<u>Use:</u>	Outdoors use, waterproof and corrosion resistant. No condensate recovery.
<u>Top cover</u>	The boiler shall be at least partially covered by a roof in order to minimize heat losses
<u>Water input</u>	Medium hard water, which might be additivated. The boiler has to be designed for easy regular maintenance cleaning and removal of calcium residues. Minimum input water temperature 10° Celsius
<u>Fire tubes</u>	Mandril attached to the base plaques. No welded seams. Minimum wall thickness 2.5 mm. Turbulators shall be factory installed.
<u>Heating body</u>	<p>Heating body shall be composed of:</p> <ul style="list-style-type: none"> <li>• Furnace</li> <li>• Turnaround chunk fully submerged in water</li> <li>• Fire tubes</li> <li>• Steam super heater</li> </ul> <p>Fire tubes and combustion chamber shall be fixed, on one side, at the front and in the other side to the gases turnaround rear box. This set of three elements shall be easily removable from the boiler's external cylinder for cleaning and inspection without disturbing burner equipment and controls.</p> <p>As the boiler has to operate with medium hard water, the easy removal of calcium deposits is a strict pre-condition for qualification. The contractor shall include diagrams, photographs and mechanical procedures to separate the heating parts of the boiler from the main body (shell) as well as specifications of nuts and bolts used.</p> <p>Turnaround chunk shall be fully submerged</p>

<u>Front</u>	The front of the boiler shall preferably be flanged in order to get easy access to the system used to fix the heating body to the external body.
<u>Steam outlet</u>	Shall be bolted and designed to overheat the outgoing steam. Shall include a 3" globe type manual blocking and regulation valve with body in cast iron and internal parts in brass.
<u>Safety valves</u>	A minimum of two safety relief valves, starting opening at nominal pressure and reaching maximal flow at 10% higher above nominal pressure, shall be installed. These calibrated spring valves shall allow a minimum flow of steam of 1000 kg/hr each when fully open.
<u>Water inlet</u>	One inch (1") manual blocking valve of external cast iron body and internal parts in brass, plus 1" solenoid valve internal parts in brass with epoxy resin encapsulated coil, IP65 protection, at 220 Volts/50 Hz. DIN connection plug to the control box. A water filter and a non-return valve shall also be included
<u>Bottom drain</u>	Shall be of 4" with 1 1/4" spherical valve
<u>Super heater drain</u>	Shall be of 1 1/4" with spherical blocking valve
<u>Control instruments</u>	The boiler shall be equipped with at least the following instruments: <ul style="list-style-type: none"> <li>• One Bourdon type manometer to measure steam pressure in the boiler, with 4" quadrant, IP65 protection; box bourdon and connection. Class 1. Range 0-6 Kg/cm<sup>2</sup>, 1/2" NPTM connection integral manifold in brass with blocking and blow off. Shall have a 1/2" hydraulic seal.</li> <li>• Two class 1 pressure/switcher/transmitter to regulate independently burner flame and security stop. Range 0.2-3 Kg/cm<sup>2</sup>; 0.08-0.25 adjustable differentials with graduated scale, IP65 protection, 1/2" NPTM process connection 1/2" NPTF electrical connection, SPDT connection terminals. Shall have 1/2" hydraulic seal.</li> <li>• One bimetallic thermometer to measure steam temperature in the boiler. 4" quadrant, IP65 protection; AISI316 class 1 box, connection range 0-150°C, with NPTM 1/2" connection. Length to be determined by the supplier, with 1/2" to 3/4" sheath</li> <li>• A independent class 1 pressure-switcher, to generate stop and activate alarm when there is steam over-temperature in the boiler. Range 0-4 bar adjustable from outside with graduated scale, IP65 protection, 1/2" NPTM connection. 1/2" to 3/4" sheath, NPTF 1/2" electrical connection, and SPDT connection.</li> <li>• Two visual REFLEX type level gauges with bodies of adequate length,</li> </ul>

- A low level electronic switch to stop burner and activate sound alarm (90 db) when water level is very low in the boiler. Shall be mounted directly on an outlet at the top of the boiler shell, with independent converter, connected to the control box,
- A three point level electronic system with appropriate sensors to regulate water level which will activate/deactivate water pump and solenoid valve and stop burner at very low water level. Shall be mounted in a metallic vessel, external to the boiler, connected to it without blocking and drain at the bottom through an at least ½” spherical valve with cast iron body and internal in brass
- A key switch for manual operation of the water pump in case of switch-off because of very low water level. This system prevents the operator or the water feeding pump to start when the tube-fires are too hot

#### Burner:

Compact burner from a well-known international manufacturer having local service in Argentina. Shall be delivered mounted on the boiler, with all electrical connections.

The burner shall be calibrated to use standard Argentine gas-oil with a minimum calorific power of about 10,200 kcal/kg. The burner shall have:

- Easy access to the head.
- Minimum effective power 1150 kW
- Three-phase 380 VAC/50 Hz
- Combustion head including diffuser, screen, electrodes, fuel/air regulation and two gas-oil injection nozzles.
- Flame detector
- Gas-oil pump of adequate flow rate, coupled to the fan and manometer for pressure control. The specifications of this pump are described latter
- Centrifugal fan of adequate power with mesh protection, three phase 380 VAC/50Hz, with IP55 protection
- Two gas-oil filters with two three way valves, to shift from one to the other while the boiler is on
- Ignition electrodes insulated with ceramics and high voltage transformer
- Control switchboard on a IP55 cabinet with screw lock, with instruments controlling flame, fan, gas-oil pump, thermal protection switch, fuses, push buttons, outlet signal by dry contact to generate alarm condition, hour counter to record working hours, etc

Burner’s control cabinet may be integrated with boiler’s controls in a single cabinet and shall be designed for outdoors work (rain, dust and hail).

#### Water circuit:

Water is not easily available in field conditions, therefore, water circuit will be integrated in the compact unit and shall be composed of the following elements:

- A centrifugal water pump, which will pump water from the farm supply or auxiliary tank (not included in the supply), into a central 1500 liters water tank described latter. The pump shall be centrifugal with a minimum flow rate of 2000 liters per hour at 1 bar
- A horizontal epoxy water tank with capacity of 1500 liters. Shall have a 0.5m manhole with lid and vent at the top and a 1”drain at the bottom. An electronic level sensor regulated at 90% and 10% of tank capacity, shall automatically regulate water level in the tank. Purge spherical valves shall be installed at the bottom of tank. The water tank shall be horizontal and transversally fixed to the platform of the trailer
- Boiler’s water feeding pump connected at the bottom of the above tank shall be designed for a pressure over 5 bars and water temperature until 105° Celsius. The pump shall be designed for a steady flow under all conditions
- A easily accessible water filter
- A water softener based on magnetic variable field device technology, shall be included in the supply to prevent hard calcium deposits

Water circuit shall be delivered complete, with all pipes, valves, and electro valves. The system shall be automatic with all commands centralized in the switchboard

The contractor shall include in the bidding documentation, a flow sheet and a complete description of the water circuit

Gas-oil circuit: Gas-oil circuit shall include the following components:

- A centrifugal pump to transfer gas-oil from drums or farmer’s storage tanks to the 400 liters central tank described after. The gas-oil pump shall have a flow rate of 500 liters/hour
- A hot galvanized BWG18 steel **or** epoxy/glass fiber 400 liters tank, resistant to UV and hydrocarbons. A lid shall be included at the top with adequate vent
- A small centrifugal pump to feed the auxiliary tank of the power generator or any other system to ensure a continuous work of the power generator
- A automatic electronic system to start/stop pumps in order to keep a steady supply of gas-oil to de burner
- High-pressure pump with regulation from 10 to 15 bars to feed the boiler’s burner.(Included in the burner)
- Pipes, by-passes and valves as required
- Two filters with adequate capacity and valves to work independently allowing cleaning and maintenance of one of them while the other is in operation

Insulation: 1 cm air layer plus 4 cm mineral wool (K=0.27) totally covering the smoke box and the shell with at least 0.6 mm aluminium sheet except in the openings.

Lifting eyes                      Two

Welding                              Welding shall be carried-out by officially certified welders according to well know norms. Lineal welds shall be random x-ray inspected.

	Joint welds shall be fully x-ray inspected. Welding procedures shall be included in the bid
<u>Painting</u>	All metallic surfaces shall be painted with high temperature resistant paint
<u>Switchboard</u>	The central switchboard control unit cabinet, designed for outdoors conditions (IP65) shall include:

- Punch type pushbutton for start/stop operation of all burner elements, pumps, regulation and safety systems and separate pushbuttons for water pump.
- Green light indicators of all active elements and red light indicators for malfunction or alarm indicators
- Power failure alarm, boiler failure alarm, low water level alarm, high pressure alarm shall activate flashing red indicators and a buzzer. Recognition and acceptance push buttons for each alarm condition shall be included in the panel board. When the acceptance button is pushed, alarm indicators shall remain red without flashing
- Diagram and acrylic labels of elements written in Spanish
- Control and signal system shall be 220 Volts sourced from one of the three phases and neutral. A differential disruptor and a luminous indicator on/off shall be installed

### **3.2 Electrical Power Generator**

The electrical power generator shall be a compact unit from a recognized international brand and mounted in on the platform of the trailer. The main characteristics shall be the following:

- Power output necessary to run the boiler and all of its accessories plus an additional 25%. Mounted on the platform. Three phase 380 Volts/50 Hz with at least one three phase outlet with neutral and earth and two single-phase 220 Volts outlets.
- Automatic voltage regulator
- Electrical startup
- Maximum 1500 rpm
- Water refrigerated
- IP66 outdoor protection
- Fuel: gas-oil as per boiler specifications
- Thermal disruptor
- Volt and Ampere output indicator
- Connections to the main gas-oil tank and gas-oil pump, water tank and pump and boiler
- Gas-oil filter or use of filtered gas-oil from burner circuit

### **3.3 Trailer**

All above equipment, namely: boiler and its accessories, 1500 liters water tank, extra large 400 liters gas-oil tank, water and gas-oil extra water and gas-oil pumps, control and regulation systems and power generator shall be mounted on a mobile platform. The characteristics of the platform shall be defined by the supplier, taking into account the following:

- Maximum wide 2.4 meters
- Air brakes and position lights meeting Argentinean traffic norms.
- Parking brakes
- Tandem axles with dual wheels. (Four wheels in total)
- Heavy duty hitch plus safety chains
- Shall be towed by a truck
- Self standing
- Suspension by springs and shock absorbers designed in such a way to absorb without damage to the boilers and its sensitive control systems, uneven pavement in rural service roads.
- 12 Volts connector
- Steel platform corrosion resisting painted

### **3.4 Manuals**

All twenty units shall include the following manuals and documents:

- Boiler: Three complete operating and maintenance manuals in Spanish with wiring diagrams and full description of the operating and security systems. Manuals shall include identification references for all spare parts
- Generator: Two complete operating and maintenance manuals in Spanish with wiring diagrams and full description of the operating and security systems. Manuals shall include identification references for all spare parts
- Welding inspection and welding procedures including type of electrodes, pre-heating, etc. Certificate of welders qualifications
- Testing certificate established by national Authorities
- Compliance with norms and codes
- Firetest report

### **3.5 Flat soil pasteurization device with heating plates**

Flat soil will be pasteurized using two aluminium boxes (plaques), which will firmly lie on the surface. Steam will be conducted to the plaques and then distributed into each box by a diffuser. The boxes will be fixed (three points fixing) and carried by a tractor, which will deposit them for a given period of time on the soil to achieve soil pasteurization. Once the pasteurization of this surface is finished, the tractor will lift the boxes and will progress by 3 meters, to conduct the pasteurization of the surface ahead

The characteristics of the boxes (See Figure 1) will be the following:

- Number of boxes (plaques) per set: Two
- Dimensions: 3 meters long; 2.85 meters wide, 0.2 meters high, each. Bottom opened
- Material: aluminium sheet 3 mm thick
- Welding: automatic welding ensuring resistance up to 3 bars
- Weight: as appropriate taking into account the characteristics of the tractor and the pressure
- Surface: 17.1 m<sup>2</sup> of soil to be pasteurized in a single operation as per attached Figure 1
- Diffusers: a steam diffuser will be mounted in each plaque
- Handlers: each plaque shall have four insulated handles for easy manual manipulation
- Structure: Plaques will be supported by a frame on which the two plaques will be attached by cotter type couplings for easy dismounting. The frame will allow continuous horizontal shift of the front plaques along the axis  
The frame structure must be built with carbon steel tubes of such a diameter and thickness as to resist operational stress without deformation. This plaque supporting structure, will be connected to the tractor by a three point hitching system The two plaques will be attached to the rear of the tractor and the hose cart will be attached at the front in order to balance weight. (See Figure 3)
- Steam circuit: A steam collector/distribution vessel of adequate dimensions will be placed at the center of the structure. The steam distribution vessel shall be able to resist 3 Kg/cm<sup>2</sup> steam pressure.
- A 70 m flexible hose (described in 3.7) will connect the steam outlet of the boiler with the above collector/distributor trough the hose cart. From the hose cart attached to the front of the tractor, steam will be conducted by a 3/4eters ( or longer, according to tractor length), 70 mm diameter flexible hose to the collector/distributor through a male quick coupling and a 3” diameter spherical valve, with carbon steel body and internal brass, with rods and lever to be operated from the tractor. The vessel will also have two steam outlets with 2 ½ ” spherical valves of the same quality as the former, 3” female rapid couplings and at the bottom it shall have a ½” diameter thermodynamic trap to allow the exit of condensate
- Hoses: Two flexible 70 mm (internal) hoses, made of rubber reinforced with high tenacity synthetic fiber will conduct steam at 160°C and 3Kg/cm<sup>2</sup> nominal pressure, from the quick couplings central vessel outlets to each plaque. One flexible 70 mm (internal) hose, made of rubber reinforced with high tenacity synthetic fiber will conduct steam at 160°C and 3Kg/cm<sup>2</sup> nominal pressure, from the quick coupling at the hose cart to the central steam collector distributor (see Figure 3)
- The whole set of plaques firmly attached to the steel structure, will be handled by a tractor trough a three points fixing device, which will lift the set, transport it and deposit it on the ground for steam application. All the metallic parts of the structure and the vessel must be built in carbon steel and hot galvanized to protect them from corrosion.

### 3.6 Ridges pasteurization device with heating plates

Ridges will be pasteurized using five aluminium boxes (plaques), which will firmly lie on the surface. Steam will be conducted to the plaques and then distributed into each box by a diffuser. The boxes will be attached to a steel structure, which will be fixed (three point fixing) at the rear of the tractor. The tractor, will deposit plaques on the soil for a pre-settled period of time to achieve soil pasteurization. Once the pasteurization of this surface is finished, the tractor will lift the boxes and will progress by 4 meters, to conduct the pasteurization of the following 4 meters ridges

The characteristics of the boxes (See figure 2) will be the following:

- Number of boxes (plaques) per set: Five
- Dimensions: 4 meters long; 0.9 meters wide, 0.4 meters high, each. Bottom opened
- Shape: Front and rear ends shall have a trapezoidal shape to adjust to the ridge as per attached Figure 2
- Material: aluminium sheet 3 mm thick
- Welding: automatic welding ensuring structural and pressure resistance up to 3 bars
- Weight: as appropriate taking into account the characteristics of the tractor
- Surface: 18 m<sup>2</sup> of soil to be pasteurized in a single operation as per attached Figure 2
- Diffusers: a steam diffuser will be mounted in each plaque
- Handlers: each plaque shall have a four insulated handles for easy manual manipulation
- Structure: Plaques will be supported by a frame on which all five plaques will be attached by cotter type couplings for easy dismounting. The frame will allow continuous horizontal shift of the front plaques along the axis
- The frame structure must be built with carbon steel tubes of such a diameter and thickness as to resist operational stress without deformation. This plaque supporting structure, will be connected to the tractor by a three point hitching system. All the metallic parts of the structure and the vessel must be built in carbon steel and hot galvanized to protect them from corrosion.
  
- Steam circuit: A steam collector/distribution vessel of adequate dimensions and will be placed at the center of the structure. The steam distribution vessel shall be able to resist 3 Kg/cm<sup>2</sup> steam pressure.
- A 70 m flexible hose (described in 3.7) will connect the steam outlet of the boiler with the above collector/distributor through the hose cart. From the hose cart attached to the front of the tractor, steam will be conducted by a 3/4 meters (or longer according to tractor length), 70 mm diameter flexible hose to the collector/distributor through a male quick coupling and a 3" diameter spherical valve, with carbon steel body and internal brass, with rods and lever to be operated from the tractor. The vessel will also have five steam outlets with 1 1/2 " spherical valves of the same quality as the former, 2" female rapid couplings and at the bottom, shall have a 1/2" diameter thermodynamic trap to allow the exit of condensate
- Hoses: Five flexible 40 mm (internal) hoses, made of rubber reinforced with high tenacity synthetic fiber will conduct steam at 160°C and 3Kg/cm<sup>2</sup> nominal pressure, from the quick couplings central vessel outlets to the plaques. One flexible 70 mm

(internal) hose, made of rubber reinforced with high tenacity synthetic fiber will conduct steam at 160°C and 3Kg/cm<sup>2</sup> nominal pressure, from the quick coupling at the hose cart to the central steam collector distributor

- The whole set of plaques attached to the structure will be handled by a tractor, which will lift the set, transport it and deposit it on the ground for steam application. All the metallic parts of the structure and the vessel must be built in carbon steel and hot galvanized to protect them from corrosion.

### **3.7 Hose and winding hose carts**

Each one of the twenty compact pasteurization units shall include the following equipment:

- 70 meters of flexible rubber hose, internal diameter 70 mm, reinforced with high tenacity synthetic fibers, flexible and adequate to continuous carry steam at 3 bars and 160° Celsius from the center of the winder up to the steam application plaques. The hose shall be connected to the center of the winding cart with 3”quick coupling from one end and shall have a 3”quick coupling to the boiler outlet at the other end
- One mobile winding cart, with wheels, to be towed by a truck, with lights and all elements required by traffic authorities, having the following characteristics:
  - Internal diameter large enough to prevent hose damage
  - Hydraulic winding mechanism to be connected to the hydraulic circuit of the tractor

## **4. FACTORY FIRETESTS**

All elements included in the supply shall be mounted and the unit shall be ready for final connection of water, steam, and fuel.

The factory firetest shall be a complete functional test conducted at the maximum pressure and, at a minimum, is to consist of filling the boiler with water and operating the burner throughout its complete range of operation. Additionally, all components wired into the boiler safety control circuit are to be tested by simulating a failure condition. A copy of the firetest report is to be included in the delivery

Upon completion of the factory firetest, the boiler shall be cooled and hydrostatically tested, and the external piping documented

## **5. DELIVERY SCHEDULE AND DELIVERY SITES**

The contractor shall deliver:

- Six (6) complete sets (boilers, plaques, carts, generator and accessories) not later than September 2001

- Four (4) complete sets (boilers, plaques, carts, generator and accessories) not later than December 2001
- Ten (10) complete sets (boilers, plaques, carts, generator and accessories) between June and December 2002, but subject to further confirmation by UNIDO by February 2002

The sets shall be delivered according to the following schedule and sites:

Sites	Delivery before September 2001	Delivery before December 2001	Delivery between June and December 2002
EEA. Famaillá Ruta Prov. 380 km. 31 - Estación Padilla. Provincia de Tucumán. Tel.(03863) 461048/1546 <a href="mailto:efama@inta.gov.ar">efama@inta.gov.ar</a>		One(1) with flat plaques	Two (2) with ridge plaques
EEA. Corrientes Ruta Nac. 12 km 27. Corrientes. Provincia de Corrientes. Tel. (03783) 421786/87. <a href="mailto:ecorrientes@inta.gov.ar">ecorrientes@inta.gov.ar</a>	One (1) with flat plaques and One (1) with ridge plaques		One (1) with flat plaques and One (1) with ridge plaques
EEA. Oliveros Ruta Nac. 11 - km 353 - 2206 - Oliveros - Provincia de Santa Fe Telefax (03476) 498277/010/011 <a href="mailto:eoliver@inta.gov.ar">eoliver@inta.gov.ar</a>	One (1) with flat plaques and One (1) with ridge plates	One (1) with flat plaques and One (1) with ridge plates	Four (4) with ridge plaques
EEA. Mendoza - Ruta 40 km 14 - Mayor Drumont Carril San Martín 3853 - Lujan de Cuyo - Provincia de Mendoza Telfax (0261) 4963500/4960973. <a href="mailto:emendoza@inta.gov.ar">emendoza@inta.gov.ar</a>		One (1) with flat plaques	
EEA. San Pedro Ruta Nac. 9 km 170 - San Pedro. Provincia de Buenos Aires Telefax: (03329) 424074/423321/493007 <a href="mailto:esanpe@inta.gov.ar">esanpe@inta.gov.ar</a>			One (1) with flat plaques
AER Mar del Plata - Chile 1485 - Mar del Plata. Provincia de Buenos Aires. Telefax (0223) 4721985 <a href="mailto:amardelp@inta.gov.ar">amardelp@inta.gov.ar</a>	One (1) with flat plaques		
AER Gran Buenos Aires - Ruta Prov. 46 km 44,5 El Pato. Provincia de Buenos Aires.telefax: 02229) 491066/1500. <a href="mailto:agranbuc@inta.gov.ar">agranbuc@inta.gov.ar</a>	One (1) with flat plaques		One (1) with flat plaques

## **6. SPECIAL CLAUSE**

**The contractor shall bid a fixed price for the whole scope of supply (20 units) taking into account that UNIDO will only commit for the first set (10 units) of the supply, which shall be delivered in 2001.**

**The confirmation of the order for the second set of units (10) to be delivered in the year 2002 at the fixed price already agreed between UNIDO and the selected Company as Contractor, is subject to the pre-condition that the Government of Argentina reaches certain targets in phasing-out Methyl Bromide. UNIDO will confirm to the contractor, in writing, not later than by February 2002 if the second portion of the supply to be delivered by 2002 becomes a firm order.**

## **7. CONTRACTOR'S GENERAL RESPONSIBILITIES**

7.1. The contractor shall assume overall responsibility for the quality and timeless supply of the equipment and services related to this contract.

7.2. The contractor shall arrange for transportation and insurance of the materials and bear all costs risks thereof, delivery DDU to the different sites described in chapter 5.

7.3. The contractor shall be responsible for applying best international procedures, including safety aspects in the equipment supplied

7.4. The contractor is responsible for securing that all equipment supplied is new.

7.5. The contractor shall be responsible for the control of all the work, services and supplies that might be executed by local subcontractors.

7.6. The contractor shall be responsible for the quality and completeness of its technical services.

7.7. The contractor shall be responsible for the insurance and social benefits, of all the contractor's personnel, if any, working in Argentina.

## **8. CONTRACTOR QUALIFICATIONS**

8.1 The contractor shall be a manufacturer of the equipment having its own production facilities and the necessary technical personnel. The contractor shall include in the bid documentary evidence of this.

8.2 The contractor shall have proven experience in manufacturing boilers and accessories for soil pasteurization. The contractor shall include in the bid documentary evidence of this.

8.3 The contractor shall include a list of its production equipment and prove its capabilities to accomplish the delivery plan

## **9. TERMS OF GUARANTEES**

The contractor shall guarantee the quality and completeness of its work, equipment, supplies and its compliance with the specifications described above

UNIDO will keep the right to carry-out quality tests. In case of non-compliance with the aforementioned specifications, UNIDO will stop the payments and return the equipment to the supplier at its own expenses

## **10. LANGUAGE OF THE PROPOSALS**

All proposals shall be written in English. Welding and Testing Certificates can be supplied in the original language.

## **11. CURRENCY OF THE PROPOSALS**

All proposals shall be quoted in United States dollars and the contract will be awarded in this currency. Proposals in other currencies will automatically be disqualified. The contractor shall bear all exchange rate risks/rewards.

## **12. SHIPMENT DOCUMENTS (FOREIGN FIRMS)**

In order to avoid unnecessary delays and demurrage costs at the border, firms from countries other than Argentina, **shall confirm** in the proposal their commitment to provide to UNIDO, **one week** before dispatching any shipment, the following documents:

- Three originals sets of the shipment documents including:
  - insurance policy covering Delivery Duty Unpaid (DDU)
  - certificate of origin in English
  - commercial invoice in English
  - packing list in English

## **14. TECHNICAL DOCUMENTS TO BE INCLUDED IN THE BIDDING OFFER**

All bidding offers shall include the following technical documents:

- A reference list of clients
- A full and detailed description of the boilers and its specifications as per above scope of supply

- A full description of the procedures to detach the heating components from the boiler's body, for cleaning and inspection
- Blue prints and draws of the monoblock unit and accessories, as well as their distribution on the mobile platform
- List and specifications of the materials
- Diagram of the operating and safety circuits
- Welding procedures and certification
- Water circuit flow-sheet
- Gas-oil circuit flow-sheet

## **15. REPORTS**

Progress reports shall be submitted by the contractor to UNIDO in hard copies and on diskette (if possible saved in Word document) as follows:

- First Interim Report: It shall include delivery and installation of equipment.
- Second Interim Report: It shall include second delivery and installation of equipment.
- Draft Final Report
- Final Report.

FIGURE 1  
Pasteurization boxes for flat soil

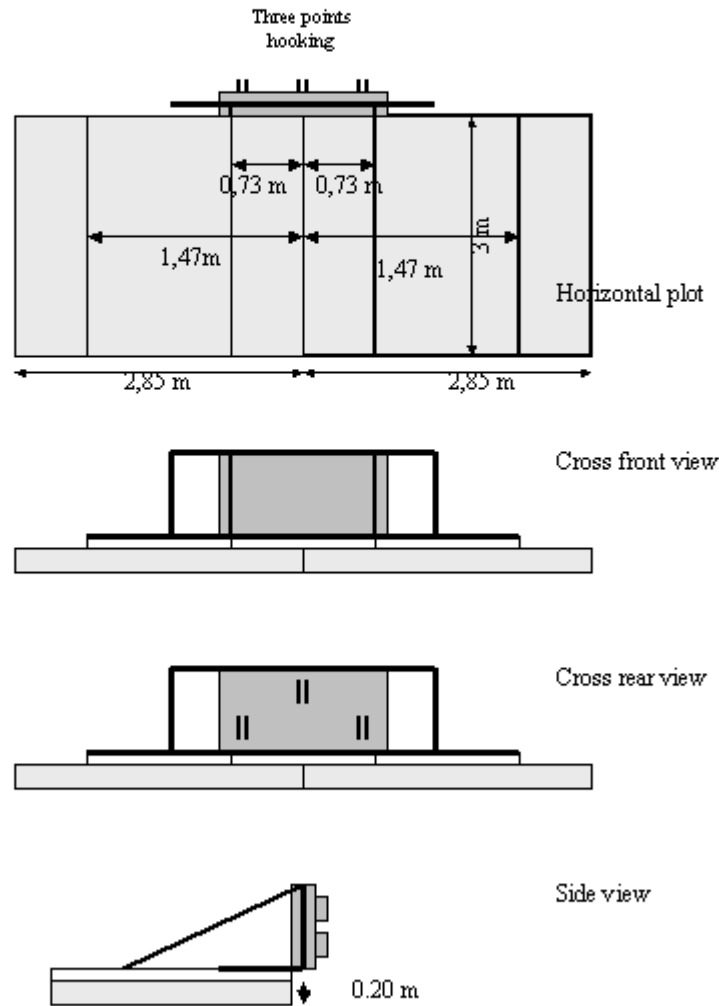


FIGURE 2  
Pasteurization boxes for ridges

