



CSIR-INSTITUTE OF HIMALAYAN BIORESOURCE TECHNOLOGY

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Open Tender Notice No. 02/2017

Please see the revised technical specifications after Pre-Bid meeting held on 13.10.2017 at CSIR-IHBT, Palampur (HP) for the purchase of following equipments:-

Sr. No.	Tender No.	Item(s)	Qty.	EMD (Rs. In lakhs)
1.	4/5(196)17-Pur	Food Freeze Drying Unit	01	4.00
2.	4/5(198)17-Pur	Multipurpose Field Essential Oil Distillation Units	09	1.30

Please note that only Technical Specifications have been revised. There is no change in Tender document and other terms and conditions.

Detailed Tender Document and other Terms & conditions are already available at our website <http://www.ihbt.res.in> under **Tender No.02/2017**.

Important Dates

- 1) Tender Due Date & Time : 26/10/2017 (1430 hrs)
- 2) Date of Opening: 26/10/2017 (1500 hrs)

Controller of Stores & Purchase

Specifications for Food Freeze Drying Unit

Supply, installation and commissioning of food freeze dryer that can be operated in Fully automated program logic controller (PLC) base equipped with Human Machine Interface (HMI) having capacity of holding 100 kg/ batch wet raw material in the form of whole, sliced, dices and shreds of fruits / vegetable & any other water based extract which are rich in nutraceuticals. Final moisture content in dried product shall be less than 5%. The freeze-dryer should have the following technical specifications.

1. Refrigeration System

- Ice condenser should have the holding capacity of minimum 100 kg per 24hrs.
- Refrigeration gas shall be CFC free gas.

2. Vacuum System

- Suitable vacuum pump should be reputed make to achieve ultimate vacuum 0.001 Torr with complete vacuum control system having anti-suck valve to preserve vacuum during power cutoff.
- Vacuum pump valve should have in-line moisture trap assembly to protect vacuum pump from condensed vapor

3. Electrical connection & Heating System

- Electrical connection **380-415V** ,3 Phase ,50 Hz
- Consisting of heating and vacuum chamber made of SS-304 or better
- Temperature range should be from - 55 deg. C to + 70 deg. C.
- Compatible heat transfer medium.

4. Vacuum Chamber & Condenser

- The chamber of ice condenser and cooling coils should be made of SS-304 or better.

5. Pneumatic System

- Auto defrosting facility for efficient processing of raw material during each batch
- System should be equipped with electro pneumatically operated valves with Non return valve (NRV) for drain & defrosting of condenser.

6. Blast Freezer

- Supply of compatible blast/deep freezer to capable of achieving and sustaining with load of 100 kg wet raw material **and also provide with set of trays suitable for loading directly in freeze drying unit**

7. Online monitoring system

- System should be equipped with **data logger**, online monitoring facility to monitor and **real time monitor for control** the system during odd working hours.
- **Appropriate number of product sensors should be provided in the instrument**

8. Spares and Fittings (whatever required / if any):

- Kit of spare parts/consumables comprising of stabilizer, compressor oil; vacuum pump oil; solenoid valve; set of gaskets and "O" rings etc should be provided with machine.
- All interconnecting piping with insulation will be provided and fitted at instrument supplier end.
- Provided with suitable genset for power backup for uninterrupted batch processing.

9. Accessories (optional) India Made:

- 25 liter water holding capacity fruit washer unit made up of SS-304 with water recirculation facility.
- Different shape fruit cutter machine of 10 kg batch capacity will also require for the pre-processing of fruits
- The complete unit also consists of vacuum packaging machine with nitrogen flushing facility and all necessary accessories for packaging the final product.
- **Optional inbuilt SIP and CIP facility for the instrument**

10. Supplier should provide/ensure all required spares and parts for next 10 years during working of equipment.

11. Provided with all required utilities for functioning of instrument, **IQQQ Documentation**, humidity chamber and air-condition unit for temperature maintain around the instrument.

12. The running cost of the machine should be clearly mentioned in the quote per kilogram of fruit/vegetables basis.

13. Comprehensive warranty for 24 months from the date of installation and after that provision of next 24 months extended warranty in the quotation

14. List of latest users of the quoted instrument in the govt sector in the country and also provide at least three user of the quoted capacity in India

15. Installation (including unloading, shifting and labour work) and Training at CSIR-IHBT; Palampur and pre inspection at company site before dispatch at supplier cost

File No.4/5(198)16-Pur :- Technical Specifications: Multipurpose Field Essential Oil Distillation Units

Supply, installation, commissioning of Multipurpose Field Essential Oil Distillation Unit with following specification. The supplier has to do all necessary plumbing, electrical, mechanical, civil works as it is a turn-key project. The unit should be tested on load and handed over in fully operating condition. The complete system total 9 no.'s should be delivered, installed and commissioned at following destination sites as per Table no. 1

Table no. 1 Tentative delivery and installation site of distillation units

Sr. No.	Capacity , L	Tentative site location
1.	2500	Ghoghardhar, JogindernagarDistt. Mandi
2.	2500	Ghoghardhar, JogindernagarDistt. Mandi
3.	2500	Neoli, Jogindernagar, Distt. Mandi
4.	2500	Manikaran, Distt. Kullu
5.	2500	Banjar/Sainj, Distt. Kullu
6.	2500	Nehria/ Khundia, Distt. kangra
7.	2500	Salloni, Distt. Chamba
8.	1200	Sihunta, Distt. Chamba
9.	1200	Bhatiat Distt. Chamba

Item no. 1: Detailed Technical specification of 2500 L batch capacity distillation unit

1.1: DISTILLATION TANK (2500 liters)

- | | | |
|-------------------------------|---|-----------------------|
| 1. Material of construction | : | Stainless Steel 304 |
| 2. Batch Capacity | : | 2500 liters |
| 3. Volume of cylindrical tank | : | $\pi/4(\text{ID})^2L$ |
| (Above false bottom) | : | |
| Where ID (Internal Diameter) | : | 1400mm |
| L (Cylindrical Length) | : | 1800mm |
| Volume of cylindrical tank | : | 2770 liters |
| 4. Volume of overall tank | : | |
| ID | : | 1400mm |
| L | : | 2100mm |
| Volume | : | 3232 liters |

1.1.1) DISTILLATION TANK

Item No.	Description Please refer Drg IHBT/drg/2017/02	Quantity (Nos.)	MOC
1	Cylindrical tank, ID=1400 mm, total length= 2100 mm, 4mm thk. The length between false bottom and vapor outlet is 1700 mm	1	SS
2	Flat bottom end connected to furnace, ID= 1400 mm	1	SS
3	Top plate (lid) with outer diameter 1500 mm	1	SS
4	Spurger, 25mmØ having OD= 1200 mm with cross inside in which there are holes of 3mmØ and 5mm Ø. It has a steam inlet valve at the inlet.	1	Gun metal
5	False bottom 1390 mm Ø, 4mm thk with perforation of 5mm Ø holes on the triangular pitch. It is supported with triangular cleats welded to the tank wall at a height of 300mm from the flat bottom end (Item No. 2)	1	SS
6	Calendriawith 4 pipes of 100 mm Ø ID.	1	SS
7	Manhole on the front side of Item No.1 to unload spent and clean the tank. ID= 400 mm, OD=450 mm tighten with I bolts on 420 mm PCD.	1	SS
8	Vapor outlet, 100 mm Ø welded on the side of Item No. 1 leading to the condenser with a loose type collar flange.	1	SS
9	Drain valve, 50 mm Ø at the side of the distillation tank.	1	SS
10	Water level gauge fitted on 10 mm Ø sockets with calibrated glass tube.	1	Glass

11	Window for fuel wood injection and ash discharge in the furnace with lid and handle.	1	MS
12	Furnace, made up of bricks having size, L= 1500mm, width= 1500mm and height= 1000mm.	1	Bricks
13	Grating to support the fuel wood on the furnace	50	MS

1.2: CONDENSER

Tube Data:

1. Material of construction	:	Stainless Steel-304
2. Outer diameter	:	25.40mm; 12 BWG
3. Wall thickness	:	2.77mm
4. Inside diameter	:	19.86mm
5. Cross-sectional area, Metal	:	$1.967 \times 10^{-4} \text{ m}^2$
6. Inside sectional area	:	$1.542 \times 10^{-4} \text{ m}^2$
7. Weight	:	1.542 kg/m
8. Surface Area		
a) Outside surface area	:	$0.0798 \text{ m}^2/\text{m}$
b) Inside surface area	:	$0.0624 \text{ m}^2/\text{m}$
9. Length of tube used	:	1200mm
10. Number of tubes fitted	:	103
11. Total length of tubes used	:	123.6 meters
12. Net surface area available		
a) Outside Heat Transfer Area	:	9.8633 m^2
b) Inside Heat Transfer Area	:	7.7126 m^2

1.2.1) CONDENSER

Item No.	Description	Quantity (Nos.)	MOC
1	Shell ID=400 mm, Length= 1200mm, 3 mm thk, welded to tube sheet.	1	SS
2	Top end bonnet, ID=400 mm, length= 200 mm, 3mm thk with ellipsoidal dished end welded with SS flange ID=400 mm, OD= 500 mm, 5 mm thk having nut bolts on 450 mm PCD.	1	SS
3	Bottom end bonnet, ID=400 mm, OD=500 mm, 5 mm thk. having suitable size nut bolts.	1	SS
4	Tube sheet, OD=500 mm, 12 mm thk with 103 holes of 25 mm Ø for condenser tubes. Other 16 nos. holes of 15 mm Ø compatible with the flange holes of the bonnet for tightening its nut bolts on 450 mm PCD.	2	SS
5	Gasket ID=400 mm, OD=500 mm, 3 mm thk with 16 nos. of holes on 450 mm PCD to fit 15 mm Ø bolts to be placed on the flange of the bonnets.	2	Firefly
6	Vapor inlet pipeline, ID=100 mm, Length= 100 mm welded with SS flange having ID=100 mm, OD=200 mm, 10 mm thk having 12 mm Ø nut bolts-4 Nos. on 150 mm PCD having 3 mm thk firefly gasket. Other	1	SS

	end is welded to Item No. 2.		
7	Baffle welded on Item No. 2 for the distribution of vapors as shown in figure.	1	SS
	Condensate outlet, 25 mm Ø welded on Item No. 3 with valve	1	SS
8	15 mm Ø nut bolts to affix the front end bonnet with the shell	21	SS
9	Condenser tubes, ID=25 mm, 12 BWG, L=1200 mm threaded into the tube sheet and then welded on triangular pitch= 35mm	103	SS
10	Segmental 25% cut baffles, 4 mm thk, welded to the shell at an equidistant of 140mm	6	SS
11	Water/ coolant inlet, 25 mm Ø consisting of GI socket welded at the bottom of shell near bottom end bonnet which is provided with a nipple and gate valve	1	SS
12	Water/ coolant outlet, 25 mm Ø welded on the upper side of the condenser as shown.	1	SS
13	Reinforce sheet, 120 mm X120 mm X5 mm thk welded at center on both sides	3	MS
14	Supporting legs/ pipes 80 mm Ø MS C-class pipes so that receiver could be easily adjusted	3	MS
15	Base plate 120mm X120 mmX12 mm thk welded to lugs (Item No. 14) and by reinforcing sheet and attached to supporting legs by nut bolts.	3	MS
16	Condensate outlet, 25 mm Ø welded at Item No. 3 with valve	1	SS

1.3) RECEIVER CUM SEPARATOR

1. Material of construction : Stainless Steel-304
2. Volume of the Receiver : $\pi/4 (ID)^2L$
 - a) Volume of cylinder, $V_{cylinder}$
 - Where, ID : 480 mm
 - L : 500 mm
 - Volume of cylindrical tank : 90.48 liters
 - b) Volume of the cone, V_{cone} : $1/3 AH_0$
 - Where, A is base area of cone : $\pi/4 (ID)^2L$
 - H_0 , Height of cone : 220 (for top cone)
 - : 150 (for bottom cone)
 - Volume of top cone : 5.03 liters
 - Volume of bottom cone : 10.19 liters
3. Total volume of Receiver : 105.7 liters

1.3.1) RECEIVER CUM SEPARATOR

Item No.	Description	Quantity (Nos.)	MOC
1	Cylindrical tank, ID=480 mm, length=500 mm, 3 mm thk	1	SS
2	Top conical end having angle=45degree welded to Item No. 1 and Item No. 8	1	SS
3	Lower conical end having angle 30 degree welded to Item No. 1 and Item No. 9	1	SS
4	Distillate recycle pipe, 15mm Ø for distillate with siphon breaker as shown in drawing. It should be placed at the height of 130mm from the bottom end and 80mm far away from the walls of the receiver.	1	SS
5	Funnel, ID=70 mm, L=70 mm, 2 mm thkwelded with long stem pipe, ID=15 mm, L= 400 mm. The edge of the stem should be U shaped as shown in drawing	1	SS
6	Partition plate, 2mm thk welded at a distance of 130mm from the wall of the tank. Partial welding at the base of the plate.	1	SS
7	Oil outlet, 20 mm Ø, L=350 mm welded at 35mm below from the top of the neck	1	SS
8	Neck ID= 100 mm, L=100 mm, 2 mm thk welded at top of separator. A loose type lid with knob is provided with the top of the neck	1	SS
9	Distillate outlet line having ID= 25 mm Ø with a gate valve welded at the bottom with Item No. 3	1	SS
10	Reinforce sheet, 100 mm X100 mm X10mm thk welded on receiver wall	4	MS
11	Lugs 80 mm X80 mm X8 mm thk welded to MS reinforcing sheet and base plate	4	MS
12	Base plate 100 mm X100 mm X12 mm thk welded to lugs (Item No. 14) and by reinforcing sheet	4	MS
13	Supporting legs/ pipes 50 mm Ø MS C-class pipes having suitable length.	4	MS
14	Reinforcing sheet welded with Item No. 2 to support the funnel.	1	MS
15	Reinforcing sheet welded with Item No. 2 to support the distillate outlet pipe.	1	MS

Item no. 2.: Detailed Technical specification of 1200 L batch capacity distillation unit**2.1) DISTILLATION TANK (1200 liters)**

1. Material of construction	:	Stainless Steel 304
2. Batch Capacity	:	1200 liters
3. Volume of cylindrical tank	:	$\pi/4(ID)^2L$
(above false bottom)	:	
Where ID (Internal Diameter)	:	1100mm
L (Cylindrical Length)	:	1250mm
Volume of cylindrical tank	:	1188 liters
4. Volume of overall tank		
ID	:	1100mm
L	:	1500mm
Volume	:	1425 liters

2.1.1) DISTILLATION TANK

Item No.	Description Please refer Drg IHBT/drg/2017/05	Quantity (Nos.)	MOC
1	Cylindrical tank, ID=1100 mm, total height= 1500 mm, 4 mm thk. The height between false bottom and vapor outlet is 1200 mm	1	SS
2	Flat bottom end connected to furnace, ID= 1100 mm	1	SS
3	Top plate (lid) with outer diameter 1200 mm	1	SS
4	Insulation of cylindrical tank up-to vapor outlet line with glass wool and aluminum cladding.	1	Glass wool/ aluminum
5	False bottom 1090 mm Ø, 4 mm thk with perforation of 5 mm Ø holes on the triangular pitch. It is supported with triangular cleats welded to the tank wall at a height of 250mm from the flat bottom end (Item No. 2)	1	SS
6	Calendria with 4 pipes of 100 mm Ø ID.	1	SS
7	Manhole on the front side of Item No.1 to unload spent and clean the tank. ID= 350 mm, OD=380 mm tighten with I bolts on 370 mm PCD. It should be connected with hinge for its self-support during open.	1	SS
8	Vapor outlet, 100 mm Ø welded on the side of Item No. 1 leading to the condenser with a loose type collar flange.	1	SS
9	Drain valve, 50Ø at the side of the distillation tank.	1	SS
10	Water level gauge fitted on 10 Ø sockets with calibrated glass tube.	1	Glass
11	Window for fuel wood injection and ash discharge in the furnace with lid and handle.	1	MS
12	Furnace, made up of bricks having size, L= 1300mm, width= 1300mm and height= 1000mm.	1	Bricks
13	Grating to support the fuel wood on the furnace	50	MS

2.2) CONDENSER

Tube Data:

1. Material of construction	:	Stainless Steel-304
2. Outer diameter	:	25.40mm; 12 BWG
3. Wall thickness	:	2.77mm
4. Inside diameter	:	19.86mm
5. Cross-sectional area, Metal	:	$1.967 \times 10^{-4} \text{ m}^2$
6. Inside sectional area	:	$1.542 \times 10^{-4} \text{ m}^2$
7. Weight	:	1.542 kg/m
8. Surface Area		
c) Outside surface area	:	$0.0798 \text{ m}^2/\text{m}$
d) Inside surface area	:	$0.0624 \text{ m}^2/\text{m}$
9. Length of tube used	:	1200mm
10. Number of tubes fitted	:	55
11. Total length of tubes used	:	66.0 meters
12. Net surface area available		
c) Outside Heat Transfer Area	:	5.2668 m^2
d) Inside Heat Transfer Area	:	4.1184 m^2

2.2.1) CONDENSER

Item No.	Description	Quantity (Nos.)	MOC
1	Shell ID=350 mm, Length= 1200mm, 3 mm thk, welded to tube sheet.	1	SS
2	Top end bonnet, ID=350 mm, length= 200 mm, 3mm thk with ellipsoidal dished end welded with SS flange ID=350 mm, OD= 450 mm, 5 mm thk having nut bolts on 400 mm PCD.	1	SS
3	Bottom end bonnet, ID=350, OD=450, 5 th having nut bolts.	1	SS
4	Tube sheet, OD=450 mm, 12 mm thk with 55 holes of 25 mm Ø for condenser tubes. Other 16 nos. holes of 15 mm Ø compatible with the flange holes of the bonnet for tightening its nut bolts on 400 mm PCD.	2	SS
5	Gasket ID=350 mm, OD=450 mm , 3 mm thk with 16 nos. of holes on 400 mm PCD to fit 15 mm Ø bolts to be placed on the flange of the bonnets.	2	Firefly
6	Vapor inlet pipeline, ID=100 mm, Length= 100 mm welded with SS flange having ID=100 mm, OD=200 mm, 10 mm thk having 12 Ø nut bolts-4 Nos. on 150 mm PCD having 3thk firefly gasket. Other end is welded to Item No. 2.	1	SS
7	Baffle welded on Item No. 2 for the distribution of vapors as shown in figure.	1	SS
8	Condensate outlet, 25 mm Ø welded on Item No. 3 with valve	1	SS

9	Condenser tubes, ID=25 mm, 12 BWG, L=1200 mm threaded into the tube sheet and then welded on triangular pitch	55	SS
10	Segmental 25% cut baffles, 4mmthk, welded to the shell at an equidistant of 140mm	6	SS
11	Water/ coolant inlet, 25 mm Ø consisting of GI socket welded at the bottom of shell near bottom end bonnet which is provided with a nipple and gate valve	1	SS
12	Water/ coolant outlet, 25 mm Ø welded on the upper side of the condenser as shown.	1	SS
13	Reinforce sheet, 120 mm X120 mm X5 mm thk welded at center on both sides	3	MS
14	Support of the condenser and legs.	3	MS
15	Base plate 120 mmX120 mmX12 mm thk welded to lugs (Item No. 14) and by reinforcing sheet and attached to supporting legs by nut bolts.	3	MS
16	Supporting legs/ pipes 80 mm Ø MS C-class pipes so that receiver could be easily adjusted	3	MS

2.3) RECEIVER CUM SEPARATOR

1. Material of construction : Stainless Steel-304
2. Volume of the Receiver : $\pi/4 (ID)^2L$
 - c) Volume of cylinder, $V_{cylinder}$
 - Where, ID : 350 mm
 - L : 450 mm
 - Volume of cylindrical tank : 43.30 liters
 - d) Volume of the cone, V_{cone} : $1/3 AH_0$
 - Where, A is base area of cone : $\pi/4 (ID)^2L$
 - H_0 , Height of cone : 130 (for top cone)
 - : 90 (for bottom cone)
 - Volume of top cone : 1.9 liters
 - Volume of bottom cone : 1.3 liters
3. Total volume of Receiver : 46.5 liters

2.3.1) RECEIVER CUM SEPARATOR

Item No.	Description	Quantity (Nos.)	MOC
1	Cylindrical tank, ID=350 mm, length=450 mm, 3 mm thk	1	SS
2	Top conical end having angle=45degree welded to Item No. 1 and Item No. 8	1	SS
3	Lower conical end having angle 30 degree welded to Item No. 1 and Item No. 9	1	SS
4	Distillate recycle pipe, 15 mm Ø for distillate. It should be placed at the height of 100mm from the bottom end and 80mm far away from the walls of the receiver.	1	SS
5	Funnel, ID=60 mm, L=60 mm, 2 mm thkwelded with long stem pipe, ID=15 mm, L= 300 mm. The edge of the	1	SS

	stem is U shaped as shown in drawing		
6	Partition plate, 2 mm thk welded at a distance of 120mm from the wall of the tank. Partial welding at the base of the plate.	1	SS
7	Oil outlet, 20 mm Ø, L=350 mm welded at 35mm below from the top of the neck	1	SS
8	Neck ID= 80 mm, L=60 mm, 2 mm thk welded at top of separator. A loose type lid with knob is provided with the top of the neck	1	SS
9	Distillate outlet line having ID= 25 Ø with a gate valve welded at the bottom with Item No. 3	1	SS
10	Reinforce sheet, 100 mm X100 mm X10 mm thk welded on receiver wall	4	MS
11	Lugs 80 mmX80 mmX8mmthk welded to MS reinforcing sheet and base plate	4	MS
12	Base plate 100 mm X100 mmX12 mm thk welded to lugs (Item No. 14) and by reinforcing sheet	4	MS
13	Supporting legs/ pipes 50 mm Ø MS C-class pipes having suitable length.	4	MS
14	Reinforcing sheet welded with Item No. 2 to support the funnel.	1	MS
15	Reinforcing sheet welded with Item No. 2 to support the distillate outlet pipe.	1	MS

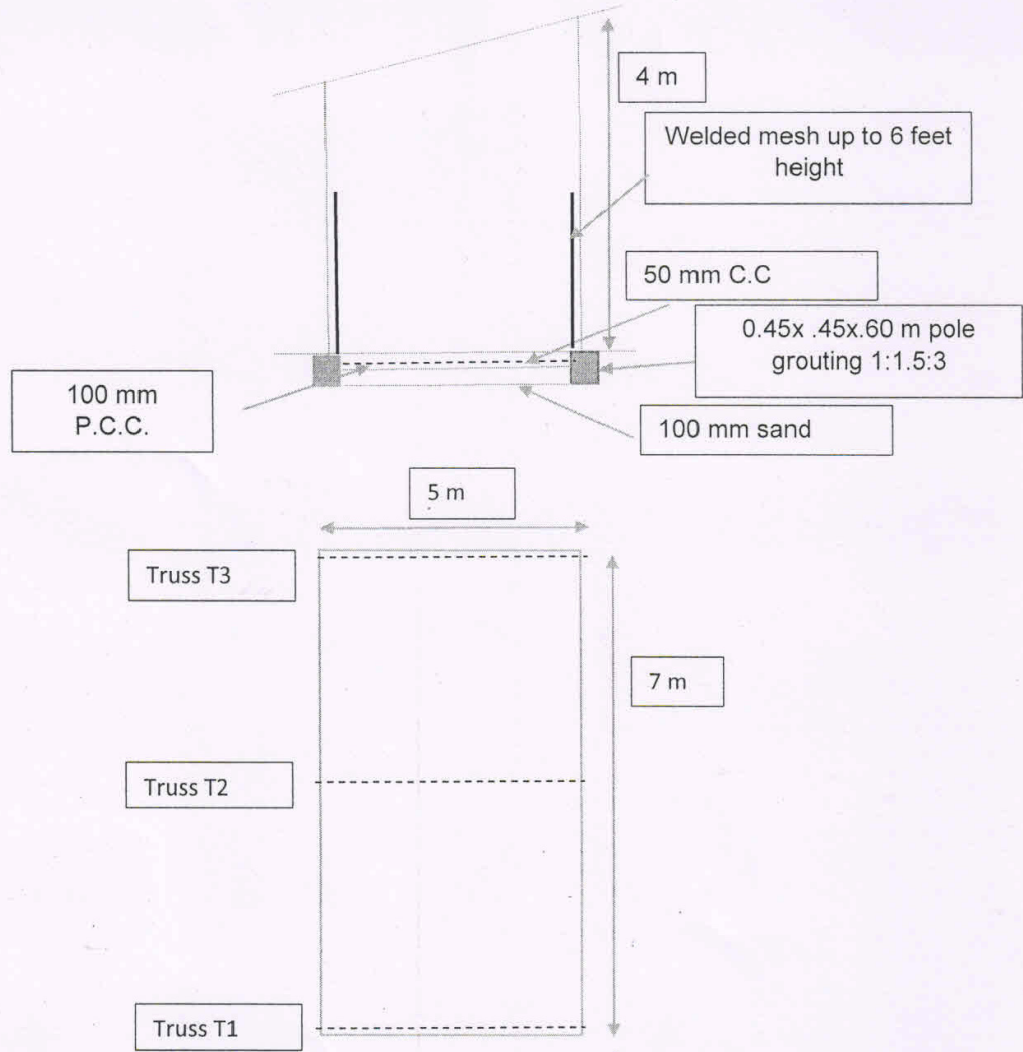
3. Necessary Utilities to be supplied along with each unit at different sites: -

Sr. No.	Name of Utilities per unit	Quantity per unit
1.	Suitable height Platform on the tank for the loading of raw material	1
2.	Brick Furnace of suitable size	1
3.	MS heat resistant painted self-stand chimney of suitable diameter and height min. 30 ft along with slings	1
4.	Over-head triple layered HDPE tanks of capacity 3000 liters of Make Sintex/ Diplast or any other ISI equivalent	1
5.	Water Storage tank triple layered for hydrosol HDPE tank Capacity 1000 L of Make Sintex/ Diplast or any other ISI equivalent	2
6.	Repute Make Centrifugal pump along with 1 hp single phase motor of Make Crompton/Hindustan motor or any other ISI equivalent, to transfer the water/ coolant along with suitable cable and plug shoe OR Diesel fired monoblock type pump, 1 hp of ISI make alongwith all necessary accessories (optional)	1
7.	Suitable enamel painted MS stand for overhead tank. Length 4 m width 4 m minimum Height 6 m/ suitable	1

	to accommodate 3000 L HDPE tank	
8.	Heat resistant polymer hose pipe size 2.5 inch with clamps	10 m
9.	Heat resistant polymer hose pipe size 1 inch with clamps	20 m
10.	Analog type Spring balance with 100 kg maximum weighing capacity with precision of ± 5 kg complete with all necessary accessories of reputed make ISI	1
11.	GI piping for inlet and outlet connection 25 mm dia with all necessary fittings socket, union, valves of ISI Make	5 lengths
12.	Suitable lighting in the shed and around shed	1 Lot
13.	A MS painted signboard of size 8'x4', displaying the title of project under which distillation unit has been established along with stand.	1

4. Specification for material for Covered shed:

- Size: 5m X 7 m plan size X 4 m clear height shed (please refer drawing)
- Structure made out of MS tube 60 X 60 X 3.20 mm thick of ISI make
- Shed top to be covered with 0.50 mm thick pre-coated iron profile sheets of Make TATA or any other ISI equivalent
- Periphery is to be protected with welded mesh of 3.50 kg/sqm of 50 mm square opening of mesh of ISI make of painted
- The flooring will be 50 mm thick C.C. flooring 1:2:4 over 100 mm thick P.C.C. 1:5:10, over 100 mm thick sand filling.
- On periphery toe wall 9" thick and 0.45 m clear height will be there. Toe wall is to be finished with 12 mm plaster 1:6 and cement paint covering
- All structure to be enamel painted of ISI make

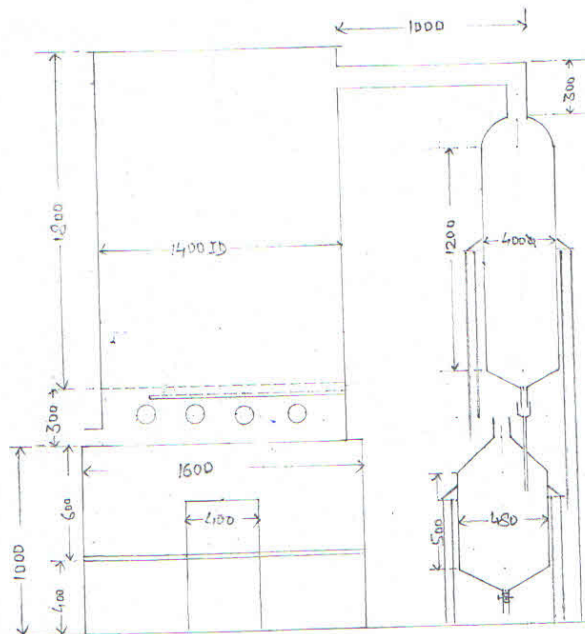
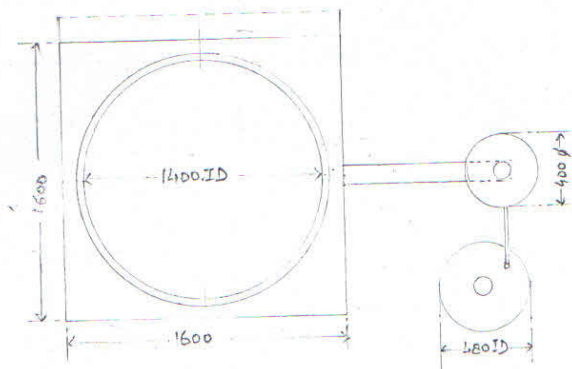


Civil drawing for covered shed

Scope of Fabricator

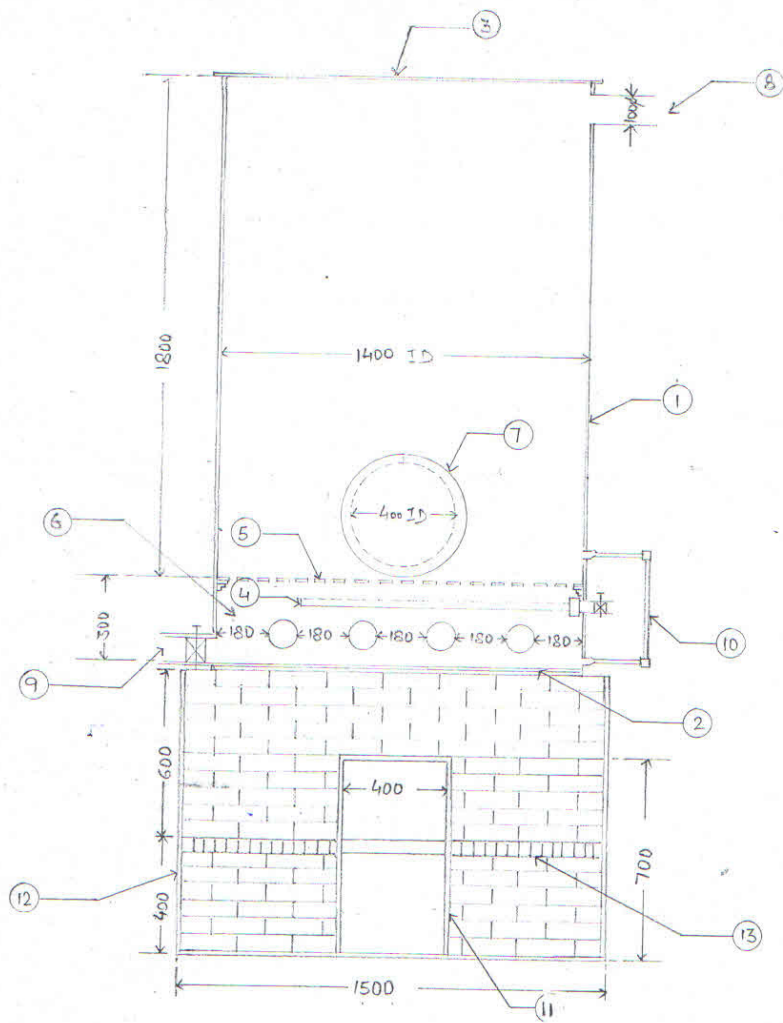
1. All the civil works including
 - Complete construction of furnace including Civil foundation base of chimney
 - Erection of chimney
 - Covered shed, structure, MS water tank stand of suitable height needs to be done by the fabricator at different sites.
 - All civil work necessary consumables like bricks, cement, sand, stone has to be supplied and arranged locally by the fabricator at all sites
2. Size of furnace: Length= 1600, Width= [] Height= 1000 (2500 liters)
3. Size of furnace: Length= 1300, Width= 1300, Height= 1000 (1200 liters)
4. Optimum Size of shed: Length= 7000 mm, Width= 5000 mm, Height= 4000 mm.
5. Vendor should have the experience of manufacturing and installation of the distillation units in the field on turn-key basis of volumetric capacity more than 1000L
6. Supply and connection of all the water lines i.e. cond [7 m] o pump to overhead tank and vice versa at all sites
7. In addition, this central processing facility should be accompanied with a water tanks, capacity 3,000 Lit., with water lifting pump and proper GI pipeline connections to the distillation units.
8. Any other essential items, which are missing for proper functioning of the distillation unit.
9. Factory acceptance test of all the nine units will be done at supplier site before dispatch and minor modification if required has to be executed by the supplier at no other extra cost of the ordered amount.
10. All units must be covered by warranty of 3 years (minimum).

Civil drawing for covered



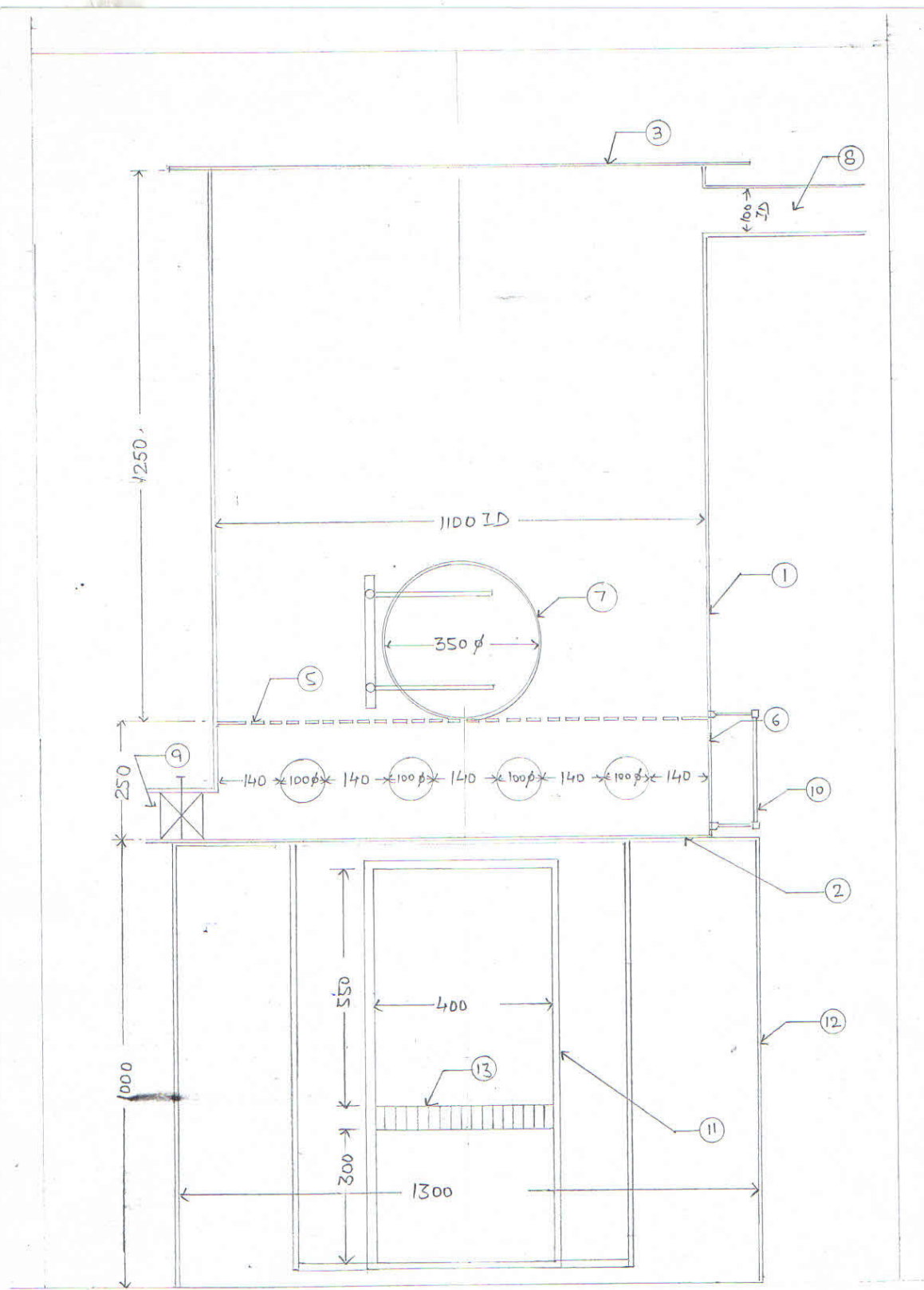
2500 Litres/Batch

IHBT/DAG/2017/01



Capacity - 2500 Litres/Batch

IHBT/DRG/2017/02



Capacity - 1200 Litres/ Batch