

Appendix-I(A)

Sr. No.	Name of the item with specifications	Qty.
1.	<p>Mini cold Storage, cold room with controls (Fully Computerized Setup)</p> <p>Cold room : 12ft. x 8ft. x 8ft. (H) External Dimension. (door size 0.9m x 2m) Includes: Storing Racks, Crate box, and packing Material with suitable placement for the proper flow.</p> <p>No. of rooms : 01</p> <p>capacity of room: 5 MT</p> <p>Process involved: Precooling, Storage and Ripening.</p> <p>Insulation of room: Prefabricated 80-100mm PUF Panels with 40+/- 2kg/m³ Density inside and outside Pre Painted 0.5mm Thick GI Sheets with cam lock for air tight construction, facing material GI precoated sheets & Flooring with 80mm PUF panels over and above 12mm thick marine ply with 1.2mm thick Aluminium chequered plate</p> <p>Expected temp. before Cooling (Product incoming temp.: +35°C</p> <p>Temp. after cooling (Final product Temp./ Room temp :) +0° to +5°C(Air Flow Constant)</p> <p>Relative humidity: 90-95%</p> <p>Humidifier: Ultrasonic Humidifier, Evaporation cap - 2.5-4 kg/hr., Automatic Water level control, Humidity control and display. SS Powder coated body, Air volume -300-400 m³/hr., working temp 0°C to 40°C, (Should be given with humidistat)</p> <p>RO System for Humidifier: System Flow Rate 10 LPH Output TDS : Less than 100 ppm IF Input TDS less than 1500 No. of Total treatment stages Six (06) Pre-treatment System:</p> <ul style="list-style-type: none"> • Spun Cartridge Filter • Antiscalent Cartridge(Balls) • Extruded Carbon Block 	01 Unit

- Granular Activated Carbon System
- Extruded Carbon Block

Dehumidifier: Dehumidifier- to maintain the humidity inside the room to maintain 80% to 60%

Ethylene Injection System + Co2 Exhaust System + Control Panel: Micro-controller based programmable

Refrigerant: R-22 / R404A

Outside ambient temp.: 52°C maximum (for insulation purpose)+45°C (for design of ripening system)

Compressor: Hermetic (Danfoss/Emersons made)

Fan for evaporators (Indoor unit):

- G.I. Powder coated body
- Designed Capacity Fan with Axial Flow
- Customize designed cooling coil
- Screw less wiring connector , Big size drain outlet
- Cooling coil fan, Capillary/expansion valve
- Capillary tube gas distributor, Electrical Box

Room lighting: 4-6 Watt/ m^2 with vapour proof light fixture

Voltage stabilizer: 3 phase Servo controlled voltage stabilizer

Control panels: Display with HMI with temperature,RH,O2 indicator, CO2, C2H4

Switchgears: All reputed make will be used

Coils & pipe: All coils & pipes are of copper make duly insulated

Condensor: Air-cooled

Wiring: Power wiring & control wiring with ISI approved PVC insulated copper conductor with supports in PVC piping

Temperature sensor: Sensitivity ± 1 Deg.C (Response time ≤ 60 sec)

Oxygen indicator:

Oxygen gas Detection System-

Fixed Type model: TX-XT, With relay and with display range: 0-30 %.

CO2 control mechanism:

CO2 control mechanism with Co2 indicator should be given Range: 0-2000ppm, with Display Co2 Sensors.

- Small exhaust fan for fresh air
- Timer based controls for fan on/off
- Exhaust Fans fitting powder coated box
- CO2 gas exhaust fan

Ethylene injection system:

Ethylene gas injection system along with control mechanism and one ethylene gas filled cylinder

- Ethylene Gas manifold system
- Ethylene gas regulator
- Ethylene gas PU pipe

Ethylene gas sensor

Gas detector/Transmitter

- Range : 20-2000 ppm C2H4
- Sensor Cell : Semiconductor
- Housed in IP44 enclosure(also available in IP 54, IP 65)
- Response time: T90 & 50 s
- Wall mounting installation
- Zero point drift
- Long life sensor
- Short circuit and overload protected
- Reverse polarity protected
- Easy maintenance and calibration

Note: All the control of refrigeration side is Danfoss make and for electrical side Siemens/L&T make.

Plastic Crates:

- Sufficient numbers according the size of cold room and ripening chambers
- Tough construction with perforation
- Light weight
- High strength
- 542 (L) X 390 (B) X 345 (H) mm
- 510 (L) X 360 (B) X 330(H) mm

Racks:

1730 MM (H) X 900 MM (W) X 400 MM (D)

5 Shelves Open Type making 4 Compartments From Slotted Angle L 40 x 40 x 3 mm Thick Shelf from 20 Gauge thick CRC Sheet duly Powder Coated Grey Color Finish

Portable Instruments Digital Type:

1. Humidity, RH (accuracy +/- 1%)
2. Velocity, (accuracy +/- 1%)
3. Temperature hand held meter (accuracy +/- 1°C)

Ducting:

Ducting should be provided on one fan of pre-cooler for studying and pressure purpose. (Properly designed for demonstrating the duct design, includes branching of the duct)

Safety Devices & equipment: Fire Alarm & Extinguisher bottle

SCADA system: Computerized SCADA system will be provided with software and Computer as per the requirement (if any)

Note: Tentative schematic diagram or Photographs of the quoted setup (complete setup) must be provided along with the technical specification.

Specific Requirement:

- System can be used for performing experiment and demonstration of Precooling, Storage and Ripening of fruit and vegetables with control atmosphere.
- Whole system will be control and display with SCADA System. Fully computerized control and must have high quality display placed on the front wall of the Cold Room.
- System must be flexible enough to operate and control at wide range of temperature, RH and Air flow.
- Fruit and vegetable packing materials (as sample should be given).
- One set of duct should be placed with three or more branches for understanding the air flow and duct design.
- Duct should have the provision to measure the pressures and velocity at every cross section changes.
- Full warranty against material performance and repairing and maintenance for three year from commissioning of room.
- Lab manual should be provide in soft and hardcopy along with the sample calculation and validations.