

## SPECIFICATIONS FOR Tender Notice No. IT/VTIP/WB/TN/ RAC/2009-10/2

<b>Category-1</b>		
<b>1.1</b>	Air Compression, Two Stage For Oil - Less Dry Air, With Rush Proof Tank Assembly, Heater & Controls Max. Pr. 10kg/Sq. cm. Capacity 45 Liter. Motor 1hp.	Compression Load 10 K.gCm <sup>2</sup> , MS Tank, Suction Capacity 200Litre/m, Reservoir 200 Liter, Automotive Condensate drain. Noise Load up to 40 db (A) in a distance of 1 meter. Temperature- 0 to 60 degree. Air Supply Pipe Line With out let , With push- pull connector. Motor – 3 HP, V- Belt, Belt guard, Auto Cut Switch, Free Air Delivery ( 1pm 256-Cfm. 90), Reputed/Popular make with I.S.I. Certification
<b>1.2</b>	Air Conditioning Direct & Indirect Water Chiller. Complete With All Control Including Humidity Control Ele Capacity 15000 Kcal/Hr.	Air conditioning plant of 15000 K.Cal./Hr. direct cool with the following: 1. Condenser fin & tube type induced or forced draft fan. 2. Cooling coil fin & tube type with appropriate three speed fan. 3. 15000 K/Cal Compressor Open type with R-22 refrigerant, suitable motor ISI mark. 4. High pressure/Low pressure cut out. 5. All electrical controls fitted in a suitable MS box in such a position that it can be demonstrated perfectly to students. 6. The plant will be put on test for 72 hours on site after installation & commissioning.
<b>Category-2</b>		
<b>2.1</b>	Bottle cooler 110 litres 1/6 hp.	Bottle Cooler of 110 liters. Capacity horizontal shape, which can maintain minimum +ve temperature. The condenser fan must be covered with shrouds. The compressor capacity must be 1/6 HP. The deep freezer must be accompanied by 0.5 KVA stabilizer.
<b>2.2</b>	Cold Storage Plant Complete With All Controls & Accessories Including Cooling Tower & Water Treatment Plant Capacity 15000 Kcal/Hr. Or Working Trainer Model/ Simulator.	15000 K Cal/hr. Good qualities insulated 6" in between in. Compressor with 7.5 HP motor with cooling tower treatment. with required LP+HP, Solenoid valve thermostat switch, High & Low pressure gauges etc. 1. Compressor :- Open type reciprocating compressor (5 ton) with 7.5 h.p. motor 2. Storage room:- 10 feet X 10 feet X 8 feet with double wall insulated panel (60 mm) type. Suitable small insulated door for the cold storage. 3. Evaporator:- In the form of copper coil fins type fitted inside the cold storage room with evaporative fan motor forced draft with water drainage system
<b>Category-3</b>		
<b>3.1</b>	Components for car AC systems. A) Wobble plate compressor with mounting. B) Serpentine evaporator. C) Parallel flow condenser. D) Hoses, tubes, receiver, expansion valve. E) electrical components & wiring harness.	Car AC Trainer consisting of following items : 1. Wobble plate compressor with mounting 2. Condenser parallel flow with fan 3. Cooling coil serpentine type with blower motor & fan. 4. Hoses, drier with liquid line indicator, expansion valve, tube etc. 5. Electrical components as required 6. Electrical motor of 1.5 HP ISI of ISO 7. One electrical converter from 220 V to 12 DC supply 8. Multi channel digital thermometer with four probes. All must be fitted on 1.5" square frame of MS & the system must be charged with 134a.

<p>3.2</p>	<p>Condensing unit with open type compressor air-cooled condenser, controls cap.3000 k.cal/ hr.</p>	<p>Compressor: Open Reciprocating Type Belt Driven, Capacity 3000 Kcal/hr  Refrigerant R-22, R-134a or CFC Free  Valve Suction &amp; discharge service valve  Compressor Motor 2 HP, 230 V AC, Single Phase (As per IS Standard)  Condenser Size : 16" x 16" – 4 Row – Internally Grooved Copper 3/8" □ tubing with Aluminum air fins – Side, Top and Bottom plates of 16 SWG Aluminum  Condenser Fan Motor 1/5 HP, 230 V AC, 50 Hz, Single Phase  Condenser Fan Blade 14" Diameter of Aluminum  Receiver Suitable with Angle Valve of 1/4" – 2 Nos. (Inlet &amp; Outlet)  Cooling Coil Size: 13" x 13" – 3 Row – Internally Grooved Copper 3/8" □ tubing with Aluminum air fins – Side, Top and Bottom plates of 16 SWG Aluminum. Or Suitable for AC type cooling coil with metering device-thermostatic expansion valve.  Acrylic Duct 14" x 14" – 4 ft long – 8 mm thick, with orifice plate, inclined manometer, axial fan, air heater, steam inlet facility, Dry bulb and wet bulb temperature sensors at inlet, &amp; outlets. Suitable Insulation of Armocol provided wherever necessary.  Rotameter To measure the flow rate of liquid refrigerant and bypass the rotameter – 1 nos.  Air Flow measurement Digital Anemometer  Control Panel It consists of the following items mounted on it:  8 channel programmable digital scanner for temperature indication of various points.  Temperature controlling thermostat  DOL starter switch for compressor  Switches and Indication Lamps for Steam Generator, Axial Flow Fan, Heater, Mains.  HP cut off switch  LP cut off switch  Digital Ammeter, Voltmeter – 1 nos. each  Pressure Gauges – 4 nos.  Process line diagram  The unit enables to perform the following measurements / Practical in Trade.  (a) Dry Bulb &amp; Wet bulb Temperature of Air Inlet &amp; Outlet of Cooling Coil Duct.  (b) Suction &amp; Discharge Pressure of Compressor  (c) Inlet &amp; Outlet Pressure of Cooling Coil  (d) Flow rate of Refrigerant at liquid line  (e) Pressure drop at duct inlet (Orifice)  Note:- The unit complete with Gas Charging &amp; Working Condition of AC System.  The above unit mounted on SS Angle 35 x 35 x 5mm.</p>
<p>3.3</p>	<p>Condensing unit with open type compressor evaporate condenser, controls cap.3000 k.cal/ hr.</p>	<p>Compressor: Open Reciprocating type Belt Driven. Capacity : 3000 Kcal/hr (1 TR)  Refrigerant : R-22, R-134a or CFC Free  Valve : Suction &amp; Discharge Service Valve  Compressor Motor : 2 HP 230 V Single Phase (as per IS standard)  Condenser : 14" * 14" – 4 Row - Internally Grooved Copper 3/8" Φ tubing with Aluminium air fins - Side , Top and Bottom plates of 16 SWG Aluminium.  Receiver: Suitable with Angle Valve of 1/4" – 2 Nos.  Cooling Coil : 13" * 13" – 3 Row - Internally Grooved Copper 3/8" Φ tubing with Aluminium air fins - Side , Top and Bottom plates of 16 SWG Aluminium.  or Suitable for AC type cooling coil with metering device - thermostatic expansion valve  Cooling Coil Motor : 1/10 HP, Single Phase, 230 V AC, 50 Hz with 15" Aluminum Blade.  Evaporative type : Suitable Evaporative Condenser  Cooling Tower made of Cooling Tower FRP or 8 mm thickness Transparent Acrylic with Drift Eliminator, Spray Nozzle, Inlet &amp; Outlet wet bulb, dry bulb</p>

		temperature sensors. Evaporative Blower : 1/2 HP, 230 V AC, 50 Hz, Single Phase (Cooling Tower - Forced Draft Type)
	<b>Category-4</b>	
4.1	Cut section of Dx chiller	Original Dx Chiller small 1 ton capacity with inlet & outlet valve . With transparent fibers 2mm sheet . Cover.
4.2	Cut section of Hermatic Reciprocating compressor	Cut section of sealed Hermatic reciprocating compressor 1 ton capacity shows the centrifugal motion and reciprocating motion . With transparent fiber 2mm sheet cover.
4.3	Cut section of Hermatic Scroll comp	Cut section of Hermatic Scroll one ton capacity shows the function of compressor. With transparent fiber 2mm sheet cover
	<b>Category-5</b>	
5.1	Cut Section Of Rotary Harmatic Compressor (Capacity1 Ton).	Cut Section Of Rotary Harmatic Compressor, Capacity 1 Ton, With transparent fiber 2mm sheet cover.
5.2	Cut section of screw compressor	Cut section of screw compressor one ton capacity shows the function of compressor. With transparent fiber 2mm sheet cover.
5.3	Cut Section Of Scroll Compressor.	Cut section of Scroll compressor three ton capacity shows the function of compressor. With transparent fiber 2mm sheet cover
5.4	Cut section of Shell & tube type condenser	Cut section of shell & tube type condenser one ton capacity with water inlet and outlet, refrigerant inlet and outlet with safety valve shows the function of condenser. With transparent fiber 2mm sheet cover.
	<b>Category-6</b>	
6.1	Deep Freezer 165 LIT.S -18° C. ¼ HP	Deep freezer of 165 ltrs. Capacity horizontal shape, which can maintain minimum -18° C temperature. The condenser fan must be covered with shrouds. The deep freezer must be accompanied by 1KVA stabilizer.
6.2	FORST FREE RAFRIGIRATOR 230 LIT. CAPACITY USING HFCS - 134A REFRIGERANT	Frost free refrigerator 230 Litres capacity using 134a refrigerant using reciprocating compressor along with one voltage stabilizer of 0.5 KVA
6.3	frost free Refrigerator 260 liters use in H.C. Refrigerant	Frost free refrigerator 260 Litres capacity using 134a refrigerant using reciprocating compressor along with one voltage stabilizer of 0.5 KVA
	<b>Category-7</b>	
7.1	NO FROST REFRIGERANT 300 LIT. CAPACITY USING HC REFRIGERNT	No frost refrigerator 300 litre capacity using HC refrigerant along with one voltage stabilizer of 1.0 KVA
7.2	REFRIGERATOR 170 LIT. USING 134A REFRIGERANT	Refrigerator 170 lit. or closer to 170 ltr. (higher side) Using 134a refrigerant with 0.5 KVA stabilizer.
7.3	Refrigerator, compression type 300 litres double door, double compressor system.	No frost refrigerator 300 litre capacity Double compressing system.
7.4	THERMOELECTRIC REFRIGARETOR	Small refrigerator operatable with battery/220V to show the function of P-N-P junctions.
	<b>Category-8</b>	
8.1	Descaling Pump Set With Stainless Steel Impeller & Housing Complete With Motor 1 Hp & Accessories	Descaling pumpset with stainless steel impeller as per relevant specification of ISI make with 1" size all parts comprising in contact of liquid are of stainless steel & suitable to be coupled with I HP 1440 RPM single phase motor with starter & main switch both pump & motor are mounted on a common base plate through a set of flexible coupling along with a stainless shell/barrel 20 or 22 SWG thickness heaving the

		capacity App. 100 lts. for acid solution capable of giving following performance. Reputed/Popular make with I.S.I. / ISO Certification.
8.2	Dry N2 in cylinder with 2 stage regulator or commercial N2 in cylinder with drier unit and 2 stage regulator.	Nitrogen Cylinder of 7 cu. Ft. capacity filled and ISI mark and double stage regulator make ESAB. 10 mtrs hose pipe of good quality with clamps.
8.3	Fan coil unit with water valve ( 2 & 3 way)	Fan coil unit 1.5 ton capacity fan motor 1/8 HP solenoid valve water valves . Two way & three way 3/8
	<b>Category-9</b>	
9.1	Hermetic Compressor 3 Ton Capacity.	Hermetic compressor 3 ton capacity 440 volts three phase 50 HZ with inlet & outlet service valves
9.2	Hermetic compressors 1.5 (AC)	Hermetic Compressor (Sealed )1.5 ton capacity make kinioskar/ Carrier/Voltas
9.3	Screw compressor (open type)	Screw compressor 5 ton capacity with suction & discharge valves.
9.4	Juice Dispencer	Compressor 1/6 HP, Fan Motor 1/35 HP. Body Stainless Steel with two containers for different juices.
	<b>Category-10</b>	
10.1	I) Evacuating & refrigerant charging station, compression. a) Rotary two stage vacuum pump & motor (with gas ballast & anti suck back) manifold with gauges & valves & capable of pulling vacuum upto 50 microns of Hg & with provision of connecting to a microns level vacuum gauge b) Graduated charging cylinder with provision for temperature correction & all necessary isolating valves. II) Evacuating & charging station as above but fitted with weighing scale (upto 2 kg. In lieu of (b) above & with accuracy of +/-1g for charging hydrocarbons	Evacuating & refrigerant charging rotary two stage vacuum pump & motor (with ballast & anti suck back) manifold with gauges & valves and capable of pulling vacuum upto 50 microns (blank off) of hg and with provision of connecting to a micron level vacuum gauge graduated charging cylinder with provisions for temperature correction and all necessary isolating valves. Weighing scale (upto 5 kg) & capacity & Accuracy of +1-1 gm. For charging hydrocarbon.
10.2	Ice candy unit complete with stainless steel tank, mould box, thermocol insulated sunmica body, agitator, compressor, motor ele. Temperature, pressure, refrigerant control gauges, motor, pipe fitting ele 3000kcal/hr. working trainer model/ simulator.	Motor Circuit : CSR, Power : 1300 Watt, Supply Voltage : 230 V 50 Hz. A/C single phase, Outer Body with Condensing unit : SS 304 G 22 SWG – Buffing finish, Size : 1500 mm (L)*750 mm (W)*750mm(H) With condensing unit and Door Capacity (inner storage) : 2 mold candy-30 min (Each mould contain 50 candy) and small storage compartment 1000 candy(500+500 each) Mold : Brass OR S.S 304 Grade, Insulation : PUF-75 mm thick (40 density) /thermocool-75 mm thick Temperature Control setting condenser : Digital temp. controller Condenser Fan Motor : 1/10 HP 230V 50Hz Single Phase Evaporator : Copper tubing -1/2" dia-50 ft long/ or Suitable size tube – dia. and length. Condenser Size : 14"*14"* 4 Row –inner grooved 3/8" size Tube top and bottom plates of 16 SWG Aluminum Door: Two door with gasket and SS or Brass handle and hangs with locking arrangement. Agitator Motor : ½ HP 230 V 50 Hz Single Phase Control Panel : It should consist of the following items mounted on it: 1. ELCB switch for mains 2. HP cut off switch 3. LP cut off switch 4. Digital Ammeter, Voltmeter -1 nos. each 5. Digital energy meter 6. Pressure Gauges-62 mm Diameter 0-500 psi- 2 nos. 7. Compounds Gauges-62 mm Diameter 0-500 psi- 2 Nos. 8. Dial type thermometer 4" dia., Range: -30 °C + 50 °C, 02 Nos. 9. Hand shut off valve ¼" 01 No in charging line 10. Process line diagram 11. Six zone digital temp indicator Note: Body base trolley should be made from S.S. angle 50*50*6 mm with four or six heavy caster wheel. The unit should be able to perform the following measurements/Practical in Trade. Suction and Discharge Pressure of Compressor Inlet and Outlet Pressure of cooling coil Measurement of temperature at different indicating point.

10.3	Ice Cuber	Ice Cube maker with bullet shaped ice in three sizes with rated capacity of 15 Kgs./24 hrs.. It must have the storage capacity of 1.3 Kgs. With water reservoir capacity of 4.5 liters. Electrically single phase 220V compressor.
<b>Category-11</b>		
11.1	Reciprocating compressor with provision of capacity control etc. for demonstration. Capacity 9000kcal/hr. semi hermetic open type.	Provision of capacity control etc. for demonstration. Capacity 9000kcal/hr. semi hermetic open type.
11.2	Recovery machine one each for CFC & 134a refrigerant with recovery cylinder	Recovery unit for 134A. The sealed compressor capacity can be 1/6 or 1/8/hp,with air cooled condenser , HP & LP cut out or dual pressure cut out liquid line indicator, two hand shut of valves,R-134 A Danfoss make drier filled with molecular sieves two oil separators etc complete in all respect
11.3	RECYCLING UNIT (OPTIONAL)	a. Recovery Unit for R-134a. The sealed compressor capacity can be 1/6 or 1/8 HP, with air cooled condenser, HP & LP cut out or dual pressure cut out, liquid line indicator, two hand shut off valves, R-134a Danfoss make drier filled with molecular sieves, two oil separators etc. complete in all respect. b. Recovery Unit for R-12.The sealed compressor capacity can be 1/6 or 1/8 HP, with air cooled condenser, HP & LP cut out or dual pressure cut out, liquid line indicator, two hand shut off valves, Compatible drier, two oil separators etc. complete in all respect. c. Four cylinders for recovered refrigerant
<b>Category-12</b>		
12.1	See through model of Direct cooled refrigerator	165/185 ltrs. Refrigerator with all sides transparent with Perspex sheet giving a look to see inside the cabinet with lower half insulated with puff & upper half without insulation. The Perspex sheet must be double. The design is enclosed.
12.2	See through model of Frost free refrigerator	230/250 ltrs. Refrigerator with all sides transparent with Perspex sheet giving a look to see inside the cabinet with lower half insulated with puff & upper half without insulation. The Perspex sheet must be double.
12.3	Shell & tube type Dx chiller (Small)	Shell & tube type Dx chiller (horizontal type) Capacity 5 ton (15000 Kcal/hr )
<b>Category-13</b>		
13.1	Table model of vapour absorption system	Table model of vapour absorption system 1) Working fluid -ammonia , Water & hydrogen 2) Heating - By any heater 3) Cabinet - with absorber, condenser, generator, evaporator Capacity 45 ltrs
13.2	Testing machine for calibration & testing fo electrical starter, relay, contractor, solenoid valve. LP, HP, Oil pressure cut out.	Electrical instrument for electrical testing chamber for the pressure testing of components , Automatic oil feeding system ,testing under high vacuum All the components & instruments would be fitted on a heavy duty panel & mounted on steel tubular frame.
13.3	Two stage rotary vacuum pump capacity approx. 60 - 100 rpm, capable of evacuating to 50 microns of Hg & fitted with gas ballast, anti suck back valve & single phase motor.	Two stage rotary vacuum pump of capacity approx. 60-100 LPM, capable of evacuating to 50 microns of hg & fitted with gas ballast, anti suck back above valve & single phase motor.
<b>Category-14</b>		

<b>Category-14</b>		
14.1	Variac input 230 V output 400 Va portabel complet with metere and controls	Input :- 230v AC, Single Phase, 50Hz. Out put: 230v to 400v AC, Single Phase, 50Hz,
14.2	Visi Cooler 250 Lts	250 Liter capacity outer body stainless steel, Inner body G.I. sheets compressor 1/5 HP. Fan motor 1/35 HP, Puff insulation Refrigerant 134 A. with reciprocating compressor and with 1KVA voltage stabilizer.
14.3	Working model of absorption system of Refrigeration cap. 3000 k.cal/hr.	Working model of absorption system of Refrigeration cap. 3000 k.cal/hr.
14.4	Working Model of Vapour Absorption System.	Refrigerator (Absorption System) noiseless volume 45 ltrs.(Approx) To be run on 220/240 volts AC having electrical rating 80 watts. Nominal consumption 1.4 KWH/24 hours with the following features. <ul style="list-style-type: none"> <li>• Ice cube making facility.</li> <li>• Height adjustable shelves.</li> <li>• All around magnetic seal.</li> <li>• Sturdy metal housing.</li> <li>• Door can be hung right or left.</li> <li>• Fully automatic defrost with evaporation of defrosted water.</li> </ul>