આણંદ કૃષિ યુનિવર્સિટી
ડેરી સાયન્સ કોલેજ, આણંદ.
ટૂંકી મુદતની નિવિદા ૨૦૧૫-૧૬

આ કોલેજના ડેરી એન્જીનીયરીંગ વિભાગ માટે નીચેની આઈટમો ખરીદવા માટે ભાવપત્રકો(કોટેશન) મંગાવવામાં આવે છે.

Instrument of heat transfer through sphere, Pipe friction apparatus, Laboratory scale freeze dryer,Proto type working models of dairy equipment, Various parts of refrigeration system, Models of various joints and machine parts, Working models of various industrial equipments.

આ અંગેની ટેન્ડર ફી (નોન- રીફન્ડેબલ) રૂ. ૫૦૦/- રોકડા અથવા ડીડી (એએયુ ફંડ એકાઉન્ટ) ના નામનો આપ્યેથી ટેન્ડર આચાર્યશ્રીની કચેરી(ડેરી એન્જીનીયરીંગ વિભાગ), ડેરી સાયન્સ કોલેજ, આણંદની કચેરીએથી કચેરી કામકાજના સમયમાં ઉપલબ્ધ થશે. અથવા www.aau.in ઉપરથી ડાઉનલોડ કરી શકાશે. આ અંગેના ભાવપત્રકો ફકત રજીસ્ટર પોસ્ટ/સ્પીડ પોસ્ટથી જ તા. ૦૪-૦૯-૨૦૧૫ સુધીમાં આચાર્યશ્રી, ડેરી સાયન્સ કોલેજ આકૃયુ, આણંદ – ૩૮૮૦૦૧ની કચેરીને મળી જાય તે રીતે મોકલવાના રહેશે.

આણંદ.

તા.12/08/2015 આચાર્ય અને ડીન

For official use only

Tender No:		*Signature:*		*Date of Issue:*	

TENDER FORM

for

Instrument of heat transfer through sphere, Pipe friction apparatus, Laboratory scale freeze dryer, Proto type working models of dairy equipment, Various parts of refrigeration system, Models of various joints and machine parts, Working models of various industrial equipment

DOWNLOADED FROM WEBPAGE
or
COLLECTED HARD COPY FROM THE OFFICE

Last date of tender submission to reach the office through speed post/registered post

04-09-2015

NOTE

Payment of Rs. 500/- by cash or DD drawn in favour of "AAU Fund A/C", payable at Anand as tender fees should accompany the filled tender otherwise the tender form shall be treated as incomplete and cancelled.

PRINCIPAL AND DEAN
SHETH M. C. COLLEGE OF DAIRY SCIENCE
ANAND AGRICULTURAL UNIVERSITY, ANAND - 388 110 (GUJARAT)

Tel. /Fax No.: (02692) 261030
e-mail: principaldsc@aau.in
Professor and Head (DE) :(M): 09898611856

Terms and Conditions:

- The quotation must be in Indian rupees and rates quoted should be **inclusive of all applicable Taxes and F.O.R. at Anand at our Laboratories inclusive of packaging, forwarding, freight & insurance, installation, commissioning and demonstration by technical team at our site and one year extended warranty of spares and equipment.**
- Our university will supply custom / central excise duty exemption certificate for being educational institute.
- Validity of the quotation should be **120** clear days from the last date of receipt of the quotation.
- **Payment shall be made only after satisfactory installation and demonstration. No advance or part payment or payment through bank can be entertained.**
- Tender forms only from original manufacturers/ their authorized dealers/ stockists who are in the concerned field will be considered, along with the said certificate.
- The credentials of the party, list of customers and complete illustrated literature should be enclosed with the tender form. The firm should be ready for pre inspection of the item and its performance, if necessary.
- All the electronic hardware should comply with international standards for safety, electromagnetic emissions and immunity, CE/FCC Mark/Certification, etc.
- Tenderers will have to attach original colour catalogue of the each quoted product ensuring exact specifications.
- In case of defective items, the same shall have to be replaced by the party concerned at its own cost, and risk, and within stipulated time.
- The Earnest Money Deposit (EMD) in the form of account payee Demand Draft in the name of "AAU Fund Account" payable at Anand, shall have to be accompanied with the filled Tender Forms. Tender submitted without EMD shall not be considered. The deposit shall be forfeited if the party in any case is not able to supply the ordered goods in stipulated period and at the rates approved.
- Duly filled tender forms in sealed envelopes through **post/speed post only** should reach the office of the **Principal, Sheth M. C. College of Dairy Science, Anand Agricultural University, Anand 388 110 before 17.00 h on 04-09-2015**
- Please super scribe the envelope, **"TENDER DOCUMENTS FOR EQUIPMENT: DAIRY ENGINEERING, DAIRY SCIENCE COLLEGE, ANAND"** and mention clearly senders' name and address.
- The PRINCIPAL shall be empowered to reject any one or all the tenders without giving any reason for doing the same. This shall not be challengeable in the Court.
- Parties may be called for scientific discussion and price negotiation, if required
- In case of disputes, decision of Vice Chancellor, Anand Agricultural University, Anand will be final and acceptable to all the parties.

- **Name of supplier / firm:**

- **Complete postal address:**

- **Telephone Number:**

- **FAX Number (if any):**

- **e-mail address (if any):**

- **Details of Tender fee:**

  D.D.Number: **Bank's Name:**

  Amount: **Date:**

- **Details of EMD:**

  D.D.Number: **Bank's Name:**

  Amount: **Date:**

- **Sales Tax No. :**

- **Registration No. :**

- **Any other details**

We agree to abide by the terms and conditions of supply mentioned in this tender document

Signature of Tenderer
(With Stamp, Name, Designation and date)

Lowest competitive rates are hereby invited for the purchase of Equipment/instruments with following specifications

Sr. No.	Specifications and other details of items to be purchased	EMD (Rs.)	Quantity
1.	**INSTRUMENT OF HEAT TRANSFER THROUGH SPHERE** **Description** The purpose of the instrument is to study the heat transfer behavior through sphere, which is made of different materials. There are two spherical shells out of which outside one should be of stainless steel 316/304 type. The outer sphere should be provided with the provision to replace the insulating material in between the two spheres. Inside sphere should be of copper and the insulating material is packed between these two shells. A heating coil is provided in the inner shell through dimmerstat. Six temperature sensors should be provided along the radius of the inner and outer spheres. **Specifications** ▪ Radius of the inner copper sphere, r_i=120 mm ▪ Radius of the outer s.s. sphere, r_o= 200 mm ▪ Power input measuring arrangement ▪ Multipoint digital temperature indicator ▪ Heater coil appropriate capacity, Dimmerstate 0-2A, 0-230V, AC ▪ Temperature sensors at required strategic points ▪ Insulating powder: Asbestos magnesia	3000/-	01
2.	**PIPE FRICTION APPARATUS** **Description** The setup should be consisting of three pipes of different diameters and material with valves at the end of each pipe to conduct experiment at various flow rates. Two Pressure tapings should be provided on each pipe at a fixed distance to measure pressure drop. One of the pipes can be connected to the bench at a time to carry out experiment. The pipe lines should be fitted with an elbow, bend, Gate Valve, Globe valve, Sudden Expansion fitting and a Sudden Contraction fitting. Two Pressure tapings should be provided across these fittings to measure pressure drop. SS QRC should be provided on the tapings to easy connect it to Manometer. The pipes should be fixed on SS frame work. Sump tank, Pump, Measuring tank, Piping and Manometer are also supplied. The entire bench should be mounted on four wheels for easy transfer. Facility should be provided to connect another flow-meter, if required. Pressure tapings are provided on bush for longer life. **Technical Specifications:** ➢ A set of fittings □ Fitting 1: an elbow, MOC: PPR with SS Threading, Size: 1/2” □ Fitting 2: a bend, MOC: GI, Size: 1/2” □ Fitting 3: Sudden contraction 1” to ½”, MOC: Nylon □ Fitting 4: Sudden expansion 1/2” to 1”, MOC: Nylon □ Fitting 5: Gate Valve, Size: ½” □ Fitting 6: Globe Valve: ½” ➢ Pipes: Three different pipes should be supplied □ Pipe 1: 14 mm dia, Length: 1200 mm, Material MS □ Pipe 2: 1/2” dia, Length: 1200 mm, Material G.I. □ Pipe 3: 1/2” dia, Length: 1200 mm, Material PPR	3000/-	01

	□ Measuring tank: MOC: SS □ Sump Tank: MOC: SS □ Centrifugal Pump: Make: Kirloskar, 0.5 HP, Max Head: 24 m, Max Flow Rate: 2250 LPH, 230 V AC, 50 Hz, Single Phase. Piping: Size: 1", PPR, Fittings: PPR with SS/brass threaded parts □ Manometer: Inverted tube type with pressure compensating arrangement □ Pressure Tapings: Machined Nylon bush size 75 mm dia X 35 (approx) adequate in number. □ Structure: MOC: SS Frame, Wheels: 3"X 1.25", Plated Polymer, 2 Swivel type without brake + 2 Swivel type with brake		
3.	**LABORATORY SCALE FREEZE DRYER** **Description:** The freeze dryer is to be used exclusively for food freeze drying. The system should have external pre-freezing arrangement followed by freeze drying process. The freeze dryer should have all necessary components, indicating and measuring devices and automatic controls. The detailed specifications are given below. (i) Unit for pre-freezing of food materials: Deep freezer having minimum 150 litre capacity to get minimum of -20 ^{o}C temperature for freezing of materials. The system should have all necessary components with CFC free 404a refrigerant. (ii) Food freeze drying system with following specifications. (1) Capacity: 3 kg having 24 h processing operating capacity (2) Water removal capacity of 800 ml in 8 to 9 h cycle. (3) Raw material input/processing capacity of 0.8 to 1.0 kg in 8 to 9 h cycle. (4) Heating surface area of 0.15 m^2 with 3 number of heater plates (5) Size of heating plates: 270 mm x 300 mm (6) Maximum heating temperature (heater plates) up to +70 degree C. (7) Drying chamber internal size of 400 to 410 mm. (8) Size of product trays: 252 mm x 280 mm. No. of trays 02 (9) Vacuum in chamber: 0.3 mbar max. (10) Two stage high vacuum pump model VKC-08 having minimum pumping capacity of 8 m^3/h to get ultimate vacuum of 20 microns under pnerope conditions. (11) Ultimate condenser coil temperature of -36 ^{o}C and ice-condenser surface area of not less than 0.14 m^2. (12) Method of defrosting of condenser: Natural after every batch. (13) Manual operation with digital temperature controller and digital vacuum meter. (14) Digital temperature scanner (15) Refrigeration system for freeze dryer with all necessary components, CFC free 404a refrigerant and air cooled condenser.	12000/-	01

4.	**PROTOTYPE WORKING MODELS OF DAIRY EQUIPMENT** **(A) BULK MILK COOLER** **Product Description:** Design, supply, installation, testing and commissioning of direct expansion type Bulk Milk Cooling systems including all accessories. Bulk Milk Coolers Capacity: 250 – 500 Litres The tank shall meet the requirements of ISO 5708 class 2 A II (latest version) The Bulk Cooling Unit shall be used to cool raw milk from the ambient temperature to 4°C in 3 h time in conformity to specified in ISO 5708 2A II. **(i) Milk Cooling Tank** **Material of construction:** Tank inner, outer, intermediate, dimpled jacket and top open able cover shall be fabricated from stainless steel AISI 304. All piping, filter, body, manhole cover, agitator shaft & blade, adjustable ball feet, dip stick, outlet valve and blank flange shall also be manufactured out of AISI 304. Filter screen shall be from nylon wire mesh. All the gaskets shall be from food grade Nitrile rubber material. The skid on which refrigeration unit is mounted shall be of S.S./ powder coated steel. The evaporation surface in contact with milk shall be passivated by standard treatment to impart corrosion resistance. The tank shall be rectangular/ cylindrical with a double stainless steel shell of AISI 304 in special ground finish 150 grit. The bottom of the tank is to be designed dimple evaporator. It is to be made from AISI 304 stainless steel using inert gas spot welding. The thickness of the inner shall be 2 mm and outer shell shall be 1.5 mm. The tank shall be provided with 4/6 Nos. legs with SS 304 adjustable ball feet legs suitable for minor height adjustment A temperature sensor shall be permanently fixed at the bottom of the outlet cup on the outer surface, to sense the temperature at the outlet and to transmit the signal to the digital temperature indicator. The temperature indicator is provided in the Milk Tank Control Panel. The tank is insulated with injected polyurethane foam without any imperfections or hygroscopic with a thickness of 50 mm **Tank accessories** Agitator – Extra low speed agitator with stainless steel shaft SS sleeved up to the drive, which is a geared motor, should be provided for optimum sealing between agitator and tank. Outlet – 1 No. Tank outlet fitted with 1 No. Butterfly valve Inlet and manhole at appropriate place CIP- Nylon Brush along with stick for manual cleaning of the tank after every unloading shall be provided. Specially designed rotary spray ball shall be considered for adequate cleaning in case of closed type of the tank. **(ii) Refrigeration system** The refrigeration system shall be designed to comply with ISO/R1662. The refrigeration system shall be of direct expansion type, with R-22 or CFC free environmental friendly refrigerant to cool the raw milk form reception temperature to 4°C in the time frame described above. The evaporator (s) of the refrigeration system shall form a part of the milk tank body as dimpled jacket in the bottom plate.	15000/-	1 set 01

	Compressor: Hermetically sealed compressors complete with drive motor. Reputed make compressors of specified capacity. The compressors are selected based on the energy efficiency and optimum capacity to take care of the cooling load. **Condenser:** Air Cooled, compact condenser unit comprising of finned condenser coils in several rows. Condenser fans of reputed make are fitted for the duty. **Receiver:** A suitable size sealed receiver shall be provided duly mounted on the skid near compressor. **Thermostatic Expansion Valve:** A suitable size and capacity TX valve of Maximum Operating Pressure type shall be provided. The make of TX valve will be DANFOSS/Equivalent. **Heat recovery system:** As the unit is to be used for teaching and experimentation purpose, system for heating of water using compressed gas is to be provided. **Suction and Discharge pressure gauge:** As the unit is to be used for teaching and experimentation purpose, system should be provided with analog/digital type suction and discharge pressure gauge of appropriate pressure range to measure the operating conditions of the compressor in different seasons. **Refrigerant pipe, fittings and controls:** All pipes fittings & controls shall comply with the latest relevant code applicable. The tubings shall be insulated, wherever necessary. **Refrigerant & Oil:** The unit is supplied complete with first charge of refrigerant type R-22/ and lubrication oil. One Set – Refrigeration system controls field mounted comprising of solenoid valve, L.P/H.P. cutout and sensor for digital temperature indicators. **(iii) Control Panel** **Milk Tank Control Panel:** The milk tank shall be provided with a wall mounted control panel with timer to control the intermittent operation of the agitator & a digital temperature indicator indicating milk temperature up to one decimal place with a least count of 0.1 °C to indicate the milk temperature. The panel shall be provided with contactors, overload relays, ON/OFF buttons & necessary MCBs, control wiring etc. In case of double compressor system, control panel shall be provided with sequence controller and timer to start one compressor at a time. The panel shall also have facility to operate refrigeration unit on auto/manual mode. In the auto mode, as soon as the milk temperature reaches to pre-set value. The compressor will switch-off to avoid freeze of milk and vis-à-vis. Thermostatic switch with temperature variation in range 0 to 16°C. Three phase electrical power supply. **Cables & Electrical Switch Gears:** All electrical switchgears and controls required for the complete system shall be of reputed make and will be in suitable ratings. The scope shall include the requisite lengths of cables to inter-connect the equipment within the Bulk Milk Cooler. Control panel shall be fabricated of 1.2 mm thick mild steel sheet in dust and vermin proof design and shall consist of the following • Electrical Switch gear		

	• Change over switch • MCB • Voltmeter • Ammeter • Push buttons. **(iv) Tool box and Tools:** Supply of Bulk Milk Unit should accompany a tools and tool box as required for proper operation and routine maintenance of the bulk cooling modules. **(v) Manual** A detailed standard manual in English language in three copies complete with all required details and circuit diagrams, line diagrams of the system shall be provided. **(B) INDUCTION MAVA KADAI** It is to be used for the concentration of milk and preparation of *basundi*, *rabdi* and *mava (khoa)* **Specification:** Capacity: 50 litre volumetric capacity Material of construction: S.S. 304 with M.S. bottom Power: 3-Phase, 440 V, 50 Hz electrical motor of suitable capacity Control panel for regulating the power supply, scraper drive and tilting mechanism to suit the processing requirement Frame structure: Stainless steel		01
5.	**MODELS OF VARIOUS JOINTS AND MACHINE PARTS** **DOUBLE CAN SEAMER MACHINE** The seamer is to be used for sealing bottom of the can and hence necessary base plate, rollers, chuck and all other accessories should be provided. Electrically operated with about 1.0 HP motor with required rpm. Can diameter: 178 mm maximum and 51 mm minimum Can height: 238 mm maximum and 22 mm minimum	6000/-	01
6.	**VARIOUS PARTS OF REFRIGERATION SYSTEM:** **Description** A centralized small capacity air conditioning system for the demonstration of teaching the subject of Refrigeration and air conditioning. The system should have all components/parts with air distribution duct in a laboratory of about 25 ft x 20 ft size to maintain around 22 ^{o}C temperature and 60 % RH in the room. The outdoor unit having condenser, compressor and condenser fan should installed on side of the room so that students can learn the heat rejected at the condenser. The duct should be laid in the room with about 2-3 slits for supply & distribution of air and suction for recycling of the air. Provision of heating, humidification, mixing of fresh air, filtration of air etc. is also necessary for demonstration of the complete air conditioning system with automatic controls. The system is to be installed in a manner that it can be used to teach various parts of the system and to determine performance of different components of the system. The specifications are given below.	9000/-	01

	i. Capacity: 3-5 TR ii. Refrigerant: 134a iii. Power supply: 440V, 50 Hz, Three phase iv. Various parts/components Condensing unit, compressor, condenser, expansion device, copper piping, evaporator unit, suction and discharge ducts. The ducts run on two sides of the ceiling, louvers (dampers) and sensors are mounted on the ducts. v. Following sensors/transmitters are mounted a various locations in the duct, condensing unit, evaporator unit and air conditioned room • Refrigerant flow sensor transmitter (1 no.): Output: 4 to 20 mA, • Hotwire Anemometer (2 no.): Output: 4 to 20 mA • RH sensor transmitter (1 no.): Output: 4 to 20 mA • Temperature sensors (8 no) vi. Control panel made of CRCA sheet of 16-18 SWG, duly powder coated is mounted inside the room. The control pane size is approx.: 800 mm X 400 mm X 1500 mm (W X D XH). A mimic diagram depicting the entire system is affixed neatly on the control panel. Mimic diagram is of size 800 mm X 1500 mm approx. The control panel is used for control of various functions like switching on-off of compressor, individual digital indicators (mentioned below), etc. On the control panel there should not be a single conventional switch. All the switches should be membrane type key-pad type. The membrane key-pad should be integrated into the mimic of the system for excellent finish/ergonomics of the equipment. Following components are to be provided on the control panel, • Digital Indicator for display of power consumption • Multipoint Digital Temperature Indicator • Pressure gauges, SS Body, Wetted brass parts, Glycerine filled, 4 nos. • Digital indicator for display of air velocity at two different points • Digital indicator for display of RH • H.P. / L.P cut out • Wiring, membrane key-pad, contactors, etc. vii. Software: An off-line software should be supplied on CD. Software should depict a mimic diagram, meters for various parameters, and it should calculate all the parameters based on the fed data such as COP, etc. There should be a facility in the software to automatically plot inlet and outlet condition of air on psychrometric chart.		

7	**WORKING MODELS OF VARIOUS INDUSTRIAL EQUIPMENT** (A) **VEGETABLE CUTTING MACHINE:** Completely fabricated from S. S. 304, fitted with ½ HP single phase motor with different attachments for shredding, grating, slicing, cubing, french fries cutting etc. (B) **ROTARY STERILIZER**: A laboratory scale rotary sterilizer is required to sterilize the tins, glass bottles & retortable pouches containing liquid or semi liquid food products. **Salient features:** **Shape:** Horizontal, cylindrical, jacketed and insulated with necessary mountings and steam distribution system **Material of Construction:** S.S. 316 In-built hot water generator/steam generation system **Operating temp & pressure**: upto 150 ^{0}C; 1 to 2 bar g **Suitable for containers:** Tins (upto 200-500 gm); Bottles (200 ml, 500 ml); pouches (500 ml) Should be provided with suitable number of carriers to hold any of the above containers. **Dimensions:** (L x D): 1 m x 0.5 m **Type:** rotary Speed regulation: suitable speed reduction gear box with VFD to have speed variation range between 8-15 RPM. Mounted on stainless steel stand/chassis of 2.5 ft height with wheels.	6000/-	1 set 01 01