

# **DOCUMENT**

**Open Competitive Bid (OCB)**

**For**

**Supply and Installation of  
Lab equipments to the  
Chemical Engineering Dept.**

**at the three campuses of  
Rajiv Gandhi University of Knowledge  
Technologies**

**Proprietary & Confidential**



**RAJIV GANDHI UNIVERSITY OF KNOWLEDGE  
TECHNOLOGIES**

**Ground Floor, Vindhya C4 Building,  
IIIT-H Campus, Gachibowli  
HYDERABAD- 500 032**

**Phone: 040-23001830**

**Proprietary & Confidential**

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## News paper advertisement

### Short Tender Notice

**RAJIV GANDHI UNIVERSITY OF KNOWLEDGE TECHNOLOGIES**



Ground Floor, Vindhya C4 Building, IIIT-H campus,  
Gachibowli, HYDERABAD- 500 032  
Phone: 040-23001830

Sealed Tenders are hereby invited from reputed Manufacturers or Authorised dealers for supply and installation of **equipments** and accessories **for** Process Control & Instrumentation Lab and Mechanical Unit Operations Lab of Chemical Engineering Departments at the three campuses of RGUKT located at Basar(Adilabad District), Nuzvid(Krishna District and RK Vally (YSR Kadapa District) of Andhra Pradesh.

**Last date of submission of tender along with EMD as specified in the bid document is on 09 .07.2012 before 04.00 pm.**

Interested parties can collect the Tender document from the office of the RGUKT from 30.06.2012 to 07 .07.2012 against payment of Rs. 5,000/- towards the cost of Tender document fee (non-refundable) through D.D. payable to REGISTRAR, RGUKT at Hyderabad. For further details visit our website [www.rgukt.in](http://www.rgukt.in)

**Date: 30.06.2012**

**Sd/-  
Registrar**

Time schedule of various Short tender related events

|                                 |                             |
|---------------------------------|-----------------------------|
| Bid calling date                | 30.06.2012                  |
| Last date for sale of document  | 07.07.2012 at 05:00 P.M     |
| Pre bid meeting                 | 04.07.2012 at 04.00PM       |
| Bid closing date/time           | 09.07.2012 at 04:00 P.M.    |
| Technical Bid Opening date/time | 09.07.2012 at 04:30 P.M.    |
| Price Bid opening date/time     | 10.07.2012 at 04:30 P.M.    |
| Bid Document fee                | Rs.5,000/-                  |
| Contact person                  | Registrar, RGUKT            |
| Reference No                    | RGUKT/Proc/ChEngg/T 14/2012 |

Registrar,  
RGUKT

## TENDER FORM

### Not transferable

Reference.No. RGUKT/Proc/ChEngg/T 14/2012

Dated:30.06.2012

**Subject:** Invitation of Tenders for Supply, installation and commissioning of Process Control & Instrumentation Lab, Mechanical Unit Operations Lab Equipments and accessories to the Chemical Engineering Departments at three campuses of RGUKT located at Basara (Adilabad Dist), Nuzvid (Krishna Dist) and RK Valley (YSR Kadapa Dist) of Andhra Pradesh.

Last date and time for submission of the TENDER AT RGUKT, Vindhya-C4, IIIT Campus, Gachibowli, HYDERABAD is **09.07.2012 up to 4:00PM**

Dear Sir/Madam,

- A. RGUKT invites sealed tenders comprising technical bid and price bid separately from reputed manufacturers (or) authorized dealers for three RGUKT IIITs located at Basara (Adilabad Dist), Nuzvid (Krishna Dist) and R K Valley (Kadapa Dist) of Andhra Pradesh.
- B. The Tender form consists of 34 pages of which pages from 6 to 25 are instructions and page No.26-27 contains the format for financial bid. The duly completed Technical Bid together with a copy of the bid document (this tender) signed on all pages by the Bidders authorized signatory and the Price Bid should be kept in separate sealed covers. These sealed covers must be submitted in a sealed master envelope superscribed "Tender for Supply , Installation & Commissioning of Process Control & Instrumentation Lab, Mechanical Unit Operations Lab Equipments and accessories to the Chemical Engineering Departments at the three campuses of RGUKT" . The last date for submission of bid is **09.07.2012 and closing time is 04:00 PM.**
- C. The Sealed Tenders should be deposited in the Tender box kept in the office of Registrar, RGUKT, Hyderabad up to **04:00 P.M. on 09.07.2012.**

For any clarification and further details on the above tender please contact by Telephone No: 040-23001830 or Contact in Person during office hours.

Thanking you

Yours faithfully,

Registrar,  
RGUKT.

**STATEMENT OF IMPORTANT LIMITS/VALUES RELATED TO BID**

| <b>Item</b>  | <b>Description</b>   |
|--|--|
| EMD  | Rs.1,50,000/-  |
| Bid Validity Period                                | 60 days from the date of opening of commercial bid   |
| EMD Validity Period                                | 60 days from the date of opening of commercial bid   |
| Warranty Period                                    | 3 years  |
| Variation in quantities/ number of residents       | <u>+ 40 %</u>  |
| Period for furnishing performance Security Deposit | Within 10 days from date of receipt of award   |
| Delivery Schedule                                  | Bidder must be prepared to deliver and install the enclosed list of Equipment within 45 days from the date of award of the contract. |
| Performance security value                         | 5% of contract value   |
| Performance security validity period               | 38 months from award of contract ( including 45 days of installation period)   |
| Period for signing the order Acceptance            | Within 7 days from date of receipt of notification of award  |

|  |   |
|--|---|
| <b>Payment terms</b>                           |   |
| On delivery at user site                       | <p>Payment for goods and services shall be made in Indian rupees as follows.</p> <ol style="list-style-type: none"><li>1. 80% of payment will be paid after installation, commissioning</li><li>2. Balance 20% will be paid after 3 months after obtaining the satisfactory certificate from the Director, RGUKT IITs.</li></ol>  |
| Maximum Liquidated Damages for late deliveries | <p>For delays:- If the supplier fails to deliver any (or) all of the goods or perform the services within the time period specified in the contract the purchaser shall without prejudice to its other remedies under the contract deduct from the contract price as liquidated damages a sum equivalent to 0.25% of the contract value per day until actual delivery or performance up to a maximum deduction of 10% of the delayed goods or services contract price. Once the maximum deduction is reached, the purchaser may consider the termination of the contract duly forfeiting the performance security etc.,</p> |



## ELIGIBILITY CRITERIA

1. This bid is open to all business establishments registered within India, and those Foreign firms which have distributor/ authorized dealer agencies in India are eligible to do business under relevant Indian Laws as in force at the time of bidding. However all firms must meet the pre-qualifications criteria. They should provide a List of customers of previous supply of similar/ same items to IITs, NIT's or Central Universities or any Academic Institute of National Repute with contact details. Copies of orders received from the reputed firms on bidding firm need to be submitted.
2. The Supplier/manufacturer should have ISO 9001-2008 certifications.
3. The bidder should have Servicing facility or work shop with in India so the provision of service is possible at a short notice and without incurrance of delay.
4. The Bidding firm should have minimum turnover as follows:

| <b>Bid Value offered against the tender call</b> | <b>Last financial year's business turnover</b> |
|--|--|
| 25 Lakhs   | 50 Lakhs                                       |
| 50 lakhs   | 1 crore  |
| 50-100 lakhs                                     | 2 corers                                       |
| Greater than 100 lakhs                           | 3 Crores                                       |

5. The bidder should furnish satisfactory performance certificate from the parties concerned to whom bulk supplies were effected of same or similar items, in case such supplies were already made. RGUKT may contact any such parties to elicit details.
6. Bidder should have been registered under Sales/ VAT Act/CST Act with the relevant State Sales Tax Authorities. He should furnish along with the bid document, the relevant VAT/CST Registration Document and PAN / TAN Card copies. Copies of the latest VAT/CST returns of bidding firm should be submitted.
7. Each and Every equipment's supplied should be conform to standard specification of ISI or equivalent international standards agencies. All bidders shall also include the following information and documents with their tenders ( in the Technical bid cover)
  - 7.1. Copies of original documents defining the constitution or legal status, place of registration, and principal place of business of the bidding firm/entity; written power of attorney of the signatory of the firm to commit the Bidding.
  - 7.2. Machinery/equipment owned by the bidder and number of employees.
  - 7.3. Latest Income Tax Saral form / Return that was filed.
  - 7.4. List of Present Clientele with contact addresses & telephone numbers

8. All the certificates furnished along with technical bids should be attested by a Gazetted Officer, counter signed by bidder along with their seal.

The bidders must submit all relevant documentary evidence to support their claim for eligibility in placing bid. **The tenders received without the above documents will be rejected.**

## Requirement & Technical Specifications

| S. No.   | Name of the equipment                                | Total required |
|--|--|----------------|
| <b>Process Control &amp; Instrumentation Lab</b> |  |                |
| 1  | Temperature control trainer                          | 3              |
| 2  | Pressure control trainer                             | 3              |
| 3  | Level control trainer                                | 2              |
| 4  | Flow control trainer                                 | 2              |
| 5  | Control valve characteristics                        | 3              |
| 6  | Calibration of Thermocouple & resistance thermometer | 3              |
| 7  | Calibration of differential pressure transmitter     | 3              |
| 8  | Dynamics of interacting and non-interacting systems  | 3              |
| 9  | Flapper nozzle system                                | 3              |
| 10   | Study of I/P and P/I converter                       | 3              |
| 11   | Multi process trainer                                | 3              |
| <b>Mechanical Unit Operations Lab</b>            |  |                |
| 12   | Jaw crusher  | 2              |
| 13   | Coarse grinding ball mill                            | 2              |
| 14   | Fine grinding ball mill                              | 3              |
| 15   | Froth floatation cell                                | 2              |
| 16   | Batch sedimentation apparatus                        | 2              |
| 17   | Sieve analysis (Sieve shaker + Sieve accessories)    | 3              |
| 18   | Plate and frame filter press apparatus               | 2              |
| <b>Accessories Required</b>                      |  |                |
| 19   | Valve positioned for control valve characteristics   | 3              |
| 20   | Air compressors (1HP, 4CFM)                          | 3              |
| 21   | Air compressor (1/2HP, 2CFM)                         | 3              |
| 21   | Mini air compressors (required 5 per campus)         | 15             |
| 22   | Digital Balance (required 5 per campus)              | 15             |
| 23   | Specific gravity bottles (required 5 per campus)     | 15             |

## Technical Specifications

### 1. Temperature controller

To study the proportional controller, PI, PID, PD and stability of system using BODE plot, study of tuning controller using zeigler-nichols method

**Specifications:**

Temperature transmitter: input RTD PT-100 (0-100°C) range 0-300 mm, capacitance type, output 4-20 mA

Process tank: stainless steel/glass/acrylic tank of capacity 0.5 ltrs with scale

Heater: Nichrome wire heater capacity 1 kW

Thyristor controller: input 4-20 mA for heater

Flow measurement: Rota meter

Piping: size 1/4

Micro-processor controller: PID setting, auto tuning, fully programmable

Software: for experimentation, PID control, data login, trend plot etc

### 2. Pressure controller

To study the proportional controller, PI, PID, PD and stability of system using BODE plot

**Specifications:**

Pressure transmitter: range 0-5 bar, type strain gauge, output 4-20 mA

Process tank: stainless steel tank of capacity 1.5 ltrs

Control valve: compatible capacity with pneumatic activator

I/P converter: input 4-20 mA, output 3-15 PSIG

Pressure regulator: 0-2 kg/cm<sup>2</sup>

Pressure gauge: bourdon type 0-2 kg/cm<sup>2</sup>, 0-7kg/cm<sup>2</sup>

Piping: PU piping

Micro-processor controller: PID setting, auto tuning, fully programmable

Software: for experimentation, PID control, data login, trend plot etc

### 3. Flow controller

To study the proportional controller, PI, PID, PD and stability of system using BODE plot, study of tuning controller using zeigler-nichols method

**Specifications:**

DP transmitter: Output 4-20 mA

Water tank: stainless steel tank of capacity 10ltrs

Orifice meter: material stainless steel

Water circulation: FHP pump tullu/champion make

Control valve: compatible capacity with pneumatic activator

I/P converter: input 4-20 mA, output 3-15 PSIG

Pressure regulator: 0-2 kg/cm<sup>2</sup>

Pressure gauge: bourdon type 0-2 kg/cm<sup>2</sup>, 0-7kg/cm<sup>2</sup>

Piping: size 1/4"

Micro-processor controller: PID setting, auto tuning, fully programmable

Software: for experimentation, PID control, data login, trend plot etc

#### 4. Level control trainer

To study the proportional controller, PI, PID, PD and stability of system using BODE plot, study of tuning controller using zeigler-nichols method

**Specifications:**

Level transmitter: range 0-300 mm, capacitance type, output 4-20 mA

Process tank: stainless steel/glass/acrylic tank of capacity 2 ltrs with scale

Water tank: stainless steel with 10ltrs

Flow measurement: Rota meter

Piping: size 1/4

Control valve: compatible capacity with pneumatic activator

I/P converter: input 4-20 mA, output 3-15 PSIG

Pressure regulator: 0-2 kg/cm<sup>2</sup>

Pressure gauge: bourdon type 0-2 kg/cm<sup>2</sup>, 0-7kg/cm<sup>2</sup>

Micro-processor controller: PID setting, auto tuning, fully programmable

Software: for experimentation, PID control, data login, trend plot etc

#### 5. Control valve characteristics

With three valves : Quick opening, linear and equal %

To study inherent, installed characteristics, hysteresis, rangeability and flow coefficient of control valve

**Specifications:**

Control valve

Type : pneumatics

size: 1/2 "

Actuator: 15 sp. Inch

Stroke: 14mm

Input: 3-15 PSIG

Water tank: stainless steel with 25ltrs

Water circulation: FHP pump tullu/champion make

Overhead tank: stainless steel material with 10ltrs capacity

Flow measurement: Rota meter

Pressure drop measurement: using manometer

Piping: size 1/2"

Pressure regulator: 0-2 kg/cm<sup>2</sup>

Pressure gauge: bourdon type 0-2 kg/cm<sup>2</sup>

## 6. Calibration of thermocouple

To calibrate the given thermocouple and calibration curve

### Specifications:

Heat source: should be with ceramic insulation

Temperature controller: digital controller 200 °C

Thermocouple: standard 3 types

- a. CR/Al
- b. Fe-constantan
- c. Cu-constantan

## 7. Calibration of differential pressure transmitter

To calibrate pneumatic differential pressure transmitter

### Specifications:

Process temperature limits: -40 to 120 °C

Static pressure limits: 3.5 MPA

And other suitable accessories

## 8. Interacting and Non-interacting system

For the dynamic study of step response, single tank capacity tank, interacting mode and non-interacting mode

### Specifications:

Process tank: stainless steel, circular with level scale and with 2.5 to 3.5 ltrs

Water circulation: FHP pump tullu/champion make

Supply tank: material stainless steel with 20ltrs

Overhead tank: stainless steel material with 5ltrs capacity

Flow measurement: Rota meter

## 9. Flapper – Nozzle system

To study and gain calculation of flapper – nozzle system

### Specifications:

Dial gauge : least count 1 micro metre

Air regulator : 0-2.5 kg.cm<sup>2</sup>

Pressure range: 0- 2.5 kg/cm<sup>2</sup>

## 10. Study of I/P and P/I converter

To study working principle and calibration of P/I and I/P converter. Study of linearity, hysteresis, accuracy and repeatability

### Specifications:

I/P converter : input 4-20 mA DC, output – 3 to 15 PSIG

P/I converter: Input-0 to 1 bar, output-4-20 mA DC

Pressure gauge : bourdon type 0-2 kg/cm<sup>2</sup>

Digital current meter: digital indication of current input and output ranging from 0-20 mA  
DC

Piping : size 1/4

### 11. Multi process trainer

In this trainer, we should be able to study flow, level, cascade, feedforward, and ratio control. Also should be ON-OFF & PID operation

**Specifications:**

DP transmitter: range 0-300 mm, capacitance type, output 4-20 mA

Level transmitter: range 0-250 mm, electronic type, output 4-20 mA

I/P converter: input 4-20 mA, output 3-15 PSIG

Process tank: stainless steel/glass/acrylic tank

Flow measurement: Orifice meter

Control valve: size 1/4", input 3-15 PSIG and linear control characteristics

Rotameter: 10-100 LHP (3 numbers)

Pressure gauge: bourdon type 0-2 kg/cm<sup>2</sup>, 0-7kg/cm<sup>2</sup>

Micro-processor controller: PID setting, auto tuning, fully programmable

Software: for experimentation, PID control, data login, trend plot etc, should be supportable

### 12. Jaw crusher

To determine the efficiency of the Crusher for crushing a material of known working index

**Specifications:**

Jaw size = 100 mm \* 150 mm

Feed size = 50 mm approximately

Product size should be = 5 mm to 15 mm

Drive = 3 HP electric motor single phase

Digital control panel should consist of energy measurement (electronic energy meter), starter (3 HP motor) and MCB (for over load protection)

### 13. Ball mill (coarse grinding)

With three fixed speeds

To study effect of RPM on the power consumption of ball mill

To determine efficiency of ball mill for grinding material with known work index

**Specifications:**

Ball mill material MS with at least 250 mm diameter, length 350 mm and thickness 5mm should satisfy. Feed size 6mm approximately and product size should pass through up to 200 mesh.

1 HP motor drive. Digital control panel should consist of energy measurement (electronic energy meter) and MCB (for over load protection)

Stainless steel balls

Diameter 20mm: 15

Diameter 15mm: 50

Diameter 10mm: 50

#### **14. Ball mill (fine grinding)**

With single bowl ball mill to grind rocks, mineral, iron ore, coal, glass and coke with ration 1:2. With an input product size 8mm should be fine grinded to 10-20 micron.

Stainless steel balls

Diameter 20mm : 15

Diameter 15mm: 50

Diameter 10mm:50

Diameter 2mm:100

Tungsten carbide balls diameter 10mm:10

#### **15. Forth floatation cell**

To find percent recovery of mineral in froth from a standard mixture and to study the performance of froth floatation cell

##### **Specifications:**

Floatation chamber : stainless steel material

Agitator : stainless steel impeller with stainless steel shaft coupled to FHP motor

Diffuser: stainless steel holding the impeller

Control panel : with standard On/Off switch and main indicator

#### **16. Batch sedimentation**

To study Effect of initial concentration and initial suspension height on sedimentation rates. Also to study Effect of particle size distribution. Use of flocculating additives.

##### **Specifications:**

Batch sedimentation apparatus should include five glass vertically mounted cylinders. Glass material should be borosilicate.

Length of cylinder = 1 meter

Internal diameter = 50 mm

The apparatus should also consist collecting tanks of each of 2 liter capacity



### **17. Sieve analysis (Sieve shaker + Sieve accessories)**

Sieve shaker should be of Rotap type.

Sieve sets: compacting device, collecting pan, mesh 400, 300, 270, 230, 200, 170, 140, 120, 100, 70, 50, 30, 20, 16, 12, 8 and 4. All sieves should be of ASTM standard

### **18. Plate and frame filter press**

To evaluate specific cake resistance and medium resistance

#### **Specifications:**

Number of frames: 6

Number of plates: 7

Size: 200 mm \* 200 mm

Material: acrylic

Filter medium: filter cloth

Filter collection tray: stainless steel with suitable size

Slurry feed tank: stainless steel material of capacity 40 ltrs

Slurry tank agitator: stainless steel agitator with SS shaft coupled to FHP motor and reduction gear box

Slurry feed pump: gear pump with FHP motor

Piping system : may be GI or PVC

Pressure measurement: bourdon type pressure gauge

Over head tank: stainless steel tank of capacity 25 lts

Control panel: with standard On/Off switch and main indicator

Screw jack arrangement for tightening and removing of frames easily

## **Technical Specifications of Accessories**

### **19. Valve positioner for control valve characteristics**

### **20. Mini air compressor with standard make motor and automated switch**

Delivery capacity in m<sup>3</sup>/min or CFM: 0.3 - 2

Motor drive: 0.5 to 1 HP,

Air pressure: 4-8 bar / 0.4 to 0.8 Mpa

Speed rpm: 500-1000

### **21. Air compressor: ½ HP, 2 CFM,**

Delivery capacity in m<sup>3</sup>/min or CFM: 2

Motor drive: 0.5 to 1 HP,

Air pressure: 8 bar / 0.8 Mpa

Speed rpm: 500-1000

## **22. Air compressor:**

Delivery capacity m<sup>3</sup>/min or CFM: 4

Motor drive: 1-3 HP,

Air pressure: bar/0.8 Mpa

Speed rpm: 1200

## **23. Digital weighing balance**

Require balances of two types based on accuracy

Capacity (g): 0-3000g

Readability (g): 0.1g

Pan Size (mm)  $\Phi$ : 160mm

Display LCD(white back light)Print

Accuracy: 0.1 kg

Capacity (g): 0-500g

Readability (g): 0.1g

## **24. Specific gravity bottles**

A small bottle or flask used to measure the specific gravities of liquids; the bottle is weighed when it is filled with the liquid whose specific gravity is to be determined, when filled with a reference liquid, and when empty. Also known as density bottle; relative-density bottle made up of glass

**NOTE**

A complete set of bidding documents may be purchased by interested bidders from the RGUKT contact person upon payment of the bid document price which is non-refundable. Payment of bid document price should be by demand draft / cashier's cheque or certified cheque drawn in favor of "Registrar , Rajiv Gandhi University of Knowledge Technologies " and payable at Hyderabad (India).