

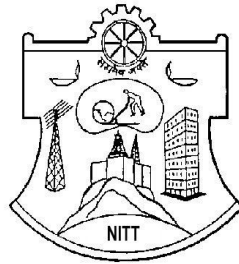
# NATIONAL INSTITUTE OF TECHNOLOGY

## TIRUCHIRAPPALLI – 15

**Department of Instrumentation and Control Engineering**

**Web : [www.nitt.edu](http://www.nitt.edu)**

**Phone : 0431 - 2503351**



# TENDER DOCUMENT

## Last date extended

**Tender Notification No.: NITT/R&C/ICE/KS/DST/2011-12/5**

**Dated: 13.6.2011**

Name of the component : pH process Equipment  
Quantity required : 1 No.  
EMD Amount : Rs.11,000/-  
Delivery : 4 weeks from the date of purchase order  
Last Date of submission of Tender : **14.7.2011 upto 3.00 p.m.**  
Address for submission of Tender : The Director  
National Institute of Technology  
Tiruchirappalli – 620 015.

**With kind attention** : Dr.K.Srinivasan  
Assistant Professor  
Dept. of Instrumentation & Control Engg.  
National Institute of Technology  
Tiruchirappalli – 620 015.  
Mobile : + 91-9486001176

Date of opening of bid : **14.7.2011 at 3.30 p.m**



**NATIONAL INSTITUTE OF TECHNOLOGY  
TIRUCHIRAPPALLI – 15**

**DEPARTMENT OF INSTRUMENTATION AND CONTROL ENGINEERING**

Tender Notification No.: **NITT/R&C/ICE/KS/DST/2011-12/5**

Dated: **13.6.2011**

**NOTICE INVITING TENDER**

The National Institute of Technology, Tiruchirappalli (NITT) is an autonomous body under MHRD, GOI, imparting Technical Education and engaged in Research Activities. It is proposed to procure the following component for the departmental academic/research activities.

Sealed Quotations under **two cover system** are invited for the following component subject to the following terms and conditions, from the reputed manufacturers or their authorized dealers so as to reach this office on or before scheduled date and time. The technical cover will be opened on the same day in the presence of bidders or their authorized agents who may choose to be present.

Name of the component : pH process Equipment  
Quantity required : 1 No.  
EMD : Rs.11,000/-  
Time for completion of supply after placing purchase order : 4 Weeks  
Last Date of submission of Tender : 14.7.2011 upto 3.00 p.m.  
Tender to be submitted at the following address : The Director  
National Institute of Technology  
Tiruchirappalli – 620 015.

With kind attention : Dr.K.Srinivasan  
Assistant Professor  
Dept. of Instrumentation & Control Engg.  
National Institute of Technology  
Tiruchirappalli – 620 015.  
Mobile : + 91-9486001176

***Place, Date and time of opening of bid*** :

Date: **14.7.2011**

Time: **3.30 p.m**

Venue: **Dean (R&C) office/Admin Block**

**Note :** The Institute shall not be responsible for any postal delay about non-receipt / non delivery of the bids or due to wrong addressee.

## SECTION : 1 INSTRUCTION TO BIDDER

1. The bidder should give details of their technical soundness and provide list of customers of previous supply of similar items to Universities, Institutes or Government Departments/Undertakings/public sectors with contact details. The details of the agency/profile should be furnished along with the copy of all related documents.

### 1.1 Bids are to be submitted under two cover system.

#### Cover 1:

#### Cover 1 should contain the following:

- a. **EMD - Earnest Money Deposit (EMD) is to be remitted by way of Demand Draft drawn on any Nationalised bank in India by Demand Draft drawn on any scheduled bank in favour of "The Director, NIT, Trichy" payable at Trichy should be submitted. EMD shall bear no interest. Any bid not accompanying with EMD is liable to be treated as non-responsive and rejected.**
  - b. **Technical pamphlets**
  - c. **Detailed technical specification**
  - d. **The agency should furnish copy of license certificate for manufacture/supply of the item.**
  - e. **The agency should furnish Income Tax PAN number**
  - f. **Warranty period offered for the tendered item to be specified. If the warranty period is not conforming with the schedule of requirements given in section 3 of the document, the bid is liable to be treated as non-responsive and rejected.**
  - g. **Duly filled up technical questionnaire, if any**
  - h. **Duly filled up deviation schedules to technical specification**
  - i. **Copy of supply orders completed during the last three years ending 31-12-2008.**
  - j. **If the prices are revealed in the cover 1, the offer will be summarily rejected**
- 1.2 **The cover 1 shall be superscribed as 'Technical cover' duly indicating the Tender reference No. and the due date of opening.**

### 1.3 Cover 2:

#### Cover 2 should contain the following

**Cover 2 shall contain Price only and shall be superscribed as 'Price Cover' duly indicating the Tender Reference No. and the due date of opening.**

**Each Cover shall be sent in a double sealed cover. The inner covers (Cover 1 and Cover 2) should be sealed individually with the sellers's distinctive seal and superscribed with the tender reference no. and due date of opening. Both the inner covers shall be placed in a common outer cover which shall also be sealed with seller's distinctive seal and superscribed with the tender reference no. and due date of opening.**

**Mention "Kind Attention: Dr. K. Srinivsan/ICE DEPARTEMENT" and submit at the address given in the Notice Inviting Tender.**

**Cover 1 - will be opened on the scheduled date and time mentioned in the tender enquiry.**

**Cover 2 - technically suitable offers alone will be opened on a date which will be intimated to the qualified bidders.**

2. The agencies should submit their rate as per the format given in Section 4 of the Notice Inviting Tender in this cover. Rate should be quoted in Indian Rupee. The rate should be quoted both in words and figures. All the pages of the bid should be signed affixing the seal. All corrections and overwriting should be initialed.
3. The tender will be acceptable only from the manufacturers or its authorized supplier.
4. The bid shall be in the format of price schedule given in Section 4. The contract form as per format given in section 5 shall be submitted. Incomplete or conditional tender will be rejected.
5. Details of quantity and the specifications are mentioned in Section 3 appended to this Notice Inviting Tender.
6. The item to be used is strictly according to the specification and subject to test by the Institute/concerned authorities. It must be delivered and installed in good working condition.
7. The Institute reserves the right to cancel or reduce the quantity included in the schedule of requirements at any time after acceptance of the tender with a notice. The Contractor/Supplier shall have no claim to any payment of compensation or otherwise whatsoever, on account of any profit or advantage which he might have derived from the execution of the work/supply in full but he did not derive in consequence of the foreclosure of the whole or part of the works.
8. Performance Security of 5% of the contract value in terms of Bank guarantee by scheduled banks shall be given by the successful bidder for the total period of warranty.
9. **Release of EMD:** The EMD shall be released after receipt of performance security from successful bidder.
10. **Validity of bids:** The rate quote should be valid for a minimum of 90 days. No claim for escalation of rate will be considered after opening the Tender.
11. **Imports:** In case, goods are to be imported, the Indian agent should furnish authorization certificate by the principles abroad for submission of the bid in response to this Notice Inviting Tender.
12. **Clarification of Tender Document:** A prospective bidder requiring any clarification of the Tender document may communicate to the contact person given in this notice inviting tender.
13. **Amendment of tender document:** At any time prior to the last date of receipt of bids, Institute may for any reason, whether at its own initiative or in response to a clarification requested by prospective bidder, modify the Tender document by an amendment.
14. ***The Institute may at its own discretion extend the last date for the receipt of bids.***
15. The bids shall be written in English language and any information printed in other language shall be accompanied by an English translation, in which case for the purpose of interpretation of the bid, the English translation shall govern.
16. The Institute reserves the right of accepting any bid other than the lowest or even rejecting all the bids without assigning any reasons therefor. The decision of the Institute Purchase Committee is final in all matters of tender and purchase.
17. The bidder should give the following declaration while submitting the Tender.

**DECLARATION**

I/we have not tampered/modified the tender forms in any manner. In case, if the same is found to be tampered/modified, I/we understand that my/our tender will be summarily rejected and full Earnest Money Deposit (EMD) will be forfeited and I/we am/are liable to be banned from doing business with NIT, Trichy and /or prosecuted.

**Signature of the Bidder** : .....

**Name and Designation** : .....

**Business Address** : .....  
.....  
.....

**Place :**

**Date :**

**Seal of the Bidder's Firm**

18. Any other details required may be obtained from the contact person given in the notice inviting tender during the office hours.

## SECTION : 2 CONDITIONS OF CONTRACT

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1. The rates should be quoted in Indian Rupee F.O.R. NIT, Trichy for supply within India.
2. In case of import both CIF and / or FOB rate should be quoted. All components of expenditure to arrive at Chennai need to be explicitly specified.
3. The bidder shall indicate the excise duty exemption for the goods if applicable
4. The Institute is eligible for customs duty and excise duty exemption.
5. The rate quoted should be on unit basis. Taxes and other charges should be quoted separately, considering exemptions if any.
6. Rate quoted should be inclusive of Testing, commissioning and installation of equipment and training.
7. **Payment** : No advance payment will be made. Payment will be made only after the supply of the item in good and satisfactory condition and receipt of performance security by supplier. In case of imports, the payment will be made through LC after installation and performance security need to be submitted at the time of LC commitment.
8. Guarantee and Warrantee period should be specified for the complete period conforming to the section 3 of this tender document.
9. Period required for the supply and installation of item should be specified conforming to the section 3 of this tender document.
10. In case of dispute, the matter will be subject to Tiruchirappalli, Tamil Nadu Jurisdiction only.

## SECTION : 3 SCHEDULE OF REQUIREMENTS, SPECIFICATIONS AND ALLIED DETAILS

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Name of the Component to be procured : **pH PROCESS EQUIPEMENT**

### SPECIFICATIONS OF pH PROCESS TRAINER

This experimental setup consists of following Specification:

#### **FEATURES: -**

#### **Section 1:**

- **ABB make pH SENSOR plus pH Transmitter** (Standard Industrial Type ).  
Range : 0-14 pH; Supply : 24V DC; Output: 4-20mA  
RTD (PT 100) to be used as a temperature sensor for temperature compensation to pH transmitter.

#### **pH SENSOR**

Resolution 0.01 pH, 1 mV, 1°C.

Reference Temp. 25°C

Accuracy  $\pm 0.02$  pH

- **PROCESS TANK:**

One no. of Process tank to be provided for mixing the Solution

Body Material : Corrosion resistive material like Acrylic

Volume: 2.5 Liters

#### **ACID AND BASE TANK:**

##### **Storage Tank : Three**

Body Material : Corrosion resistive material like Acrylic

Acid Tank 40 Liters with maximum flow rate 1 l/min.

Type of Acid: HCl with 0.0012 mol/l

Base Tank 40 Liters with maximum flow rate 1 l/min.

Type of Base: NaOH-NaHCO<sub>3</sub> with NaOH with concentration of 0.002 mol/l and

NaHCO<sub>3</sub> with concentration of 0.0025 mol/l

- **SOLENOID VALVE:**

A Solenoid valve to be provided with corrosion resistance material at the outlet of the water tank to give disturbance to the process

Supply : 230V AC/50Hz

- **STIRRER:**

A stirrer to be provided with corrosion resistance material to stir the solution present in the vessel.

Supply : 0-5V DC

Rod Material : Corrosion resistive type

- **USB BASED DATA ACQUISITION SYSTEM**

A Matlab, SciLab and Labview compatible USB Data Acquisition system has a base board with provision for Two pluggable add on ADC & DAC boards

#### **12 bit ADC & 14 bit DAC**

- **V/I & I/V CONVERTER**

Two Channel Current to Voltage Converter [INPUT : 4-20mA, OUTPUT : 0-5V]

Two Channel Voltage to Current Converter [INPUT : 0-5V, OUTPUT : 4-20mA]

- **OTHER FEATURES:**

An Electronic level switch to be provided to maintain the liquid level.

Suitable Hand valves to be provided wherever necessary.

All the equipments are mounted in an attractive frame.

Acid and alkaline paths are connected by rust proof tubes.

**Digital Panel meter to display the pH Transmitter O/P**

Necessary pressure gauges & Short Circuit protection.

Mimic diagram in the panel. & All electrical connectors terminated in the panel.

**LAB** view and **MATLAB** compatible.

## **Section 2:**

- **CONTROL VALVE WITH SMART POSITIONER:**

Two numbers of Teflon body Industrial Control valves with Smart petitioners to be provided to control the fluids like alkali and acid.

Body Material: Tefflon Body; Input : 4-20mA ;Supply : 20PSI Output : 3-15PSI

- **FLOW TRANSMITTERS– 2 Numbers**

To indicate Acid and base flow rate and flow sensor should be corrosion resistive material.

## **Section 3:**

- **Variable Speed Pump: 2 Numbers**

Valve less metering pumps with ceramic piston, ceramic liner and kynar casing driven by variable speed motor, Pump controllers to accept 4-20 mA signal and feed back indicator to display pump speed

The maximum flow rate of pump to be 576ml/min. with resolution of 0.2ml/min.

## **Other General Requirements for all the sections:**

- Quotations for all the three sections are mandatory.
- Purchase orders will be issued for Section 1 with either section 2 (or) section 3
- The liquid level in the tank to be 1.5 times the tank diameter and length to diameter ratio is 1:1.5
- **NIT Trichy will provide LAPTOP/PC for Control algorithm implementation**
- **Demonstration**

The supplier has to demonstrate the following concepts:

- An acid stream (HCl solution) and an alkaline stream (NaOH and NaHCO<sub>3</sub> solution) are fed to a 2.5 l constant volume, well-mixed tank, where the pH is measured through a sensor located directly in the tank.
- The control objective is to drive the system to different pH conditions (tracking control) and also to maintain the tank pH at a specified value despite variations in acid stream flow rate (disturbance rejection) by manipulating the alkaline stream flow rate. The acid flow rate is considered a measured disturbance and the tank volume is maintained constant using an overflow weir.
- The computer interface for data acquisition and control uses the real time tool box and editor using MATLAB.



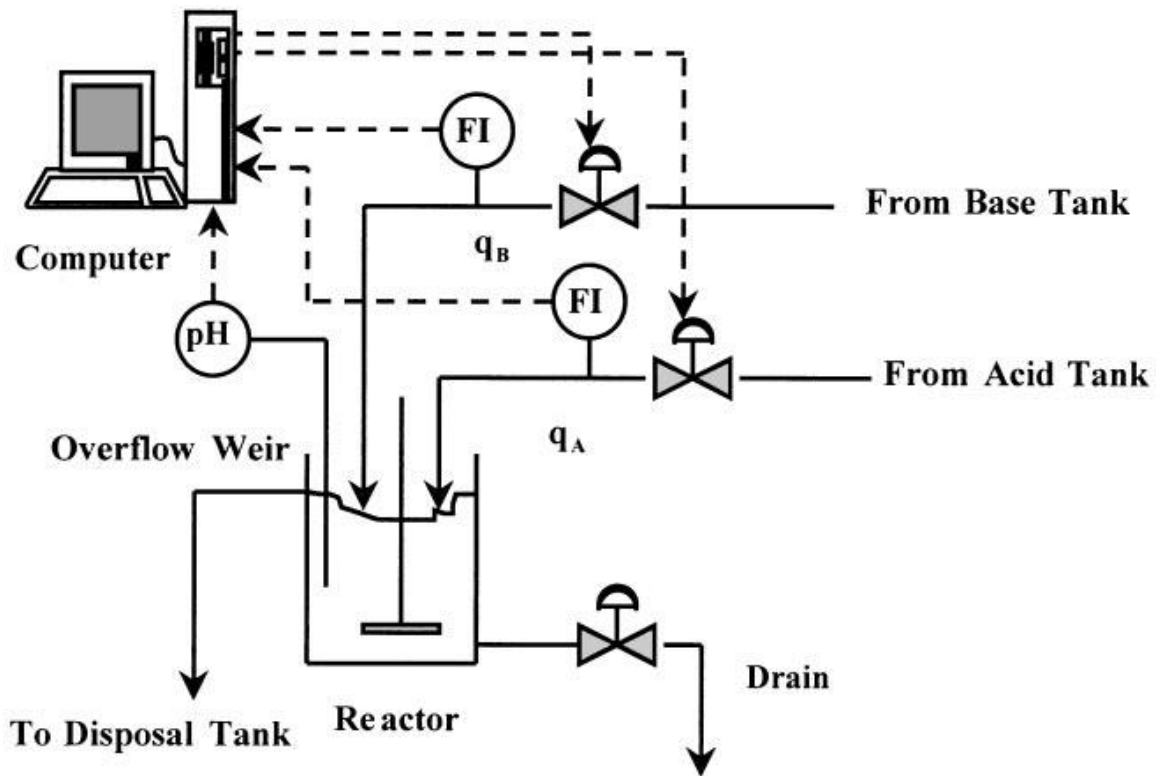


Figure : PI Diagram of pH process

Name of the Component to be procured : **pH PROCESS EQUIPEMENT**

Specifications : REFER SPECIFICATION DETAILS

Quantity : 1 No.

Any other details/requirement : REFER SPECIFICATION DETAILS

Warranty period required : 5 YEARS FROM THE DATE OF DEMONSTRATION

Delivery schedule expected after release of purchase order (in weeks) : 6 Weeks

EMD (in Rupees) : Rs.11,000/-

Performance Security to be given by Successful bidder after release of purchase order (in Rupees) : 5% of the equipment cost.

**SECTION : 4 PRICE SCHEDULE**

[ To be used by the bidder for submission of the bid ]

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- 1. Component Name :
- 2. Specifications (confirming to Section 3 of Tender document-enclose additional sheets if necessary) :
- 3. Currency and Unit Price :
- 4. Quantity :
- 5. Item cost (Sl.No.3 & Sl.No.4) (in Indian Rupee) :
- 6. Taxes and other charges :
  - (i) Specify the type of taxes and duties in percentages and also in figures
  - (ii) Specify other charges in figures
- 7. Warranty period (confirming to the Section 3 of Tender document. This should be mentioned in Technical bid also in order to get qualified for Financial bid) :
- 8. Delivery Schedule (confirming to the Section 3 of Tender document) :
- 9. Name and address of the firm for placing purchase order :
- 10. Name and address of Indian authorized agent (in case of imports only) :

**Signature of the Bidder** : .....

**Name and Designation** : .....

**Business Address** : .....

.....

.....

**Place :**

**Date :**

**Seal of the Bidder's Firm**

**SECTION : 5 CONTRACT FORM**

[ To be provided by the bidder in the business letter head ]

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1. (Name of the Supplier's Firm) hereby abide to deliver the .....by the delivery schedule mentioned in the Section 3 tender document for supply of the items if the purchase order is awarded.
2. The item will be supplied conforming to the specifications stated in the tender document without any defect and deviations.
3. Warranty will be given for the period mentioned in the tender document and service will be rendered to the satisfaction of NIT, Trichy during this period.

**Signature of the Bidder** : .....

**Name and Designation** : .....

**Business Address** : .....  
.....  
.....

**Place :**

**Date :**

**Seal of the Bidder's Firm**