

**DEPARTMENT OF CHEMICAL ENGINEERING  
NATIONAL INSTITUTE OF TECHNOLOGY: TIRUCHIRAPPALLI - 620 015**

**21.02.2014**

**Minutes of the pre-bid conference**

**Tender Notification No.: NITT/F.No.: UG MOD 045/PLAN 2013-14/CHE**

**dt. 14.02.2014**

The pre-bid conference was held on 21.02.2014 at 09.00 AM in the committee room of Chemical Engineering department to discuss the specification published in the tender. Based on the discussion, the committee recommends the following amendments to the specification. In addition, the committee recommends the delivery date has to be mentioned as 24 weeks subject to Export License clearance.

**Amendment for pH Process Control System:**

<u>Original specification in tender</u>	<u>Amended specification</u>
<ul style="list-style-type: none"> <li>• <b>ABB make pH SENSOR plus pH Transmitter</b> (Standard Industrial Type).</li> </ul>	ABB/ Honeywell/ Yokogawa 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.	
<b>pH SENSOR</b>	
Resolution 0.01 pH, 1 mV, 1°C.	
Reference Temp. 25°C	
Accuracy ±0.02 pH	
<ul style="list-style-type: none"> <li>• <b>PROCESS TANK:</b></li> </ul>	
One no. of Process tank to be provided for mixing the Solution	
Body Material : Corrosion resistive material like Acrylic	
Volume: 2.5 Liters	
The liquid level in the tank to be 1.5 times the tank diameter and length to diameter ratio is 1:1.5	
<ul style="list-style-type: none"> <li>• <b>ACID AND BASE TANK:</b></li> </ul>	

<b>Storage Tank : Three</b>	
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	
<ul style="list-style-type: none"> <li>• <b>SOLENOID VALVE:</b></li> </ul>	
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	
<ul style="list-style-type: none"> <li>• <b>STIRRER:</b></li> </ul>	
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	
<ul style="list-style-type: none"> <li>• <b>USB BASED DATA ACQUISITION SYSTEM</b></li> </ul>	
A Matlab, SciLab and Labview compatible USB Data Acquisition system has a base board with provision for Two pluggable add on ADC & DAC boards	
<ul style="list-style-type: none"> <li>• <b>12 bit ADC &amp; 14 bit DAC</b></li> </ul>	
<ul style="list-style-type: none"> <li>• <b>V/I &amp; I/V CONVERTER</b></li> </ul>	
Two Channel Current to Voltage Converter [INPUT : 4-20mA, OUTPUT : 0-5V]	
Two Channel Voltage to Current Converter [INPUT : 0-5V, OUTPUT : 4-20mA]	

<ul style="list-style-type: none"> <li>• <b>Branded Computer (DELL/HP/IBM) for Control algorithm implementation:</b></li> </ul>	
<p>PC Intel Core i7 Processor 2600 3.40GHz (vPro), 8 MB Cache, Intel Q67 Express Chipset, 19" LCD Monitor with a minimum resolution 1280x1024 required, 512MB Radeon Graphics Card, 8GB Memory DDR3 SDRAM 1333MHz, Hard disk 1 TB 7200 rpm (SATA II) 3.0 Gbps, 8x DVD +/- RW, USB Keyboard and USB Optical mouse, 10/100/1000 NIC, Intel 8259LM, VGA 15 pin Intel HD Graphics, 1920 x 1200 60Hz resolution, Small Form Factor (SFF), SMPS - 240, Energy Star 5.0, Integrated High Definition audio with Internal Speakers, Stereo/speakers line-out &amp; line-in, Microphone in jacks, Headphone (front), Minimum 1 Serial Port (9-pin) and 1 Parallel port (25-hole), 8 USB ports, Hi-Speed USB 2.0 of which 2 should be in front, Number of PCI slots (120 pins), 32-bit / 33 MHz (Minimum 1 required), PCI Express x16 graphics slot (164 pins), 80 Gbps (low-profile), minimum 4 memory slots on motherboard.</p>	
<ul style="list-style-type: none"> <li>• <b>OTHER FEATURES:</b></li> </ul>	
<p>An Electronic level switch to be provided to maintain the liquid level.</p>	
<p>Suitable Hand valves to be provided wherever necessary.</p>	
<p>All the equipments are mounted in an attractive frame.</p>	
<p>Acid and alkaline paths are connected by rust proof tubes.</p>	
<p><b>Digital Panel meter to display the pH Transmitter O/P</b></p>	
<p>Necessary pressure gauges &amp; Short Circuit protection.</p>	
<p>Mimic diagram in the panel. &amp; All electrical connectors terminated in the panel.</p>	
<p><b>LAB</b> view and MATLAB compatible.</p>	
<ul style="list-style-type: none"> <li>• Variable Speed Pump: 2 Numbers</li> </ul>	

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.	
<ul style="list-style-type: none"> <li>• <b>Other General Requirements for all the sections:</b></li> </ul>	
The liquid level in the tank to be 1.5 times the tank diameter and length to diameter ratio is 1:1.5	
<ul style="list-style-type: none"> <li>• <b>Demonstration</b></li> </ul>	
The supplier has to demonstrate the following concepts:	
<ul style="list-style-type: none"> <li>• 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.</li> </ul>	
<ul style="list-style-type: none"> <li>• 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.</li> </ul>	
<ul style="list-style-type: none"> <li>• The computer interface for data acquisition and control uses the real time tool box and editor using MATLAB.</li> </ul>	
	5% bank guarantee for 5 years towards the supply of spare components after the warranty period.

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