

Date: 24.09.2018

To

.....  
.....

**REFERENCE: JU/CHEMICAL/NPDF/2018/02**

**SUB** : Invitation for quotations for supply and installation of the following item

Dear Sir/Madam,

You are invited to submit your most competitive quotation for the listed item within 1<sup>st</sup> October at 1 pm.

The item: **Diffusion Growth Chamber**

Specification: Attached

Warranty: 1 year or more

The quotation will be in favour of: Dr Azizur Rahman, C/O, Prof Papita Das, Department of Chemical Engineering,  
Jadavpur University, Kolkata – 700032.

*Papita Das* 24/09/18

Prof Papita Das

Dept of Chemical Engineering



**Dr. Papita Das**  
Professor  
Dept. of Chemical Engineering  
Jadavpur University, Kolkata

## Equipment Specification -

**Construction** : These equipment is made with durable triple walled construction, where exterior wall is made of 18 SWG powder coated 304 grade stainless steel. Inner chamber is made of corrosion resistant 16 SWG stainless steel 316 L grade and provides the appropriate climatic and lighting conditions for microorganism growth testing applications. Polyurethane insulation minimizes heat loss. Doors come in solid construction with magnetic gasket. Shelves are made of painted stainless steel 316 l wire, easy to lift out and easy to clean.

**Orbital Shaking System** : Speed Control :  $\pm 1$  rpm, timer : 0.1- 99.9 h, Power supply : 220/230 V, 50/60 Hz , Drive mechanism : Triple-eccentric with permanently lubricated ball bearings , Motor type : Solid state , DC brushless motor , Shaking speed : 25 to 180 RPM , Orbit : 2.5 cm. Built-in, magic clamp-compatible shaker platform available for higher speed mixing.

**Temperature & Other Controlling System** : This equipment is provide precise *temperature control from 5°C to 60°C* with accuracy of  $\pm 0.2^\circ\text{C}$ . Imported PID based temperature and humidity control system supported by high accuracy PT100 RTD sensor and capacitive sensor. Dual-beam IR sensor provides more accurate CO<sub>2</sub> readings

**Humidification** : The humidity range varies from *10%RH to 95%RH* as per required temperature. This varied temperature range makes the equipment ideal for various corrosive & noncorrosive applications. The humidification system consists of a stainless steel tank and an ISI mark immersion heater. It also features automatic water filling device, when water goes below the low level, this device opens the valve for water re-filling.

**Refrigeration System** : These equipment incorporate high quality continuous running refrigeration system which ensures precise temperature control by alternately cycling refrigerant this also extends compressor life, and eliminates the risk of ice buildup in the coil. Compressor is used only branded featuring low noise level (<60dB) and minimal vibration. Solenoid valves have an extended stem for quiet and long life operation. Evaporator coil is ceiling mounted and incorporates twin air circulation fans in an aluminum housing.

**Air Circulation** : In order to achieve uniform temperature and humidity level in every corner of the chamber forced air circulation is needed and in our seed germinators we use branded motorized blower assembly for this purpose. This assembly not only distributes temperature and humidity uniformly all over the chamber but also offers quiet and vibration free operation for long years.

**Ultraviolet Germicidal Irradiation (UVGI)** : UV light is electromagnetic radiation with wavelengths shorter than visible light. UV can be separated into various ranges, with short-wavelength UV (UVC) considered "germicidal UV". At certain wavelengths, UV is mutagenic to bacteria, viruses and other microorganisms. Particularly at wavelengths around 260 nm–270 nm,<sup>[7]</sup> UV breaks molecular bonds within micro organismal DNA, producing thymine dimers that can kill or disable the organisms.

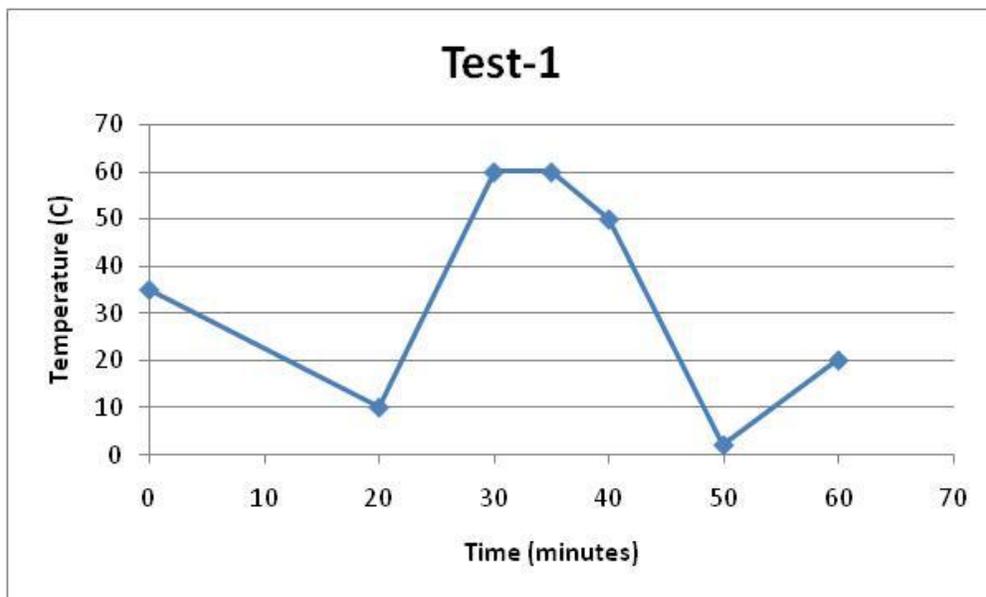
**Lighting System** : These equipment use high LUX fluorescent LED lighting and equipped with high quality up to 8 fluorescent LED lights with combination switching are controlled through microprocessor controlled cyclic timer. This timer controls the light mode which is controlled using 24x7 digital timer.

**Gas Purging System** : High quality circumferential butt-welding of pipes with other tubes, pipes or fittings, requires inert gas to be used inside the bore to prevent oxidation and notching of the root penetration weld bead. Each system has 2 protected inflatable dams connected by an armored spinal tube. The spinal tube carries the gas to inflate the purge dams and the low profile needle valve to release the gas gently, to purge the interspace without turbulence. Same system will be provide for outlet operation

### Test-1

This test has five steps. Graphical feed profile is also attached.

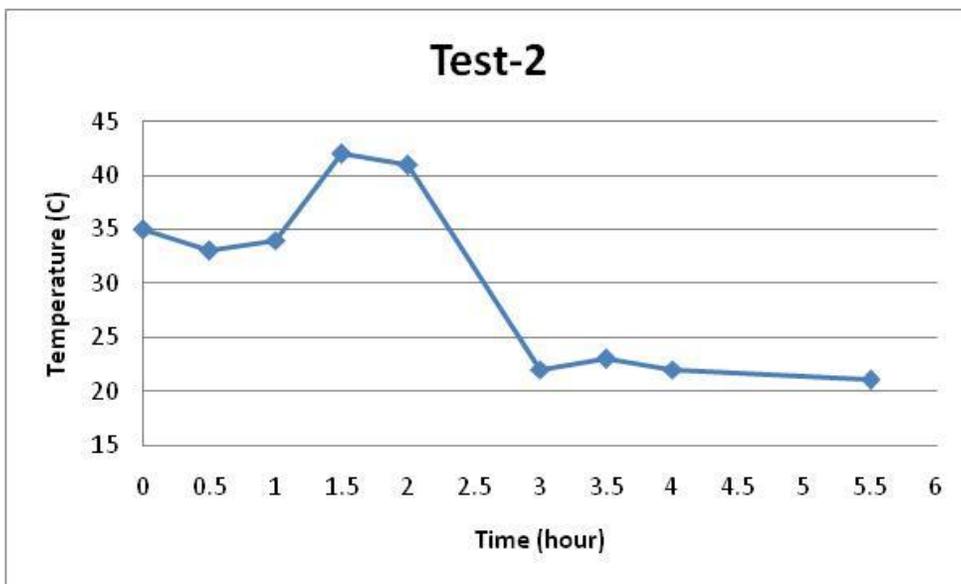
0. Ambient (say 35 deg C) to 10 deg C in 20 min
1. 10 deg C to 60 deg in 10 min (ramp up)
2. Maintain at 60 deg for 5 min (soak/dwell time)
3. 60 deg C to 50 deg C in 5 min (ramp down)
4. 50 deg C to 2 deg C in 10 min (ramp down).
5. 2 deg C to 25 deg C in 10 min (ramp up)



## Test-2

This test has seven steps and it takes longer time to complete. But it should not be a problem with PC interfaced BOD. Graphical feed profile is also attached.

0. Ambient (say 35 deg C) to 33 deg C in 0.5 hr
1. 33 deg C to 34 deg C in 0.5 hr (ramp up)
2. 34 deg C to 42 deg C in 0.5 hr (ramp up)
3. 42 deg C to 41 deg C in 0.5 hr (ramp down)
4. 41 deg C to 22 deg C in 1 hr (ramp down)
5. 22 deg C to 23 deg C in 0.5 hr (ramp up)
6. 23 deg C to 22 deg C in 0.5 hr (ramp down)
7. 22 deg C to 21 deg C in 1.5 hr (ramp down)
- 8.



### Additional Requirements :

1. Vendors should provide continuous technical support and maintenance of equipment.
2. Vendors must have sufficient experience in supplying equipment in reputed organizations for research purpose. They must provide references of end users whom we can contact for their opinion.
3. Vendors must provide detailed documentation for the equipment, including calibration certificate, design certificate.
4. Vendors must provide training to our scholars for using the equipment.
5. All the expenses for installation, training and post sales technical support will be borne by the vendor.