

**Department of Aerospace Engineering
Indian Institute of Technology Kanpur
Kanpur - 208016**

To:

M/s : Unique Chemoplant Equipments (UCE), Mumbai

Sub : Quotation for supply of **“Aerospace grade laboratory autoclave”**

Sir / Madam:

This is in continuation to the earlier call for quotations for a “Aerospace Grade Laboratory autoclave”. Due to closure of offices in the year-end, the date of submission of the quotation is extended to 15th January, 2012.

With best regards.

Sincerely,

(C.S. Upadhyay)

**Department of Aerospace Engineering
Indian Institute of Technology Kanpur
Kanpur - 208016**

To:

M/s :

Sub : Quotation for supply of **“Aerospace grade laboratory autoclave”**

Sir / Madam:

With reference to the subject mentioned above, you are invited to submit the quotation in a sealed cover in order to reach us before 31st December, 2011 in the proforma quotation enclosed herewith in the form of hard copy / soft copy for your use. Soft-copy of the model quotations are available on the website: www.iitk.ac.in/dord. The detailed specifications of the equipment are given below.

With best regards.

Sincerely,

(C.S. Upadhyay)

Detailed specifications of the desired autoclave:

Specifications:

Diameter of working space	: 900 mm
Length of working space	: 1000 mm
Autoclave Door	: Davit arm Door
Maximum charge	: 150 kg (Equivalent to steel)

Maximum Temperature	: 200°C
Heating Rate	: 0 to 3°C per min
Cooling Rate	: 3°C per min. (Avg.)
Cooling medium	: Water
Cooling system	: Closed loop water circulation system with cooling tower and pumps (with water softening system)

Water softening plant	: Suitable capacity water softening plant.
Heating medium	: Electrical air heaters
Number of Thermocouples	: 03 Nos
Type of Thermocouples	: K (chromel / Alumel)
Temperature display accuracy	: ± 1% FSR (Digital)
Temperature Controller	: PID controller with ramp & Soak control

Maximum Pressure	: 7 bar (g)
Pressurization medium	: Air
Blower	: Centrifugal blower with pressurized blower motor.
Pressure display accuracy	: ± 1% FSR (Digital)
Pressure Controller	: PID Controller
Pressurisation Source (<i>required</i>)	: Compressors with 0.5 Cub. Metre Storage reservoir to achieve pressurisation rate of 0.5 bar/min.

Number of vacuum lines	: 2 suction lines and 1 measurement line
Vacuum system	: Rotary vacuum pump
Free air displacement capacity	: 300 Liters / minutes
Vacuum Control	: Should be able to maintain the specified vacuum level in the reservoir
Maximum vacuum at source	: 2 Torr (a) (~2.7 mbar)
Vacuum fail protection	: Required for all the three lines
Vacuum display accuracy	: ± 1% FSR (Digital)
Vacuum Reservoir	: 100 lit. capacity vacuum reservoir

Control and Instrumentation System	: Control system with single PC, PLC and enhanced mimic
Data acquisition system*	: 6-channel Chart recorder (Computerised data acquisition system instead of the chart recorder required)
Alarm, Safety, Interlocks and Status	: Through PLC and mimic
Heater control	: SCR controlled heaters
Temperature Control Accuracy	: ± 1 °C (Air temperature)
Pressure Control Accuracy	: ± 0.2 bar
Air circulation system	: Fixed speed Blower
Temperature Uniformity	: ± 2 °C (In the working space under steady state condition at 2 bar pressure)
Heat exchange coil type	: Tubular Cross flow
UPS for control system	: Required

Notes:

1. Scope of work includes supply, erection and commissioning including acceptance tests, training on operation at IIT Kanpur.
2. The taxes, transportation, packing and forwarding charges should be included.
3. Civil works such as foundations for autoclave, compressors, cooling tower, water treatment plant, cable trenches, openings for pipes etc., will be provided by IIT, Kanpur.
4. Power source to the control panel, compressor panel, makeup water line will be provided by IIT, Kanpur.

Additional Notes:

1. We do not require third party inspection of the autoclave shell.
2. For acceptance, we would like preparation of standard specimen. IIT Kanpur will prepare the mould and the sample to be cured. Demonstration of all the desired functionality is the only requirement for acceptance.
3. A one or two-day training session for the staff and concerned faculty will be needed, on how to use the autoclave, precautions to be taken, maintenance checks to be conducted, sample preparation, use of the vacuum ports, maintenance of the support systems (compressor, cooling unit, etc).
4. Extended AMC, without spares, for three additional years will be required.
5. We do not have specific requirements about brands of compressors, cooling towers, computers to be supplied.