



No: PUR/2009-10/IND11219/RSP

Date: 15/01/2010

**Sub : Request for Pro-forma Invoice**

Dear Sir

This Research Institute is interested in purchasing of the items mentioned below. You are therefore requested to forward a pro-forma invoice along with your terms & conditions of supply & payment. Please provide a copy of the technical literature and the specifications of these items in a sealed envelope.

Please read carefully the terms and conditions mentioned overleaf and submit your pro-forma invoice/quotation accordingly.

SNo.	Name of Item	Catalog No	Qty
1	Pure Steam Generator (Electrically Operated), 50 Kg/h		1

**Important**

- Please mention our reference number on the envelop and address all correspondence to Director IMT Chandigarh only.
- Please quote strictly as per our specifications.
- Please attach compliance sheet
- Proforma Invoice received after due date will not be considered under any circumstances.
- Please note that your Quotation should reach us latest by **2/2/2010** opened on **3/2/2010**.
- **Your Quotation must be duly stamped and reach directly to IMT from you only. If quotation is submitted by Indian representative/agent then they must have to produce a authority certificate of principal party for quotating the price Other wise it will be very difficult at our end to consider your quotation.**

Yours faithfully,

**Stores & Purchase Officer.**

## Pure Steam Generator

Capacity: 50 Kg/hr at 2.5 kg/cm<sup>2</sup>

Principle of operation: The pure steam generation system consists of a single column comprising of an Evaporator and Separator. The Evaporator is to be fitted with heavy-duty industrial grade SS 316 water immersion heaters to generate vapour. The generated vapour to pass through the separator column. The separator column has to use separation technique for particle entrainment and separation of impurities such as droplets and pyrogenic material.

Materials: All material in contact with the Feed Water, WFI and generated Pure Steam are of SS.316 L. Gasket material is to be Pharmaceutical grade PTFE or viton. All non-contact parts are fabricated from S.S. 304.

Pressure vessels: The evaporator, separator and pre-heater are to be designed in accordance with ASME SEC VIII and All welding are to be of high quality argon welding in full compliance with LVP GMP.

### Piping

- All process piping is to be of SS 316L quality, semi-seamless pipe with high quality orbital welding. All other piping is fabricated from S.S. 304
- All fittings in contact with the feed water, WFI and generated Pure Steam are to be of sanitary construction tri-clover fittings with viton gasket. All other fittings are to be threaded connection.
- All pipelines are to be designed to ensure a 2% slope for full draining and no dead-legs greater than 2D.

### Valves

- The process valves in contact with the feed water, generated pure steam is to be S.S. 316L contact parts with Teflon seat and Tri-clamp connections.
- All other valves are to be ball valves with S.S. 304 contact parts with Teflon seat.
- Automatic valves: pneumatically actuated by instrument air controlled via solenoid valves.

### Surface finish

- All contact parts of the equipment are to be electro polished to a surface finish better than 0.3  $\mu$  Ra value.
- All non-contact parts of the equipment are mechanically polished to a surface finish better than 1.2  $\mu$  Ra value.

### INSULATION

Insulation: The evaporator, the separator column, and the Pure Steam condenser are to be insulated with resin-bonded wool or better. The insulation is to be held in place by SS. 304 outer cover.

Structure: The PSG is to be mounted on a stand of SS. 304.

Feed pump: A feed water booster pump with an electric motor to be supplied. The feed pump is to be of SS. 316 centrifugal pump along with an automatic shut-off valve and flow meter.

Steam sampler: A steam sampler is to be provided to sample the condensate of the generated pure steam.

Automatic Control System: The pure steam generator is fitted with a SS304 control panel with following features:

1. Automatic regulation of feed water via a level switch and automatic feed water inlet valve.
2. Automatic regulation of heaters using pressure switches in the generated pure steam line.
3. Conductivity sensor and analyser for feed water inlet.
4. "START" and "STOP" push – button and necessary indication lamp.
5. All electrical switchgear and hard wiring.

Energy saver system: To minimize the energy consumption the heating load is to be divided into two banks. Each bank is to be independently controlled via two pressure switches.

Recording: 80-column dot matrix data printer for recording – dates, time, process parameters, process status, alarms etc.

Equipment Qualification:

The equipment is to be supplied with:

- Maintenance and service manual.
- Design Qualification Document.
- Installation Qualification Document.
- Operational Qualification Document.
- Testing and Calibration Reports.

Warranty: 1 year from the date of installation.