

[www.fabkerala.gov.in](http://www.fabkerala.gov.in)  
[email.director@fabkerala.gov.in](mailto:email.director@fabkerala.gov.in)  
Fax : 0471 – 2441741

**DEPARTMENT OF FACTORIES & BOILERS**

**No.A3/4124/F&B/2015**

“SURAKSHA BHAVAN”  
OFFICE OF THE DIRECTOR OF  
FACTORIES AND BOILERS,  
MEDICAL COLLEGE P.O.,  
THIRUVANANTHAPURAM,  
DATED: 21 -12-2015.  
PHONE:0471– 2441597,2440974.

**E- TENDER NOTICE**

Sealed E-Tenders are invited from the manufactures and authorized dealers for the supply and installation of the following high quality branded equipments separately.

The eSubmission Tender System of Kerala enables the Tenderers to download the Tender Schedule free of cost and then submit the bids online through this portal.

Sl. No.	Item	Quantity	Estimate Amount	EMD	Cost of Tender Form
1	Vibration Meter	1	8,00,000	1 % of the cost of Item	Rs.1500+VAT
2	Air Velocity meter	2	1,00,000	“ “	Rs.400+VAT
3	UV light irradiance meter	1	1,00,000	“ “	Rs.400+VAT
4	Infrared irradiance meter	1	1,00,000	“ “	Rs.400+VAT
5	EMF (ELF) tester	1	1,00,000	“ “	Rs.400+VAT
6	Digital Multimeter / Ohmmeter (intrinsically safe)	1	1,50,000	“ “	Rs.400+VAT
7	Intrinsically Safe Light meter	2	2,00,000	“ “	Rs.400+VAT
8	Vertical elutriator cotton dust sampler	2	2,00,000	“ “	Rs.400+VAT
9	Personal heat stress monitor	2	3,00,000	“ “	Rs.600+VAT
10	Radiation survey meter	1	1,00,000	“ “	Rs.400+VAT
11	Portable gas detectors	1 each	6,00,000	“ “	Rs.1200+VAT
12	Microwave Digestion System	1	8,00,000	“ “	Rs.1500+VAT

Last date for the receipt of filled up Tenders: 1 PM on 16-01-2016  
Opening Tender : 2 PM on 19-01-2016

More details contact Director of Factories & Boilers, Thiruvananthapuram on all working days till 16-01-2016, 1 PM. The under signed reserves the right to reject the tender without assigning any reason thereof. The tender notification is also available in the official Website: [www.fabkerala.gov.in](http://www.fabkerala.gov.in)

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## Specifications

### 1. **Vibration meter :**

- Portable Digital Human Vibration Meter & Analyzer for worker exposure and industrial hygiene studies.
- Integrated with tri-axial accelerometer
- Hand Arm & Whole Body Capability
- Transducer/seat pad for whole body vibration and wrist band/probe for hand arm vibration measurements shall be supplied with.
- LCD display.
- Frequency weightings and measurements for Hand-Arm and Whole Body Vibration
- Simultaneous 3-channel Measurements: X, Y and Z axes, and logs RMS and peak values.
- Battery operated (with battery pack and charger, if rechargeable batteries).
- Calibrator shall be supplied with.
- Carrying case
- Intrinsically safe (desirable).
- USB and Serial Interface to PC with software (desirable).
- **Measuring range:**

Acceleration (RMS)	0.4 m/s <sup>2</sup> to 200 m/s <sup>2</sup>
Frequency	0.5 Hz – 1000 Hz

### 2. **Air Velocity meter:**

- Portable air velocity meter for environmental wind and temperature testing/analysis.
- Simultaneous display of Ambient Temperature and Air Flow or Air Velocity.
- LCD Display.
- 3% reading accuracy
- Battery operated (with battery pack and charger, if rechargeable batteries).
- Carrying case
- Intrinsically safe (desirable)
- USB and Serial Interface to PC with software (desirable).
- **Air velocity measuring range:**  
0.40 To 30 m/s

### 3. **UV light irradiance meter**

- Measures irradiance & exposure to UV radiation from various industrial sources.
- Hand held UV meter with separate, interchangeable sensor heads for UVA, UVB & UVC ranges
- Designed for peak spectral response at 254 nm, 312 nm or 365 nm
- Measurement units: mW/cm<sup>2</sup>
- Interference filter to select appropriate UV band and to eliminate all other unwanted radiation
- Non sensitive to infra red
- Carrying case
- Battery operated (with battery pack and charger, if rechargeable batteries).
- LCD display
- USB and Serial Interface to PC with software (desirable).
- **Measurement range:**  
UV light irradiance : 0.1 – 250 mW/cm<sup>2</sup>

#### 4. Infrared irradiance meter

- Measures to Infrared irradiance form various industrial sources.
- Hand held meter
- Measurement unit:  $\text{mW}/\text{cm}^2$  or  $\text{W}/\text{m}^2$
- Interference filter to eliminate all other unwanted radiation or non sensitive to other radiations
- Carrying case
- Battery operated (with battery pack and charger, if rechargeable batteries).
- LCD display
- USB and Serial Interface to PC with software (desirable).
- **Measurement range:**  
IR irradiance:  $10 - 1000 \text{ mW}/\text{cm}^2$  or  $(100 - 10000 \text{ W}/\text{m}^2)$

#### 5. EMF (ELF) tester

- Measurement of ELF (Extremely Low Frequency) static EMF (Electro Magnetic Field) levels around industrial devices/electrical appliances/power lines.
- Tri-axial measurement probe
- LCD display
- EMF bandwidth (frequency range): 30Hz to 300Hz
- Magnetic flux density in milli Tesla (mT)
- Electric field strength in V/m or kV/m
- RMS display of values measured over sampling time
- Unit with dielectric handle
- Battery operated (with battery pack and charger, if rechargeable batteries)
- Carrying case.
- USB and Serial Interface to PC with software (desirable)
- **Measuring range:**

Magnetic flux density (RMS)	0.1 – 200 mT
Electric field strength (RMS)	1 - 30 kV/m

#### 6. Digital Multimeter / Ohmmeter (intrinsically safe)

- Intrinsically safe for Ex-rated areas
- Waterproof, dust-proof and drop-proof
- Resistance and continuity test
- Relative mode to remove test lead interference on resistance measurements
- LCD display
- Battery operated (with battery pack and charger, if rechargeable batteries).
- Carrying case
- USB and Serial Interface to PC with software (desirable).
- **Measuring range**

Resistance	0.5 $\Omega$ to 100 $\Omega$
Accuracy	$\pm (0.25 \%)$

## 7. Light meter

- Measures light intensity in industrial workplaces.
- Selectable units of measurement: Lux and Foot candle (Fc)
- Measuring range: 0 to 400000 Lux and 0 to 40000 Fc
- Resolution: 0.1 Lux / 0.01 Fc
- Measuring accuracy:  $\pm 5\%$
- LCD display
- Carrying case
- Battery operated (with battery pack and charger, if rechargeable batteries).
- Intrinsically safe (desirable)
- USB and Serial Interface to PC with software (desirable).

## 8. Vertical elutriator cotton dust sampler

- Cotton Dust Sampler with a tripod stand and alternatively provision for mounting on the columns or walls of the work place.
- The sampler shall consist of ;
- **vertical elutriator**,
- a three-piece plastic 37mm filter cassette,
- critical orifice for regulating the flow rate at  $7.4 \pm 0.2$  lpm,
- low maintenance vacuum pump with mounting brackets,
- 0 to 30" Hg vacuum gauge,
- tubings, fittings and filter jar.

### Specifications

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Flow Rate	7.4 lpm
Particle Cut-Point	15 $\mu$ @ 7.4 lpm
Filter Cassette	Plastic (polystyrene); for 37mm membrane filter with back-up pad; three-piece design
Filter Media	Polyvinylchloride (PVC) filter media with 5-micron pore size, 37mm diameter
Vacuum Gauge	0 to 30"Hg
Vacuum Pump	Oil-Less Rotary Vane, 1/10 HP, 1.25 cfm (35 lpm) free-flow
Vertical Elutriator	Over-all dimensions - 6-inch (15 cm) O.D. x 28-inch (71 cm) L; weight: 7.25 lbs. (3.3 kg) max.
Power	220-230V AC, 50-60Hz

## 9. Personal heat stress monitor

Personal heat stress monitor for directly detecting physiological heat response of industrial workers exposed to wide range of heat exposure.

User-selected alarm trip points to provide an audio alert to elevated core temperatures.

To monitor personal heat stress levels and to create heat stress measures that can minimize risk.

Compact size combined with belt or pocket attachment for convenient personal monitoring.

Ear canal sensor for measurement and warning of dangerous deep body core temperatures.

Data logging for documentation of personal heat exposure.

Intrinsic safety certification for monitoring in potentially hazardous locations where heat is often extreme (desirable).

### **SENSOR:**

#### **Thermistor Temperature Sensor**

Accuracy and ranges: +/-0.1° C from 32° C to 40° C

### **MEASUREMENT PARAMETERS:**

Temperature reading: °Celsius

10 second data logging intervals

Overall summary data

Detailed time history data

### **MECHANICAL DESIGN:**

Water & dust ingress protection rating

**Light Weight** Housing & Ear sensor assembly

### **OPERATING TEMPERATURE RANGE:**

Unit: 0° C to 70° C

### **OPERATING HUMIDITY:**

0% to 95% (non-condensing)

### **DATA MANAGEMENT SOFTWARE TO BE PROVIDED**

### **OUTPUT:**

Printer / computer interface

Audio Alert

### **POWER SOURCE:**

Rechargeable or disposable batteries

## 10. Radiation survey meter

- General purpose Geiger -Müller detector for measurement of alpha, beta and gamma rays
- Count rate and dose rate mode
- Detection and measurement of alpha, beta and gamma radiation  $\leq 10$  keV.
- LCD display that can be switched between counts per minute (cpm), counts per second, dose rate in  $\mu\text{Sv/hr}$ , total counts.
- LED indication and beeper with each count.
- Audible alarm set when radiation level thresholds are exceeded.
- USB and Serial Interface to PC with software (desirable).

### Specifications:

Sensor	Halogen-quenched Geiger-Müller detector with mica end window.
Operating range	0.01-1000 $\mu\text{Sv/hr}$ (Cs-137), 0-300,000 cpm;
Sensitivity	100 cpm or $1\mu\text{Sv/hr}$ referenced to Cs-137
Alert	User-adjustable alert level set using buttons
Count light	Red LED flashes with each count
Audible signal	Chirps for each count (can be muted)
Power	Battery operated (with battery pack and charger, if rechargeable batteries).

## 11. Portable gas detectors

- Hand held, battery operated, Digital portable gas detectors;
- Easy key pad operation
- Data logging facility in the PC through USB interface (desirable)
- intrinsically safe (desirable)
- Low Bat indication
- Gas concentration display ppm.
- Low, High, TWA, STEL configurable alarms with Audio & Visual alerts
- Suitable rechargeable battery pack with charger.
- Large easy to read backlit LCD display
- RFI/EMI shielding
- Quotes can be for instrument with multi gas sensors or for separate single gas detectors for the following:

<u>Gas/vapour</u>	<u>Measuring Range</u>
Ammonia	0-100 ppm
Chlorine	0-20 ppm



## Temperature & pressure sensors

Automatic temperature & pressure control system, sensors should be protected properly from any chemical attack, sensor should monitor and control all vessels simultaneously.

## Exhaust

The system should have inbuilt exhaust system to cool the vessels and to drive away if any fumes in the cavity.

## Safety measures

Over-pressure venting safety interlock, the system should have good interlocking system for safety and cavity door. Compartment made of corrosion resistance material. All hardware should have protective coating for the resistance from acid/organic fumes. The system should be certified by necessary safety authority for safe operations.

## Controller

System should be controlled by a touch screen controller. All the features should be in built in the software.

## Vessel Starter Set

Accessory set contains 12 Complete High Pressure Plus Vessel Assemblies, 1 High Pressure Plus Control Vessel, 1 Turntable, 1 Retaining Ring, 1 Membrane Insertion Tool, 1 Membrane Removal Tool and 1 Box Rupture Membranes.

## Installation and Familiarization

Installation and training to users should be given at our laboratory by a trained Application engineer.

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