

KERALA UNIVERSITY OF FISHERIES AND OCEAN STUDIES



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KUFOS HQRS, Panangad, Ernakulam

GA7/3539/18	04/2018	Panangad, Dated : /

TENDER NOTICE

Sealed Competitive limited tenders are invited for the setting up of “Heat & Mass Transfer Lab for School of Ocean Engineering & Under Water Technology”.

The particulars / specifications are attached:

Last date & time for receipt of tender	23.04.2018	11.00 AM
Date & time of opening of tender	23.04.2018	11.30 AM

The envelope containing the Tender should bear the superscription “Tender for the setting up of Heat Mass Transfer Lab for School of Ocean Engineering & Under Water Technology: GA 7/3539/18” and should be sent to the Registrar, Kerala University of Fisheries and Ocean Studies, Panangad, Kochi - 682 506, Ernakulam District. Intending firms/individuals can submit their tenders in the tender form downloaded from the official site of KUFOS with detailed specification, tender cost of Rs.600/- and EMD for Rs.2,900/- by means of Demand Draft drawn in favour of the Finance Officer, KUFOS, Panangad, Kochi payable at State Bank of Travancore, Vyttila along with the offer. More details are available in the office of Director School of Ocean Engineering & Under Water Technology (Ph. No.8921613329) and he can be contacted on all working days with the permission of undersigned.

All the terms and conditions applicable to University/Government quotation/Tenders are admissible to this also. Right to accept the Tender in full or in part or to reject without assigning any reason whatsoever is reserved with the undersigned.

**REGISTRAR**

To

Firms

Copy to: NB/Computer Engineer/Dr. Suryakala Director/Spare

**1. Heat transfer analysis during conduction and convection**

This apparatus is used to find out the heat transfer coefficient of vertical cylinder in natural convection.



## Experimental Setup consisting of:

- Brass tube vertical cylinder of dia 32mm and 500mm long.
- Duct of size : 150 X 150 x 500 mm
- Set of Thermocouple - 6 Nos.
- Ring type Heater.

## Control Panel consisting of:

- 6 Channels Digital Temp. Indicator range: 0-300oC
- Dimmerstat : 0-2A /230V
- Mains ON/OFF switch
- Digital Voltmeter 0-250V
- Digital Ammeter 0-2 A.

### 1. Study on various types of heat exchangers used in food industry

The apparatus is used to calculate heat transfer rate and LMTD in parallel and counter flow.

## Experimental Setup consisting of:

- Outer tube of inter I.D. 25mm and length 1.2metre.
- Inner tube of I.D. 10 mm and length 1.5metr.
- Thermocouples - 5 Nos.
- Arrangement for making parallel and counter flow.

## Heating arrangement:

- Cold water storage tank.
- Hot water stroge tank temp constant through thermostat.
- Electric industrial heater of 2 KW.

## Control panel consisting of:

- 5 Channels Digital Temp. Indicator range: 0-200oC
- Digital Voltmeter 0-250V
- Digital Ammeter 0-2A
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1. Preparation and calibration of thermocouples
2. Range : 100oC

Display : 3-1/2 digit LED  
Resolution : 0.1oC  
Power source : 230V +/-10%, 50 Hz.



- Heating and cooling arrangement with Thermometer.
- Test point also provided. Complete with Operating Manual.

### Experiment:

- To plot Temperature Vs. Digital Voltmeter reading
- To study of characteristics of Thermocouple.

#### 1. Determination of thermal conductivity of different food products

This experiment is used to calculate the thermal conductivity of **different food**

#### Experimental setup consisting of:

- Food Plate dia 170mm.
- Disk type heater
- Cooling chamber with water circulation.
- Central heat ring.
- Thermocouple - 4 Nos.

#### Control panel consisting of:

- 4 Channels Digital Temp. Indicator range: 0-300°C
- Dimmerstat : 0-2A / 230V
- Mains ON/OFF switch

Digital Voltmeter 0-250V

Digital Ammeter 0-2 A.

#### 5. Study of working principle and constructional details of plate heat exchanger

The apparatus is used to calculate heat transfer rate and LMTD in Plate type heat Exchanger

#### Experimental Setup consisting of:

- Plate Box Size : 300 x 300 mm
- Plate size : 200 x 200 mm
- Thermocouples : 5 Nos.
- Arrangement for making parallel and counter flow.

#### Heating arrangement:

- Cold water storage tank.
- Hot water storage tank temp constant through thermostat.
- Electric industrial heater of 2 KW.



### Control panel consisting of:

- 5 Channels Digital Temp. Indicator range: 0-200oC
- Digital Voltmeter 0-250V
- Digital Ammeter 0-2A

### 6. Study of working principle and constructional details of shell and tube heat exchanger. Determination of overall heat transfer coefficient of shell and tube, plate heat exchangers

#### jacketed kettle used in food industry

Shell and Tube Heat Exchanger (1:2 pass) shell of M.S. having 150mm dia. length 500mm and thickness of 3mm fitted pipes on 15mm. triangular pitch arrangements. Cut baffles are provided as per TEMA standards.

#### Heating arrangement:

- Cold water storage tank.
- Hot water storage tank temp constant through thermostat.
- Electric industrial heater of 2 KW.

### Control panel consisting of:

- 5 Channels Digital Temp. Indicator range: 0-200oC
- Digital Voltmeter 0-250V
- Digital Ammeter 0-2A

Knob to adjust the temperature of thermostat.

### 7. Studies on heat transfer through extended surfaces

This experiment is used to calculate the thermal conductivity of liquid (commercial glycerol).

#### Experimental setup consisting of:

- Commercial glycerol filled between the metal plates of dia170mm.
- Disk type heater
- Cooling chamber with water circulation.
- Central heat ring.
- Thermocouple - 4 Nos.

### Control panel consisting of:

- 4 Channels Digital Temp. Indicator range: 0-300oC
- Dimmerstat : 0-2A / 230V
- Mains ON/OFF switch
- Digital Voltmeter 0-250V

Digital Ammeter 0-2 A.

## 8. Studies on temperature distribution and heat transfer in HTST pasteurizer

We can define **milk pasteurization** as the process of heating milk (or milk product) to a predetermined temperature for a specified period without re-contamination during the entire process.

The predetermined temperature usually depends on the heat resistance of spoilage microorganism that the pasteurization.

**Control panel consisting of:**

- 4 Channels Digital Temp. Indicator range: 0-300oC
- Thermocouple - 4 Nos.
- Dimmerstat : 0-2A / 230V
- Mains ON/OFF switch
- Digital Voltmeter 0-250V

Digital Ammeter 0-2 A.



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