

**B-1 RE-TENDER FOR LAB EQUIPMENTS**  
**DEPT: CHEMICAL ENGINEERING**

**INSTITUTE OF PETROCHEMICAL**  
**ENGINEERING**

(DR.BABASAHEB AMBEDKAR  
TECHNOLOGICAL UNIVERSITY)

Website: [www.iopelonere.com](http://www.iopelonere.com)

RE-TENDER No.-01/2017-18  
LONERE-402 103, TAL.MANGAON,  
DIST. RAIGAD

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# Institute Of Petrochemical Engineering

(DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,)  
LONERE, 402103, TAL.MANGAON, DIST.RAIGAD.

## :Re-tender Notice and Tender Conditions:

1. Sealed tender in duplicate will be received on prescribed form by the PRINCIPAL in his office up to the dates mentioned for the supply of stores as per schedules attached.
2. Prescribed Re-tender Form will be available from this office on payment of Rs.500/- not refundable, on any working day between 10.00 a.m. and 3.00 p.m.
  - a) Re-tenders should quote rates for F.O.R., destination and submit the original quotation in printed Tender Form and duplicate copy of an ordinary typed form along with a covering letter attached therewith. They should state the earliest delivery period necessary for completion of the order.
3. The origin of stores offered whether Indian or Foreign and in the case of the former, state in which it is manufactured should be clearly stated against each article.
4. The tender in duplicate should be submitted in sealed cover and super scribed with Re-tender No. and date of opening of the Re-tender. The right to ignore any Re-tender which fails to comply with the above instructions is reserved. All outstation Re-tenders should be sent by Registered Post.
5. **Opening of Re- tender** – You are at liberty to be present or authorize your representative to be present at the opening of tender at the time and date specified in the schedule.
6. (a) In the case of stores, subject to price fluctuation clause, the details, viz., i) manufacturer's price ex-works or ex-point of dispatch whether on Rail or sea, ii) freight, iii) dues, and iv) other charges including firm's margin should be clearly and separately stated.
  - (b) Basis of revision in price, if claimed, should be accompanied by details of variation in no other case any revision of price admissible.
7. The purchasing officer does not pledge himself to accept the lowest or any tender and reserves to himself the right of accepting the whole or any part of the tender or portion of the quantity offered against any item and you shall supply the same at the rate quoted. You are at liberty to quote for the whole or any portion of the quantity of any item or state that the rate quoted shall apply if the entire quantity of any such item is taken from you.
8. (a) Where offers by the tenderer are for stores imported with the assistance of the State Trading Corporation the tenderer should specifically stipulate that the offers made are in accordance with the price fixation formula of the State Trading Corporation.
  - (b) In the event of the order being placed against any of the tenderers and if the tenderer fails to supply any stores according to the terms and conditions of acceptance of tender or fails to replace any stores rejected by the P.O. or by any person on his behalf within such time as may be stipulated,

the Purchasing Officer shall be entitled to purchase such stores from any other source and at such price as the Purchasing Officer shall in his sole discretion think fit.

If action as stipulated above is taken:

01. The offer of the defaulting contractor will not be considered.
02. The defaulting contractor will be penalized to the extent of the difference in the rates or 10 per cent of the value of the earlier order, whichever is higher.
03. If the defaulting contractor fails to pay the penalty he will be permanently delisted from the list of approved contractors of the P.O. and the registration deposit of the contractors will be forfeited to Government.
09. In the case of non-delivery and / or delayed delivery against an order placed with you , the Purchasing Officer , reserves to himself the right to impose such penalty in his sole discretion as he think is fit.
10. (a) **Re-tenders should be accompanied by Earnest Money as indicated in Schedule attached. The Earnest Money will be forfeited if you fail to complete the contract according to your tender, if accepted. Re-tender without Earnest Money may not be considered.**  
  
(b) Successful Tenderer will be required to pay a sum fixed by the Purchasing officer as security deposit i.e. 2% and enter into agreement for the performance of the contractor.
11. Certified copy of income-tax clearance certificate in the prescribed form should be enclosed with the Re-tender. Quotations received without the above certificate are liable to be rejected.
12. **Samples**: - Tender samples are not required unless specifically called for. Quotations without samples where samples are specifically called for are liable not to be considered.  
Samples should be affixed with a label showing:-
  - (a) Name and address of the firm
  - (b) Tender No.
  - (c) Opening date of tender.
13. Tenderers convicted of an offence under the Bombay Prohibition Act, 1949, or the Bombay Opium Act, 1936, will be considered ineligible for being given contracts.
14. **Release of controlled materials** – Tenderers who do not stipulate conditions regarding release of controlled materials may be given preference.
15. **Extension of time** –
  - i) As soon as it is apparent that contract dates cannot be adhered to, an application shall be sent to the purchasing officer.
  - ii) Without prejudice to the foregoing rights, in such failure to deliver in proper time as aforesaid shall have arisen from any cause, which the purchasing officer may admit as a reasonable ground for an extension of the time (and his decision shall be final). He may allow such additional time as he considers to be justified by the circumstances of the case.

- iii) Provided always that any failure or delay on the part of sub-contractors through their employment may have been sanctioned shall not be admitted as a reasonable ground for any extension of time or for exempting you from liability for any such loss or damage, as aforesaid and provided further that no extension shall be allowed unless application for it shall, in the opinion of the purchasing officer (which shall be final) have been made and in his opinion is justified.
- iv) The purchasing officer, reserves the right to call for break-up of the quotation where necessary.

16. **General Instructions:-**

- (1) Priced Tender Form should be returned duly filled in, failing which tender will not be considered.
- (2) Tenderers should submit their quotations in duplicate.
- (3) S.T. & G.T. should be clearly stated failing which it will be taken as inclusive of all taxes.
- (3-A) Any statutory increase, or decrease, as an act of States or the Central Government relating to Sales and other Taxes shall be to the account of the purchaser by a contractor.
- (3-B) **Fall Clauses** – It is a condition of the contract that all through the currency thereof, the price at which you will supply the stores should not exceed the lowest price charged by you to any customer during the currency of the rate contract and that in the event of the prices going down below the rate contract prices you shall promptly furnish such information to us to enable to amend the contract rates for subsequent supplies.
- (4) Tenderers not on the register of this office should deposit in this office as Earnest Money an amount equivalent to 1 percent of the value tendered and requisite D.D. submitted along with the tender failing which the tender will be rejected forthwith.
- (5) Exact earliest and clear delivery period should be quoted.
- (6) It will be the responsibility of the Tenderer to inform this office within the validity period of the quotation in the event of the stores offered ex-stocks being sold elsewhere. Failure to comply with this instruction shall be construed to mean that the stores are available ex-stock during the validity period.
- (7) Tenderers should indicate the rates in Metric System of Weights and Measures only.
- (8) Tenderers may quote rates for equivalent makes, store also and should indicate specifically the make of spare parts, i.e. genuine, imported equivalent make or indigenous. They are required to give guarantee for premature wear, exact fitness and satisfactory performance of the parts, offered other than the genuine (original manufacture of the machinery).
- (9) Ex-stock offer or those on Tenderer's own import license will only be preferred.

(10) Tenderers should state the place of inspection of the stores offered, if the goods are offered for inspection outside Maharashtra State the Tenderers will have to bear all expenditure of inspection carried out by this office.

N.B. - Special consideration would be given in the case of Tenderers quoting the requirements of Maharashtra Government with Indian Standards Specifications and those with quality markings.

Goods should be dispatched at carrier's risk failing which they should be properly covered by transit insurance. However, the supplier will be responsible until the entire store contracted for arrival in good condition at destination.

(11) Please note that Tender Form should be filled in serial order of item Nos. 1,2,3 etc. and rates accordingly typed in **Schedule B of column No.4** of the printed Tender Form in original and also on the counterfoil the rate of each item and other details should be given as required under each column. If the specifications are different than those prescribed in the tender, they should be shown on a separate page but rates for these items should be indicated on the printed form. Same procedure should be followed for alternative tender for the same item.

(12) Samples for the quoted items must be submitted along with tender.

(13) Samples destroyed in tests will not be returned and no payment made thereof.

(14) Offers of Small Scale Industries quoting their registration number with the Directorate of Industries, Maharashtra and National Small Scale Industries Corporation (Government of India) shall be only for items of approved programme of manufacture of the contesting Small Scale Industries Unit. Likewise the offers of state Industrial Co-operative Associations, Maharashtra State shall be on behalf of the member Industrial Co-operative Societies only and those of M.S.S.I.D.C. shall be on behalf of S.S.I. Units registered with the Directorate of Industries of Maharashtra State and restricted to products of their own manufacture.

Note: - (1) Tender Samples – Analysis Reports on Tender on Tender Samples will not be furnished to tenderers.

(2) **Quotations offered by Tenderers** – Tenderers should, if not in a position to quote for entire quantity and for delivery as required, state specifically the quantity which they can deliver at the prices quoted and according to the required delivery. Silence on the point will entail responsibility for supply at quoted prices in full quantities as per required delivery.

(3) **Packing** – Packing proposed to be employed should be clearly stated giving details of the charges for all alternative packs.

(4) Failure to observe any of the conditions mentioned above will result in the quotations being summarily rejected.

# INSTRUCTIONS TO THE TENDERER

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**: INSTRUCTIONS TO THE TENDERER:**

***Please do not forget to Attach:***

1. Demand Draft of State Bank Of India in drawn in favor of The PRINCIPAL, Institute of Petrochemical Engineering, Lonere – Mangaon for the amount of **Rs.5000/-** against Earnest Money Deposit.
2. Attested copy of Sales Tax (GST) Registration Certificate should be attached.
3. The vendor should have at least ten years experience in manufacturing such type of equipments and should have supplied to reputed institute/industries. Attach experience certificate of the same.
4. Exemption for EMD and tender cost will be given on provision of attested valid NSIC/SSI certificate with the tender.

**IMPORTANT NOTE:**

Please do note that omission to attach any of the above listed documents shall cause rejection of Tender.

**PRINCIPAL**



**INSTITUTE OF PETROCHEMICAL ENGINEERING**  
**(DR.BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,)**  
**LONERE –402 103, Tal. Mangaon, Dist. Raigad**  
**Website: www.iopelonere.com, Email: iopelonere@rediffmail.com**

**: RE-TENDER NOTICE: No. 01/2017-18 :**

Sealed Re-tender in B-1 form are invited by the undersigned from the manufacturers or authorized dealers for the supply of Chemical Engineering Lab Equipments.

Blank Re-tender forms will be issued in this office from 07.02.2018 to 07.03.2018 during 10.00 a.m. to 03.00 p.m. on working days on payment of **Rs. 500/-** to be paid online. Alternatively the form can also be downloaded from our website. However a D.D drawn in favor of **‘The Principal, Institute of Petrochemical Engineering, Lonere. Dist Raigad. Maharashtra.’ Payable at Mangaon (Code 0276)** is to be attached along with the tender document in envelope I. Last date of receipt of completed tender forms is 07.03.2018 up to 1.00 p.m. Probable Date of opening of the tenders is 07.03.2018 at 3.00 p.m. Right to reject any or all tenders without assigning any reason there of is reserved by the competent authority.

PRINCIPAL

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**INSTITUTE OF PETROCHEMICAL ENGINEERING  
LONERE –402 103**

**INVITATION OF TENDER  
DETAILED RE-TENDER NOTICE**

- 1) Sealed Re-tender in B-1 form are invited from Manufacturer/Authorized Dealer who has registered themselves with the appropriate class under the systems.
- 2) Re-tender form, the conditions of the tenders, specifications can be had on cash payment of **Rs. 500/- ( Non-refundable ) per set from the office of the PRINCIPAL, INSTITUTE OF PETROCHEMICAL ENGINEERING , Lonere, Tal.Mangaon, Dist Raigad on any working day from 07.02.2018 to 07.03.2018 between 10.00a.m. to 3.00 p.m. the office hours.** The Re-tender forms duly completed shall be received in the office of the PRINCIPAL, INSTITUTE OF PETROCHEMICAL ENGINEERING, Lonere, Tal. Mangaon, Dist. Raigad upto date 04.09.2017 up to 01.00 p.m. The Re-tender shall be opened 07.03.2018 at 03.00 p.m., if possible, in the presence of such indenting tenderer or his / their representative who may present at that time. Re-tenders sent by post shall be sent well in advance by registered post and must reach by the above time & date. For late delivery by postal or any other authentic mailing services, the institute shall not be responsible.
- 3) The Re-tenders should be accompanied by the D.D. of State Bank of India, on Mangaon Branch in favor of The PRINCIPAL, INSTITUTE OF PETROCHEMICAL ENGINEERING, Lonere, Tal.Mangaon, Dist Raigad as earnest money deposit.
- 4) **Earnest money in any other form of cash, Term deposit or Cheque shall not be accepted.**
- 5) The amount of earnest money shall be forfeited; in case of successful manufacturer/dealer/supplier does not pay amount of initial security deposit within the time stipulated by the Principal and complete the tender documents. In all other cases, the earnest money shall be refunded.
- 6) **The successful tenderers shall have to pay the security deposit in cash i.e. @ 2%.**
- 7) The event of the failure of the tenderer to pay cash security deposit within ten days (unless extended by the Principal in writing) from the date of receipt of the notice of acceptance of the tender, the earnest money shall be forfeited to the Institute and the acceptance of his tender shall be considered withdrawn. Except that in the event of the notice of acceptance of the tender not being issued within 90 days of the date of opening of the tender, the tenderer shall have to option (to be intimated in writing in good time before the expiry of 90days period) of withdrawing his tender in which case the earnest money shall be refunded in full. All the tenders shall remain open for the period of 90 days from the date fixed for the opening of the tender and thereafter until it is withdrawn by the tenderer by notice in writing.
- 8) Earnest money of the unsuccessful tenderers will be refunded on their application only after an intimation of rejection of their tender is sent to them or on expiry of the validity period whichever is earlier.
- 9) No pages shall be removed from or replaced in the tender.

## Tendering Procedure:

- 1) Blank Re-tenders can be purchased from the office of The PRINCIPAL, INSTITUTE OF PETROCHEMICAL ENGINEERING, Lonere.
- 2) **Manner of submission of the tender and its accompaniments:**  
Tenderer should submit the Re-tender in two separate sealed envelopes as detailed below.
  - A. Envelope No. I (Documents): The first envelope clearly marked as **Envelope No 1 shall contain the following documents.**
    - a) D.D. of State Bank of India for the amount of the Earnest Money deposit.
    - b) An up to date Income Tax clearance certificate in original , from Income Tax Officer of the Circle or true copy there of duly attested by a Gazetted officers, valid on the date fixed for the receipt of the tender, unless specifically exempted in this respect by the Government.
    - c) **Sales Tax registration and clearance certificate should be attached.**
    - d) **Attach** experience certificate of at least 10 years in the manufacturing such type of equipments and should have supplied to reputed institute/industries.
    - e) attested copy of ISO 9002 Certification.
  - B. **Envelope No. II : ( Re-tender )** : The second envelope marked as Envelope No.II shall contain only the main tender including the stipulations issued by the Institute after the last date of sale of Tender forms. A tender submitted without this would be considered as invalid. The tenderer should quote his offer on schedule B of the tender documents to be submitted only in envelope II. He should not quote this offer any where directly or indirectly in Envelope No. I. The manufacturer / dealer / supplier shall quote for the supply of equipment as per the details given in the main tender and also based on the detailed set of additional stipulations issued by the Institute as informed to him by letter from Institute, after the last date of sale of tender forms.

## **Submission of Re-tender:**

- 3) The two sealed envelopes no. I and II shall be again put together in one common cover and sealed. This sealed cover shall be marked on the left hand top corner “Re-tender for the supply of “Chemical Engg. Lab Equipments”. The full name and address of the tenderer and the name of the Authorized agent delivering the sealed cover containing the tender shall be written on the bottom left hand corner. If submitted by Post, the sealed envelope marked as above shall be enclosed in another cover properly addressed and shall be sent by Registered Post. The date and time for the receipt of envelope containing tender shall strictly apply in all cases. The tenderers should ensure that their tender is received by the, PRINCIPAL, INSTITUTE OF PETROCHEMICAL ENGINEERING, Lonere. before the expiry of the date and time. No delays on account of any cause will be entertained for the late receipt of the tender. Tender offered or received after the date and time is over will either not be accepted or if inadvertently accepted will not be opened and shall be returned to the tenderer unopened.

While submitting your tender, the following procedure may please be observed and other points bore in mind.

01. The maker’s name must be specified.
02. The “Terms and conditions” for supply and delivery of stores, should be clearly indicated in the tender, stating whether rates quoted are, inclusive of all Taxes, Packing and forwarding charges freight charges etc. not,

**However rates offered as including all taxes will be more welcome.**

03. Please mention clearly whether consignment would be Ex-Godown, Ex-shop or F.O.R. dispatching stations. Preferably terms offered as “delivery of consignment of stores, on F.O.R.
04. Re-tender received after the stipulated date and time may not be taken into consideration.
05. Items tendered should confirm to the specification shown in the attached list when and where, full or no specifications are indicated against items in the list. Kindly furnish your full specification in accordance with accepted standards against each item tendered. Where reference to catalogue is made, the relevant catalogues / pamphlets / Literature should accompany the tender.
06. Your Re-tender should be for all new items and not for second hand.
07. Please state whether items will be available Ex-stock, If not the minimum period for delivery, or for supplying the items or stores.
08. It should be clearly stated whether , Excise duty, Sales Tax (VAT), General Tax, Central sales Tax , Insurance Freight or Packing and Forwarding charges, or any other taxes and duties etc. livable.
09. It would be appreciated if illustrated catalogues/ Literature etc are furnished with the quotation.
10. Expression such as “Complete with standard Equipment” complete with standard accessories Equipment to as good as should be avoided. If at all their use is unavoidable then it should be very specifically indicated as to what exactly they mean and what exactly would be supplied under them. Any ambiguity or vagueness should be avoided.
11. A declaration in form I will be issued for Sales Tax concession for sales of scientific instruments by a Registered dealer, as per Provision made under Bombay sales Tax-Act 1959 , vide section 41, at entry No STA – 1095 / 37 / Taxation 2, dated 22<sup>nd</sup> September, 1935 . If a change in declaration in form I will be issued according to the instructions issued by the Maharashtra Govt. time to time.
12. Institute Of Petrochemical Engineering is part of DR. Babasaheb Ambedkar Technological University and this University is registered with the Department of Scientific & Industrial Research (DSIR) for purposes of availing customs duty exemption in terms of Government Notification No.51/96-Customs dated 23<sup>rd</sup> July 1996 and central excise duty exemption in terms of Government Notification No.10/97-Central Excise dated 1 March 1997.

**Opening of Re-tenders:** - On the date specified (if possible) for the opening of the following procedure shall be adopted for the opening.

- a) Envelope No. I: First of all, Envelope No. I of the tender will be opened to verify its contents as per the requirement. If the various documents contained in this envelope do not meet the requirements of the Institute, a note will be recorded accordingly by the tender opening authority and the said tenderer, Envelope, No.II will not be considered for further action but the same will be recorded.
- b) Envelope No.II: This envelope shall be opened immediately after the opening of the envelope No. I only if the contents of the Envelope I are found to be acceptable to the Institute, the tender rates in **schedule B** shall then be read out.

### **Acceptance of Tender:**

01. Acceptance of Re-tender may be communicated to the supplier by Fax or E mail or by Telephone or otherwise by The Principal, Institute Of Petrochemical Engineering, Lonere.
- 01 The right of not accepting the lowest offer is reserved with The Principal, Institute of Petrochemical Engineering, Lonere. The acceptance criterion of the tender contains the following procedure.
  - a) Full technical specification of the proposed equipment to be submitted alongwith the tender.
  - b) Please see “**Submission of Re-tender” (01 to 11)**.
  - c) Financial offer.
02. A conference if required shall be called by the Principal to negotiate or ascertain the financial offer given by the tenderer in comparison with the sub clauses mentioned above and the tenderer shall be informed well in advance regarding the date, time and venue of the conference.
03. The right to accept or reject any or all the tenders without assigning any reason thereof is reserved with the Principal , Institute Of Petrochemical Engineering , Lonere.

### **PAYMENT:**

**100% payment will be released within 30 days after proof of inspection, physical verification and satisfactory installation of Equipments at workplace.**

## SCHEDULE B

Sr.No.	Name of the Equipment	Qty.	Rate per Unit in Rs.	Total Amount in Rs.
<b>01.</b>	<b>Thermal Conductivity of Metal Rod Apparatus</b>	<b>01 No.</b>		
<b>02.</b>	<b>Pin Fin In Natural/Forced Convection Apparatus</b>	<b>01 No.</b>		
	<b>OR</b>			
	<b>Forced Convection From Horizontal Cylinder Apparatus</b>	<b>01 No.</b>		
<b>03.</b>	<b>Emissivity Measurement Apparatus</b>			
<b>04.</b>	<b>Pool Boiling Apparatus</b>	<b>01 No.</b>		
<b>05.</b>	<b>Valves Piping and fittings Models</b>	<b>01 No.</b>		

**NOTE:**

- 01 The rates must be quote in accordance with detailed technical specifications.**
- 02 The rates inclusive of all taxes, , packing and forwarding charges, freight charges etc.**
- 03 100% payment will be released within 30 days after proof of inspection, physical verification and satisfactory installation of Lab Equipments at workplace.**

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Seal & Sign of Supplier

# TECHNICAL SPECIFICATIONS

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## HEAT TRANSFER LAB EQUIPMENTS

Sr. No.	Name of item
1.	<p><b>Thermal Conductivity of Metal Rod Apparatus</b> Apparatus is used to calculate the thermal conductivity of metal rod (Copper).</p> <p><b>Experimental setup consisting of:</b></p> <ul style="list-style-type: none"> <li>➤ Test rod of copper of 12mm dia. and 200mm long.</li> <li>➤ Ring type Heater</li> <li>➤ Cooling chamber of dia 125mm and 50mm long with arrangement for water circulation</li> <li>➤ Shell filled with asbestos insulating powder</li> <li>➤ Set of thermocouples - 6 Nos.</li> </ul> <p><b>Control panel consisting of:</b></p> <ul style="list-style-type: none"> <li>➤ 6 Channels Digital Temp. Indicator range: 0-300°C</li> <li>➤ Dimmer stat : 0-2A / 230V</li> <li>➤ Mains ON/OFF switch</li> <li>➤ Digital Voltmeter 0-250V</li> <li>➤ Digital Ammeter 0-2 A.</li> </ul>
2.	<p><b>Pin Fin In Natural/Forced Convection Apparatus</b> The apparatus is used to calculate the heat transfer coefficient of vertical pin in natural convection / forced convection.</p> <p><b>Experimental set up consisting of:</b></p> <ul style="list-style-type: none"> <li>➤ Vertical pin of dia 12 and 125mm long fitted on a heater.</li> <li>➤ Blower unit with orifice of 14mm and manometer arrangement for flow measurement.</li> <li>➤ Duct of size : 100 X 150 x 500 mm</li> <li>➤ Pin-Fin : Brass</li> <li>➤ Ring type Heater</li> <li>➤ Set of Thermocouples: Cr/Al – 6 Nos.</li> </ul> <p><b>Control Panel consisting of:</b></p> <ul style="list-style-type: none"> <li>➤ 6 Channels Digital Temp. Indicator range: 0-300°C</li> <li>➤ Dimmer stat : 0-2A / 230V</li> <li>➤ Mains ON/OFF switch</li> <li>➤ Air Blower</li> <li>➤ Digital Voltmeter 0-250V</li> <li>➤ Digital Ammeter 0-2 A.</li> </ul>
OR 2.	<p><b>Forced Convection From Horizontal Cylinder Apparatus</b> The apparatus is used to find out the surface heat transfer coefficient for a horizontal pipe flowing heat by forced convection to air flowing through it for different air flow rates and heat flow rate.</p> <p><b>Experimental Setup consisting of:</b></p> <ul style="list-style-type: none"> <li>➤ Horizontal pipe of internal dia 25mm and length 300mm</li> <li>➤ Blower with orifice plate of dia. 15mm and manometer for flow measurement.</li> <li>➤ Long type heater on test section.</li> <li>➤ Set of Thermocouple - 6 Nos.</li> </ul> <p><b>Control Panel consisting of:</b></p> <ul style="list-style-type: none"> <li>➤ 6 Channels Digital Temp. Indicator range: 0-300°C</li> <li>➤ Dimmerstat : 0-2A / 230V</li> <li>➤ Mains ON/OFF switch</li> <li>➤ Air Blower</li> <li>➤ Digital Voltmeter 0-100/250V</li> <li>➤ Digital Ammeter 0-2 A.</li> </ul>



3. **Emissivity Measurement Apparatus**  
 The apparatus is used to measure the emissivity of a metal.  
**Experimental Setup consisting of:**

- Test plate: Polished aluminum of dia 125mm
- Reference plate : black aluminum of dia 125mm
- Wooden chamber with Perspex cover.
- Mica-insulated heaters for black and polished body.
- Set of Thermocouple - 3 Nos.

**Control Panel consisting of:**

- 3 Channels Digital Temp. Indicator range: 0-300°C
- Dimmer stat - 2 Nos. of 0-2A/230V
- Mains ON/OFF switch
- Digital Voltmeter 0-250V
- Digital Ammeter 0-2 A.

4. **Pool Boiling Apparatus (Critical Heat Flux Apparatus)**  
**Experimental setup consisting of :**

- Glass trough
- Stand for glass through
- Band heater test heater assembly.
- Thermometer : 0-100°C
- Magnifying glass.

**Control panel consisting of:**

- Digital Ammeter : 0-2A
- Digital Voltmeter : 0-230V
- Main ON/OFF switch.
- Dimmer stat : 0-8A

- To determine the critical heat flux at different bath temperatures
- To plot the graph of Critical Heat Flux with respective Bath Temperature

5. **Valves Piping and fitting Models**

**Different types Valves**

**\*Specification:**

<u>Sr.NO</u>	<u>Technical Specifications (Size of valves: 1")</u>	<u>Quantity</u>
<u>1</u>	<u>Cut section of different type of valves such as, Ball Valve, Globe Valve, Gate Valve, Butterfly valve, Horizontal NRV, Vertical NRV, Needle Valve, Flow Control Valve, Solenoid Valve, Pneumatic Diaphragm type Equal % Valve.</u>	<u>1</u>

\*Features: -

1. Compact Ergonomic Design.
2. User Friendly, Self Explanatory Systems.
3. Robust Construction.
4. Training Manual for Operation Ease

A) **Different types PVC fittings**

**\*Specifications**

- PVC sewer pipe shall conform to ASTM D3034 (3-inch through 15-inch), ASTM F679 (18-inch through 60-inch), or CSA B182.1 (4-inch through 60-inch).
- PVC fittings shall conform to ASTM 3034, ASTM F1336, or CSA B182.2.
- PVC bell-and-spigot push-on type joints shall be gasketed, conforming to ASTM D3212.
- All PVC sewer pipe and fittings shall be installed in accordance with ASTM D2321 or CSA B182.11

<u>Sr.NO</u>	<u>Technical Specifications (PVC Fittings 1")</u>	<u>Quantity</u>
<u>1</u>	<u>PVC fittings such as Bends, Couplings Repair, couplings Reducer, couplings, Transition couplings, Fittings with service-line branches, Tapping saddles, Spigot-by-spigot adaptor and Deep-socket fittings (controlled-settlement joints)</u>	<u>1</u>

