DELTA T

EVENT DESCRIPTION :

Delta T aims to bring out ideas of innovative heat exchanger design and its application in industries. The participants are required to construct a working model of a heat exchanger to effectively transfer heat from a hot source to cold sink using a secondary heat transfer fluid without direct contact.

The good old mud pot has amused us for ages, an incredible technology. It's time for you to enter the kelvin-league. Impress us with your innovative design and incredible thermodynamic skills.

FORMAT:

The event will be conducted in two stages:

Stage I

The participants will have to submit an abstract of the design in the specified format. Last date for abstract submission is 15th February 2015.

Stage II

Shortlisted teams must bring their working models on the day of the event for testing. The model will be put to test and judged based on the judging criteria mentioned.

RULES :

- Maximum 3 persons per team.
- Each team will be provided with 2 litres of Process fluid at room temperature and 2 litres of water at elevated temperature (60-70 ^{o}C).

- Chemical and Physical composition of the process fluid will not be revealed to the participants at any point of time. Participants are expected to design the heat exchanger such that it will solve the usual problems faced in a heat exchanger. Hint: Foaming, evaporation etc.

- The third thermal fluid (chemical X) will be provided on the day of the competition. The maximum amount of the third fluid that will be provided is 1 litre. All participants will be given the same third fluid and it will be at room temperature. The nature of the third fluid (chemical X) will be disclosed on the day of the competition.

- Oral questions regarding the design will be asked for all participants.

- While writing the abstract, participants are requested to give the specific dimensions of their heat exchangers (eg: if a cylindrical heat exchanger is used then the height and radius of the cylinder must be mentioned).

- The area occupied by the design should be within 1.5m X 1.5m.

- The fluids should not be contaminated before, during or after the heat exchange process. Points will be deducted if there is any volume loss in the fluids provided.

- Process fluid discharge from the cold sink should be provided in such a way that the water can be collected in a container with insulating walls. The temperature of process fluid will be measured from that container.

- The entire process should be completed in the least time possible (which should not exceed 15 min).

- No other heating/electrical devices allowed. Exothermic reactions should not be used.

- Mixing of fluids is not allowed.

- Unwanted and unnecessary actions or behaviour by participant shall not be tolerated, and will lead to disqualification of the team.

- Marks will be deducted for any actions violating the above rules.

- Judge’s decision is final.

JUDGING CRITERIA :

- Elevation in the temperature of the cold sink (Process fluid) initially given at room temperature.

- Heat transfer area. Will be calculated on the day of the competition by the organizers.

- Time taken for the entire process.

- Originality and innovation in design.

- Volume loss (least).
- On spot problem solving skills.
- The third thermal fluid (chemical X) will be provided on the day of the competition. The maximum amount of the third fluid that will be provided is 1 litre. Participants who use less than the maximum amount will be awarded extra points. The lesser the amount of third fluid used, the more will be the extra points that are awarded. For the convenience of the participants, it can be assumed that the third fluid (Chemical X) has properties (viscosity, density, etc.) similar to that of water. This assumption is for design purposes only (the third fluid may or may not be water).

PROBLEM STATEMENT:

In an Industry the process fluid needs to be preheated. In another process hot liquid is rejected .Now as an Engineer you are required to design a heat exchanger to efficiently transfer heat from the hot liquid to the process fluid using a third chemical X which will be provided by us.

FAQ:

1. Is it maximum of 3 people or strictly a team of 3?

It is a maximum of 3. But no special credit for teams with lesser participants.

2. Are UG-PG collaboration teams, cross college teams allowed?

Yes

3. Is any registration fee required?

Nope. Except for registration in Pragyan, no special fee is needed

If there are any queries regarding the problem statement, mail them to deltat@pragyan.org

RESOURCES:

https://www.youtube.com/watch?v=mEExlOX458Y

PRIZE MONEY: Worth INR 30,000

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