|  |  |
| --- | --- |
| **logo** | **E**astern **M**editerranean **U**niversity **D**epartmentof **M**echanical **E**ngineering **L**aboratory **H**andout |

**COURSE: Thermodynamics I** (**MENG 245) –Group 2**

**Semester: Fall (2017-2018)**

**Name of Experiment:** The Electric Boiler- Take home experiment

**Submission Due : 26th December Tuesday 2017, 5:00 pm (*Reports should be submitted to the lab assistant Gorkem Ozankaya*)**

**Lab Assistant: Gorkem Ozankaya** (e-mail: [gorkem.ozankaya@cc.emu.edu.tr](mailto:gorkem.ozankaya@cc.emu.edu.tr))

**Instructor: Asst. Prof. Dr. Devrim Aydin** (e-mail: devrim.aydin@emu.edu.tr)

Submitted by:

Student No:

Group No:

Date of experiment:

Date of submission:

------------------------------------------------------------------------------------------------------------

**EVALUATION**

|  |  |
| --- | --- |
|  |  |
| **Data , Results & Graphs (50%)** |  |
| **Discussion, Conclusion & Answer to Questions (30%)** |  |
| **Neat and tidy report writing (20%)** |  |
| **Overall Mark** |  |

**Honor Pledge:**

By submitting this report I pledge that I have neither given nor received unauthorized assistance on this assignment.

\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date Signature

1. **Objective and Introduction**

The objective of the steam generator experiment is to practice thermodynamics of evaporation of water and to analyze energy requirement for liquid-gas phase change of saturated steam.

1. **Experimental procedure**
2. Use an electric kettle for boiling the water.
3. Fill the kettle up to a certain volume (between 1-2 liter)
4. Turn on the electricity
5. Measure and record the operational time of the kettle till boiling.
6. **Activities**
   1. **Determination of the power rating of the kettle**

* Measure the initial (T1-before boiling) and final (T2-after boiling) temperatures of water. If you do not have temperature sensor/measurement sensor, please assume T1=20 °C and T2= 100 °C.
* Assume P=constant at 1 atm during the boiling process.
* Assume that in the final state, water is in saturated mixture state and the quality *X*=10%.
* Calculate specific enthalpy of compressed liquid water for initial state (h1) by using equation h = m. cp. T, and calculate the enthalpy of saturated mixture by reading hf and hg values from Thermodynamic Property Tables for the given quality value.
* Measure the kettle operational time during the boiling process.

1. Calculate the power rating of kettle by using the equation below;

Please show / describe all steps used for determination of initial and final enthalpies, measurement of time and calculation of water mass.

1. Show the process on a T-v diagram. Please insert the T, P and v values in the diagram