Eastern **M**editerranean **U**niversity **D**epartment of **M**echanical **E**ngineering **L**aboratory **H**andout

COURSE: **Thermodynamics I (MENG 245)**

Semester: Fall (2018-2019)

Name of Experiment: The Electric Boiler- Take home experiment

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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.

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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.

2. Experimental procedure

1. Use an electric kettle for boiling the water.
2. Fill the kettle up to a certain volume (between 1-2 liter)
3. Turn on the electricity
4. Measure and record the operational time of the kettle till boiling.

3. Activities

3.1. Determination of the power rating of the kettle

- Measure the initial (T_1-before boiling) and final (T_2-after boiling) temperatures of water. If you do not have temperature sensor/measurement sensor, please assume T_1=20 °C and T_2= 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 (h_1) by using equation h = m. c_p. T, and calculate the enthalpy of saturated mixture by reading h_f and h_g 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.

$$w_{electric} = \frac{m_{water} \times (h_2 - h_1)}{\Delta t}$$

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