Eastern Mediterranean University
Department of Mechanical Engineering
Laboratory Handout

COURSE: Thermodynamics I (MENG245) – Group II

Semester: FALL (2017-2018)

Name of Experiment: Absolute Zero of Temperature

Laboratory Date and Place: 18th October 2017, ME025

Instructor: Assist. Prof. Dr. Devrim Aydin
Assistant: Marzieh Rezaei

Submitted by:
Student No:
Group No:
Date of experiment:
Date of submission:

EVALUATION

Activity During Experiment & Procedure	**30 %**	
Data , Results & Graphs	**35 %**	
Discussion, Conclusion & Answer to Questions	**30 %**	
Neat and tidy report writing	**5 %**	
Overall Mark		

Honor Pledge:

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

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Date Signature

1. CONCEPT

1.1. PURPOSE

The Absolute Zero Apparatus is used to experimentally determine the temperature of absolute zero (in degrees Celsius). Absolute zero, by definition, is the point at which a gas exerts zero pressure. The Absolute Zero Apparatus consists of a Fast Response Temperature Sensor and plastic tubing (with pressure connector) mounted into a hollow copper sphere. When the sphere is submerged in a water bath and connected to a temperature sensor, pressure sensor, it will display the temperature and pressure.

1.2. THEORY

For an ideal gas, the absolute pressure is directly proportional to the absolute temperature of the gas.

$$T = \frac{V}{nR} P$$

Thus a plot of temperature vs. pressure will result in a straight line.

$$y = (slope)x + b$$

$$T = \frac{V}{nR} P + 0$$

The slope of the line depends on the amount of gas in the thermometer, but regardless of the amount of gas, the intercept of the line with the temperature axis should be at absolute zero. If we instead plot the temperature in degrees Celsius, the intercept will not be zero, but rather the temperature of absolute zero in degrees Celsius.

2. REQUIRED EQUIPMENT

- Absolute zero apparatus manometer
- Boiling, iced and room temperature water

3. OBSERVATIONS AND READINGS

	Temp	Pressure
Ice water		
Tap water		
Room Temp water		
Boiling water		

4. CONCLUSIONS AND RESULTS