

The first test was focused around analyzing pressure in both static and dynamic fluids through the use of Bernoulli's equation and the gamma-height equation. There are several different course objectives covered in this test. Some of the objectives covered are describing the pressure of a stagnant fluid, explaining the fluid dynamics in pipes and fittings, and applying the principles of conservation of energy and mass. These objectives are observed in the two main systems of the test. First, the piping system and pump cover the object is related to conservation of energy describing pressure of a dynamic fluid. The second component is the U-tube manometer which relates to the pressure of a stagnant fluid.

In comparing my completed test to the provided solutions I was able to identify the mistakes I made. In the first problem, when calculating the energy losses throughout the entire system, I missed several areas for minor losses. I failed to include the elbows, and the inlet/outlet of the pipes. Over the course of 2500 ft of pipe and a 50 ft rise, these minor losses didn't alter the result much, but in a smaller setup this could have dramatically affected the outcome. In the second problem, I struggled in manipulating the gamma-h equation to get the correct solution. I also made an incorrect assumption that the change in pressure in the pipe would be equivalent to the change in pressure of the mercury.

Comparing my results to the grading rubric, which I have included on page 2, the grade should be a 68/90. Including the homework, 10 points would come out to 78%. The writing portion followed the rubric well, but failing to answer the second problem correctly or performing the correct operation, was a major detriment to the overall grade.

I ran into two issues when completing this test. First I missed some of the smaller details of the pump power problem and second, I missed the purpose of what the second problem was looking for. The concepts in this test, selecting the correct pump power and reading pressure differential will be very applicable to my career. Designing systems to deal with pumping fluids, whether water, coolant, or another fluid is very important when working in any sort of factory or general manufacturing facility. My current position involves a great deal of machinery and fabrication methods that generate a great deal of heat. With this, the skills reinforced by this test will contribute to future projects I may be involved in.

WRITING RUBRIC (APPLIES TO THE WHOLE TEST, NOT TO PARTICULAR PARTS)

1. Purpose	0.5/10.0 out of 0.5/10.0
2. Drawings	1.0/10.0 out of 1.0/10.0
3. Sources	1.0/10.0 out of 1.0/10.0
4. Design considerations	1.0/10.0 out of 1.0/10.0
5. Data and variables	0.5/10.0 out of 0.5/10.0
6. Procedure	2.0/10.0 out of 2.0/10.0
7. Calculations	2.0/10.0 out of 2.0/10.0
8. Summary	0.5/10.0 out of 0.5/10.0
9. Materials	0.5/10.0 out of 0.5/10.0
10. Analysis	1.0/10.0 out of 1.0/10.0
TOTAL	10.0/10.0 out of 10.0/10.0

PART 1)

1. Select pipe diameter	1/7 out of 1/7
2. Use Bernoulli's to get h_a (ref & points in pict.)	1/7 out of 1/7
3. Pipe energy losses	1/7 out of 1/7
4. Minor losses	1/7 out of 2/7
5. Pump power with efficiency	1/7 out of 1/7
6. Correct results	1/7 out of 1/7

PART 2)

1. Use geometrical relation	1/6 out of 2/6
2. Use $\gamma \cdot h$ procedure	0/6 out of 1/6
3. Proper manipulation of eqs and solve for "h"	1/6 out of 2/6
4. Correct results?	0/6 out of 1/6

PART 3)

1. Use spreadsheet from previous parts to get pump power (P) for diff Q. Did losses change with Q?	1/5 out of 1/5
2. Plot pump power (P) vs Q	1/5 out of 1/5
3. Read Q for pump power equal to $\frac{1}{2}P$ in part 1	1/5 out of 1/5
4. What is the new manometer reading?	1/5 out of 1/5
5. Correct results?	1/5 out of 1/5