

## FPST 2483 Lab #12 Pump Inspection      Name: \_\_\_\_\_

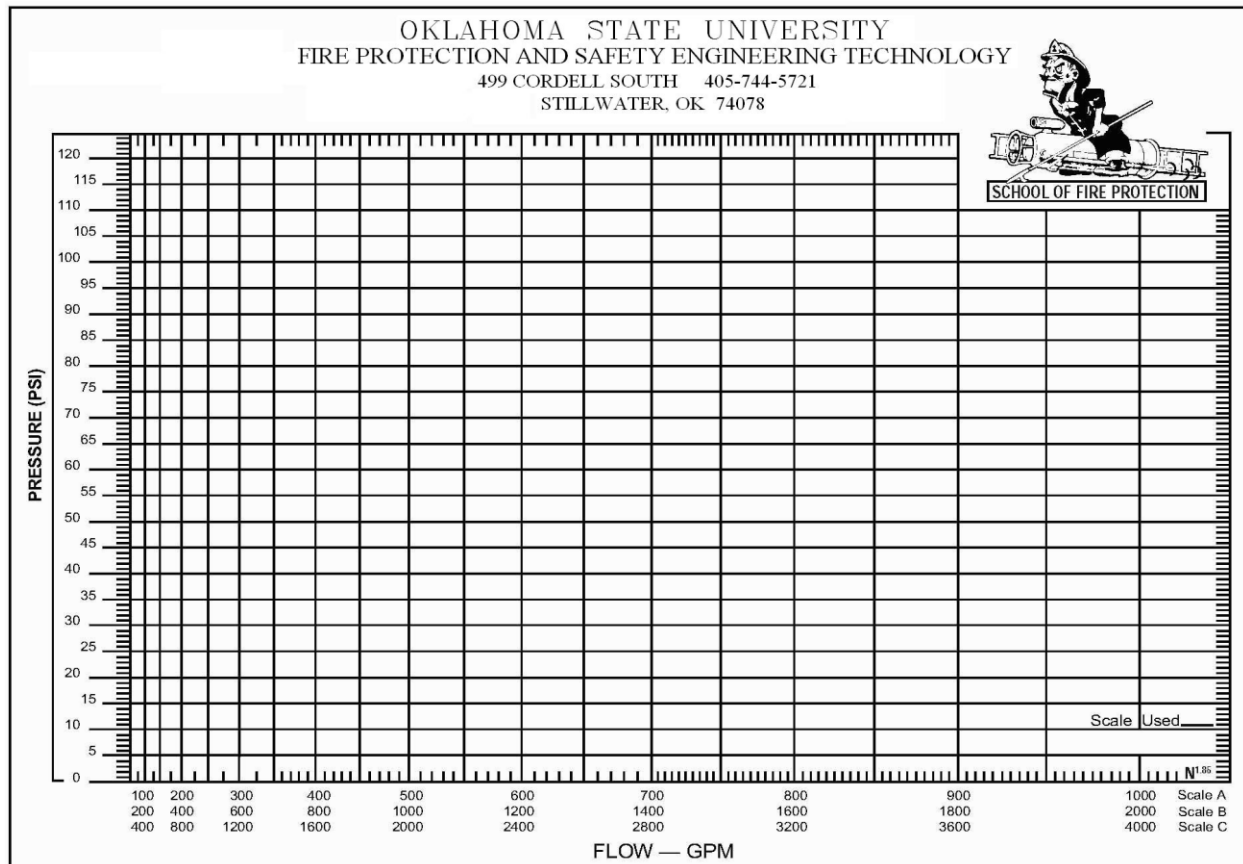
**OBJECTIVE:** After completing this unit the student will be able to graphically depict pump performance and identify standard pump installation components.

Respond as directed to the following questions.

1. On a horizontal - shaft pump, if the discharge gauge reads 123 psi and the suction gauge reads 31 psi, what is the net pressure being developed? Assume the suction lines and discharge lines are the same size.
  
2. If the pump from Problem No. 1 were delivering 1,000 gpm with the gauges reading the same, what would the net pressure be if the suction line is 8 inch and the discharge line is 6 inch? (Be sure to consider velocity pressure in this problem.)
  
3. If the discharge gauge on a vertical-shaft pump reads 78 psi when the distance down to the water surface is 87 feet, what net pressure is being developed? (Ignore velocity pressure.)
  
4. If the pump from Problem No. 3 has an 8-inch discharge pipe and is delivering 1,500 gpm, what net pressure is being delivered if the gauge readings are the same? (This time include velocity pressure.)

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5. Graphically predict the performance of a listed vertical - shaft pump that takes suction from a lake with a surface level 15 feet ***below*** the discharge gauge. Assume that the pump is rated at 80 psi and 1,250 gpm. You may ignore velocity pressure. Plot both gauge level and water level performance.



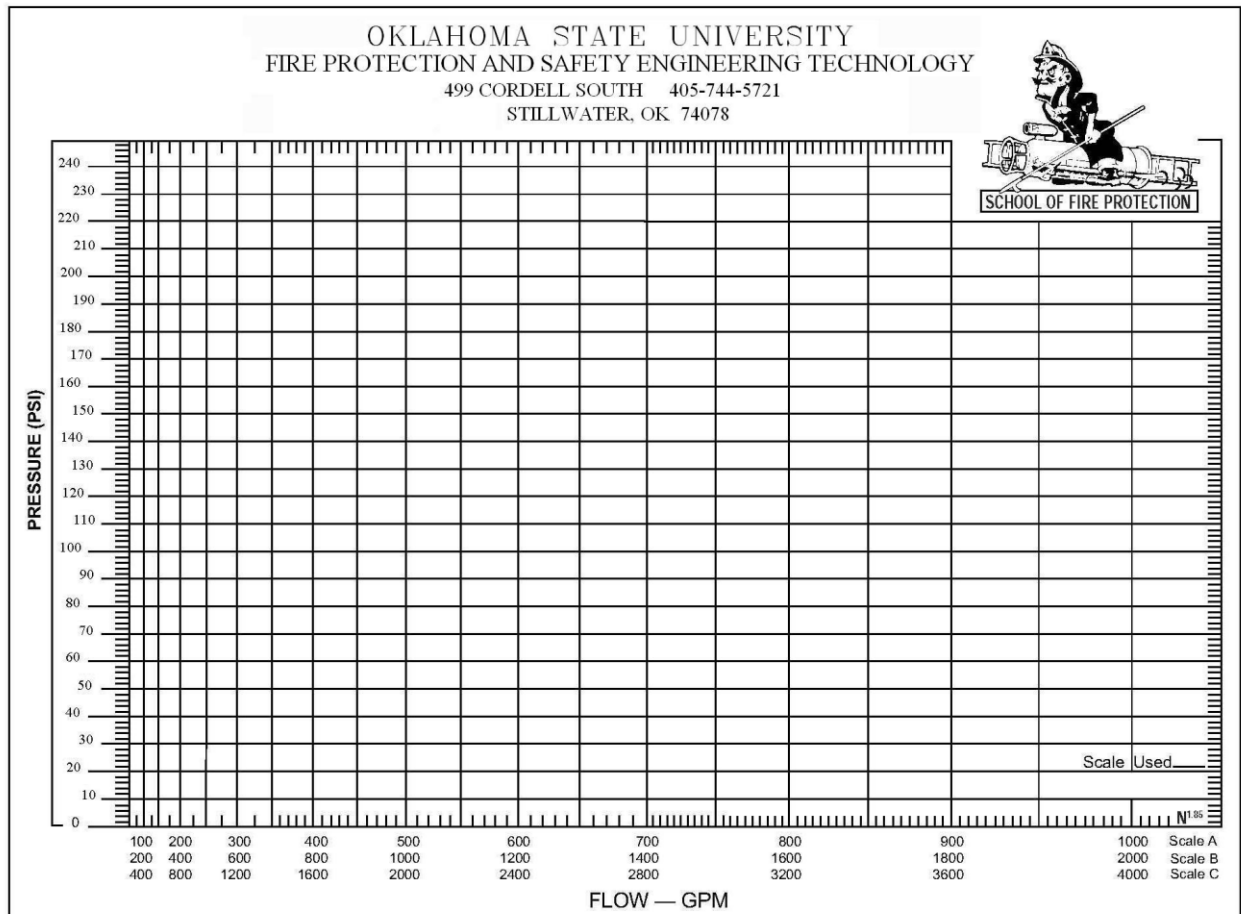
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6. Graphically predict the combined performance of a new 1,000 - gpm fire pump rated at 70 psi when taking suction from a city water supply which yields the following test results:

Static Pressure: 58 psi

Residual Pressure: 34 psi

Measured Flow: 1,130 gpm



7. List all of the types of internal combustion engines currently acceptable for driving industrial fire pumps.

8. List all of the types of drivers considered acceptable for driving industrial fire pumps.

9. How can you tell if a diesel engine is acceptable for driving an industrial fire pump?

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10. Which is the least common acceptable type of industrial fire pump driver?
  
11. Why would it be desirable to have both an electric motor-driven and a diesel engine-driven fire pump protecting the same facility?
  
12. To which NFPA standard must the installation of transformers comply?
  
13. Why is proper orientation of the eccentric reducer in the horizontal pump suction line important?
  
14. What are the minimum acceptable sizes of the suction and discharge lines on a 1,500-gpm horizontal-shaft pump?
  
15. What is the minimum acceptable size of the discharge line on a 1,500-gpm vertical-shaft pump?
  
16. Discuss the difference in function of the large relief valve, as found on diesel-driven pumps, and the smaller circulation relief valve, as found on electrically driven pumps. What is the purpose of each?
  
17. In a piping arrangement supplying a horizontal-shaft pump, what would be the purpose of a by-pass pipe around the pump?
  
18. What is a jockey pump used for?
  
19. Where is the preferred location of the diesel fuel storage tank? Why is this location permitted since diesel fuel is a combustible liquid?

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20. How many 2 1/2-inch hose connections would you expect to find on a test header for a 1,000-gpm pump?
21. What is the required minimum pipe diameter of the test header line from a 500-gpm pump?
22. What is the advantage of a liquid-filled pressure gauge?
23. Which type of indicating control valve is required on the suction line in a horizontal pump installation? Why are other types not permitted?
24. What is the preferred type of construction for a pump house?
25. Why is a circulation relief valve not required on a diesel-driven pump?
26. In what situation might a large pressure relief valve be required on an electrical motor-driven pump?
27.     For a horizontal-shaft pump rated at 1,000 gpm:
- a.     What is the minimum acceptable diameter of the suction line?
- b.     What is the minimum acceptable diameter of the discharge line?
28.     Why should at least 20 psi be maintained in a water supply system?

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29. Determine the maximum gpm rating of horizontal pumps that should be used with the following water supplies:

- a. Static Pressure: 48 psi  
Residual Pressure: 16 psi  
Measured Flow: 850 gpm
  
- b. Static Pressure: 93 psi  
Residual Pressure: 16 psi  
Measured Flow: 1,850 gpm
  
- c. Static Pressure: 74 psi  
Residual Pressure: 36 psi  
Measured Flow: 2,775 gpm

