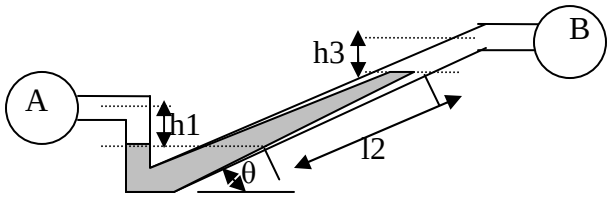
Purdue University
School of Nuclear Engineering

NUCL 355 - Nuclear Thermal-Hydraulics Laboratory

Spring 2011

Prelab HW 1: Basic Hydrostatic Pressure and Manometer Experiments

1. a. The inclined tube manometer shown below is used to measure the air pressure in pipe A. The gage fluid is water, θ is 30°, and pipe B contains air at atmospheric pressure. Determine the air pressure in pipe A when the differential reading, l2, is 0.25 m.



   b. What is the advantage of having an incline in the tube used to measure deflection, instead of measuring the deflection in a vertical tube?

2. The hydraulic press, or hydrostatic press, was invented by Joseph Bramah and is therefore sometimes called the Bramah press. It consists essentially of two cylinders each filled with liquid and each fitted with a piston; the cylinders are connected by a pipe also filled with the liquid. One cylinder is of small diameter, the other of large diameter.
   a. If the smaller piston has an area of 4 sq in. and a force of 80 lb is exerted on it, calculate the force on the larger piston having an area of 100 sq in.
   b. If the smaller piston moves downward five inches, how will the larger piston move?
   c. What conservation law is being satisfied for this relative movement?
   d. What is the great advantage of this press?