

Problems

Fluids - 2

The elbow below is a cut section of a pipe that weighs 10 lbf. It contains a volume of 1 ft³ water, with an attached manometer containing fluid with a density twice that of water. The pressure at the inlet is 200 lbf/ft². Density of water is 62.4 lbf/ft³.

1. **(90 points)** Assume inviscid flow, calculate the resultant anchoring force (in lbf) required to hold the elbow in place, ignoring the mass of the manometer. Give both the magnitude and direction of the force. State all your other assumptions. Clearly label your x- & y-axis and your control volume.

2. **(10 points)** Now including viscous effect. What additional information(s) you would like to have in order to calculate the force for part 1. Will the force be higher or lower, why?

