FLUID FRICTION LAB

DRAFT

MET 3101

1. AFTC.
2. Control module ON.
3. AB 1 ON.
4. Open all valves on left array and V22. Pump ON. START . Flush air from lines.
5. Install thumb drive and select Drive f. Okay data collection.
6. Select PIPE TYPE Rough Pipe 17 mm. Set line 1 valve OPEN. Close other valves. Valve adjustments should be done slowly. Connect manometer to tapping points.
7. Set Rotameter 600L/h using V22.
8. Open manometer petcocks slowly.
9. COLLECT DATA. Thirty second interval.
10. Record ROTAMETER & FLOWMETER. Set manometer position sensors. Computer will log SPD1, SPD2, SPD1 – SPD2, and SC1 (gpm). You can log representative data using the “Select Data” button.
11. Select three additional flow rates using V22. Watch levels to ensure manometer capacity is not exceeded.
12. CLOSE manometer petcocks.
13. CHANGE TEST COMPONENTS. Select SMOOTH pipe 16.5 mm. Adjust array valves slowly. Connect tapping points. Set Rotameter to 600L/h using V22. Repeat the previous data collection using this line. You may select different flow rates as long as you do not exceed the capacity of the manometer. Close manometer petcocks.
14. CHANGE TEST COMPONENTS. Select GATE Valve. Adjust array valves. Connect tapping points. Set the Rotameter to 1000 L/h. Set GATE valve wide open. Collect data. Close valve one full turn; collect data. Repeat for two and three full turns; collect data. Close valve 3.5 full turns; collect data. Make valve adjustments slowly, ensuring the manometer capacity is not exceeded. Close the manometer petcocks.
15. CHANGE TEST COMPONENTS. Select the DIAPHRAM valve. Start with wide-open diaphragm valve and the Rotameter at 2000 L/h. Data for the DIAPHRAM valve should be collected for wide-open, one full-turn, two-full turns, and 2.5 full-turns. Make valve changes cautiously to avoid exceeding the capacity of the manometer.

Report:

1. Use the data from the two straight pipes to calculate friction factors and relative roughnesses. Compare the lab data with Mott values.
2. Use the data from the two valves to calculate loss coefficients and compare lab values with published values.
3. Offer any comments and suggestions to improve the value of this lab.
4. Share the data from the thumb drive, f.

System Data

1. Wide–open gate valve: 4.4 turns.
2. Wide–open diaphragm valve: 4.6 turns.
3. Pipe diameter for GATE valve: 17mm.
4. Pipe diameter for DIAPHRAM valve: 20mm.