Josh Whitehead
U1069343
ChEn 3353

Homework 9
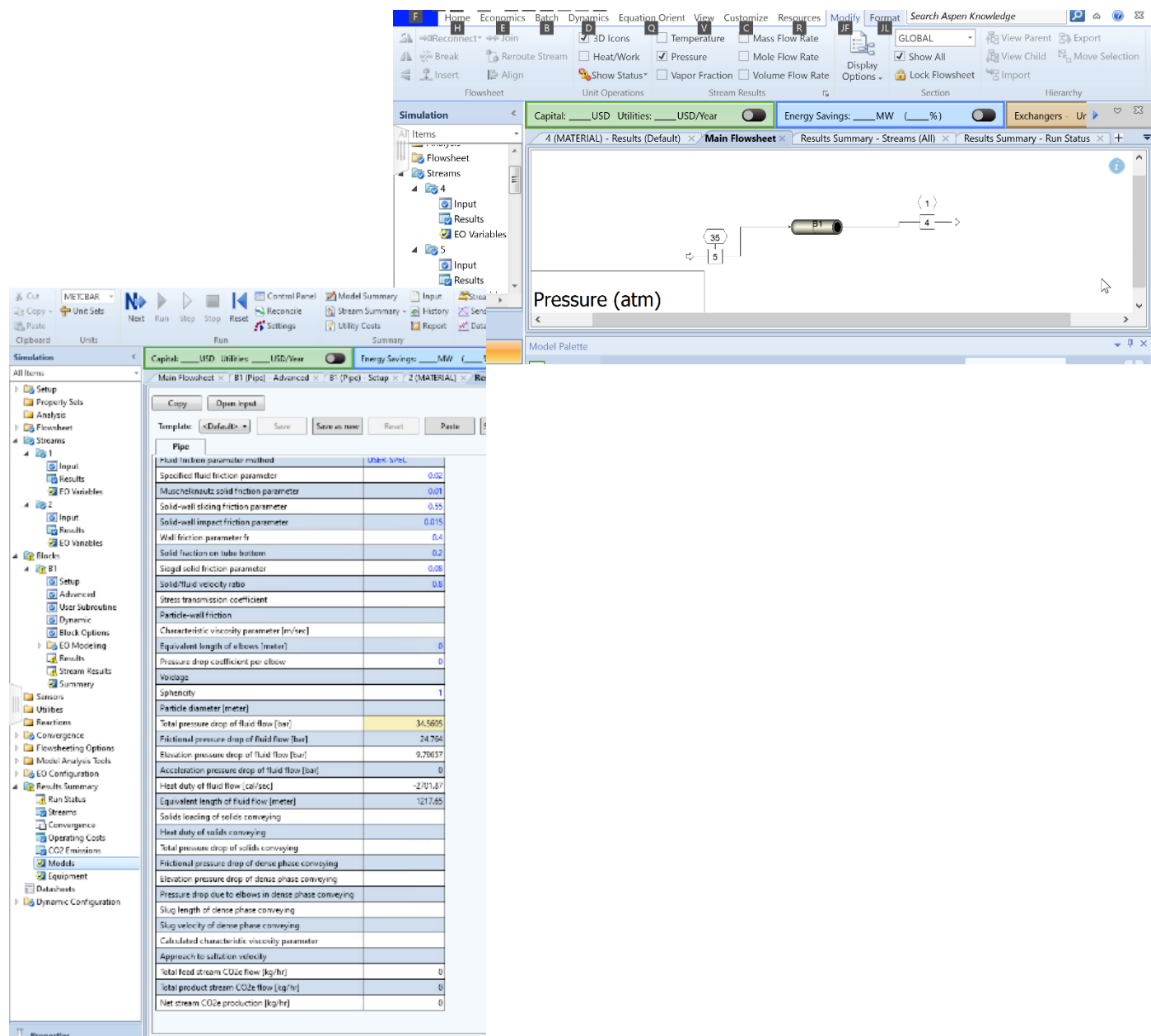
Problem 1

Using:

$$\sum K = 11.1$$

$\epsilon = 0.26$ mm

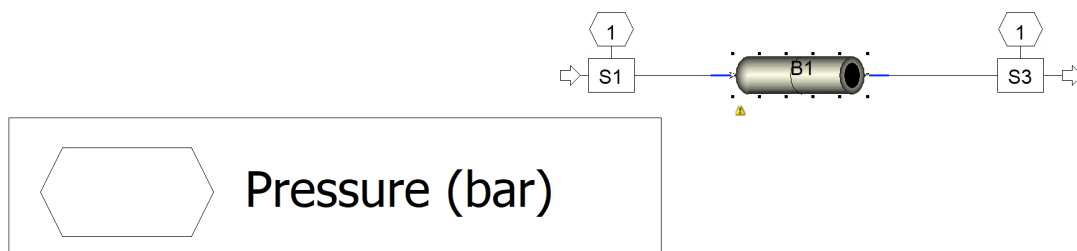The inlet pressure was calculated by Aspen to be 35.1 atm

Problem 2

H$_{pump}$=450 ft

$$P = \frac{1.94*32.2*3*450}{.75} = 112200 \qquad \longrightarrow \qquad 112200/550 = 204hp$$

Pressure (bar)

Capital: _____USD Utilities: _____USD/Year	Energy Savings: _____MW

B1 (Pipe) - Setup × | Results Summary - Run Status × | Main Flowsheet × | Result

Copy | Open Input

Template: <Default> ▾ | Save | Save as new | Reset | Paste

Pipe

Total pressure drop of fluid flow [bar]	-0.00647493
Frictional pressure drop of fluid flow [bar]	9.83977
Elevation pressure drop of fluid flow [bar]	-9.84624
Acceleration pressure drop of fluid flow [bar]	0
Heat duty of fluid flow [cal/sec]	-19965.8
Equivalent length of fluid flow [meter]	609.6

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Problem 3

Using k=4.5:

Re = 12000, Flow is Turbulent

Total head drop = 36*12 = 432 ft