

MET330 Test 3: Problem 2

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Input Data		
Specific Weight=	62.4	lb/ft3
Kinematic Viscosity=	1.21E-05	ft2/s
DeltaP=	12095.9	lb/ft2
Pipe length = L _{III} =	900	ft
Pipe length = L _{II} =	900	ft
Pipe length = L _I =	600	ft
D _{III} =	0.1142	ft
D _{II} =	0.1558	ft
D _I =	0.1558	ft
Wall Roughness=	5.00E-06	ft
K elbow=	30	fT
Le/D tee 1, 2=	60fT	20fT
D _{III} /e=	22840.00	
D _{II} /e=	31160.00	
D _I /e=	31160.00	
g=	32.2	ft/s2
Density, p =	1.94	slugs/ft3
Area, A _I =	0.01907	ft2

ITERATION 1

f_{III}= 0.018
f_{II}= 0.018
f_I= 0.018

(NEW)					
Sub-Iteration	V _I (ft/s)	V _{III} (ft/s)	V _{II} (ft/s)	V _I (ft/s)	%diff V _I
1	7.591300	7.72934876	9.028139328	13.17856773	73.60%
2	10.384934	5.933026148	6.930099707	10.11595676	-2.59%
3	10.250445	6.046242669	7.062331248	10.30898217	0.57%
4	10.279714	6.021909801	7.033911591	10.2674965	-0.12%
5	10.273605	6.027002169	7.039859239	10.27617859	0.03%
6	10.274892	6.025930108	7.038607122	10.27435081	-0.01%
7	10.274621	6.026155524	7.038870397	10.27473513	0.00%

NEW f _{III}	NEW f _{II}	NEW f _I	Re _{III}	Re _{II}	Re _I
0.02036	0.01842	0.01709	5.69E+04	9.06E+04	1.32E+05

New Total Flow Rate, Q_I = 87.9767 gpm
Expected Increase, Delta Q = 22.9767 gpm

Based on my calculations, the new total flow rate for the modified system design would be 87.9767 gpm. This means that the expected increase in total system flow rate after adding the parallel branch would be roughly 22.9767 gpm, given that pressure remains constant from the previous design.

