

Fluids Test 3 Problem 2 Ben Smithson

Topic	Calculations	Units
Given		
Delta P=	11462.15	lb/ft ²
y=	62.4	lb/ft ³
L1=	1500	ft
L2=	900	ft
D1=	0.1558	ft
D2=	0.1142	ft
Le/D Tees	20*Ft	
FT 2inch	0.019	ft
Le/D Tees with K	0.38	ft
Le/D Reducer	0.04	ft
Le/D Elbow	0.6	ft
g	32.2	ft
Kinematic Viscosity =	1.89E-05	ft ² /s
Roughness	1.50E-04	
D1/e	1.04E+03	
D2/e	7.61E+02	
Le/D Tees for Q2	1.14	ft
Le/D Expander	0.34	ft

For Q1

Iteration	F1	Q1 (ft ³ /s)	V1
1	0.01	0.211315	11.08421
2	0.02	0.149422	7.837718
3	0.03	0.122003	6.39947
4	0.025	0.133647	7.010268
5	0.024	0.136403	7.154825
6	0.023	0.139337	7.30871
7	0.0235	0.137846	7.23054

For Q2

Re1	New F1	%diff	Q1 (GPM)	Iteration	F2	Q2 (ft^3/s)	V2
9.14E+04	2.24E-02	-124%	94.84486	1	0.01	0.125462	12.24868
6.46E+04	2.33E-02	-16%	67.06544	2	0.02	0.088715	8.661122
5.28E+04	2.39E-02	20%	54.7587	3	0.03	0.072435	7.071776
5.78E+04	2.36E-02	6%	59.98515	4	0.023	0.082727	8.076538
5.90E+04	2.36E-02	2%	61.22209	5	0.025	0.079349	7.746743
6.02E+04	2.35E-02	-2%	62.53885	6	0.024	0.080985	7.906486
5.96E+04	2.35E-02	0%	61.86996	7	0.0251	0.079191	7.731296
				8	0.0252	0.079033	7.715941

	New		
Re2	F2	%diff	Q2 (GPM)
7.40E+04	2.40E-02	-140%	56.31131
5.23E+04	2.49E-02	-25%	39.81811
4.27E+04	2.56E-02	15%	32.51135
4.88E+04	2.51E-02	-9%	37.13058
4.68E+04	2.53E-02	-1%	35.6144
4.78E+04	2.52E-02	-5%	36.34879
4.67E+04	2.53E-02	-1%	35.54338
4.66E+04	2.53E-02	0%	35.47279