

Problem 1

<u>Gage Fluid</u>	<u>ΔP (lb/in²)</u>	<u>γ (lb/ft³)</u>	<u>h (ft)</u>
(Gasoline)	2.7177	42.4000	9.2299
(Mercury)	2.7177	844.9000	0.4632

Problem 2

<u>Sch. 40 Steel Pipe (in)</u>	<u>Diameter (ft)</u>	<u>Flow Area (ft²)</u>	<u>V (ft/s)</u>	<u>Q (ft³/s)</u>	<u>NR (Reynold's)</u>
1.50	0.1342	0.014140	9.4547	0.1337	62837.0914
1.25	0.1150	0.010390	12.8672	0.1337	73281.6536
1.00	0.0874	0.006000	22.2817	0.1337	96443.5416
2.00	0.1723	0.023330	5.7304	0.1337	48897.1455
2.50	0.2058	0.033260	4.0195	0.1337	40967.1822

<u>ρ (Density of coolant)</u>	<u>n (Dynamic Velocity)</u>	<u>f (Moody's Chart)</u>	<u>K (Filter)</u>	<u>f_T (Table 10.5)</u>	<u>g (ft/s²)</u>
1.7829	0.000036	0.0200	1.8500	0.0200	32.2000
1.7829	0.000036	0.0210	1.8500	0.0210	32.2000
1.7829	0.000036	0.0225	1.8500	0.0220	32.2000
1.7829	0.000036	0.0190	1.8500	0.0190	32.2000
1.7829	0.000036	0.0185	1.8500	0.0180	32.2000

<u>Pipe Size</u>	<u>Cost per 6 ft</u>	<u>Cost for Installation</u>	<u>L_s (ft)</u>	<u>L_d (ft)</u>
1.50	\$33.95	\$127.31	10	20
1.25	\$28.95	\$108.56	10	20
1.00	\$23.95	\$89.81	10	20
2.00	\$46.95	\$176.06	10	20
2.50	\$71.95	\$269.81	10	20

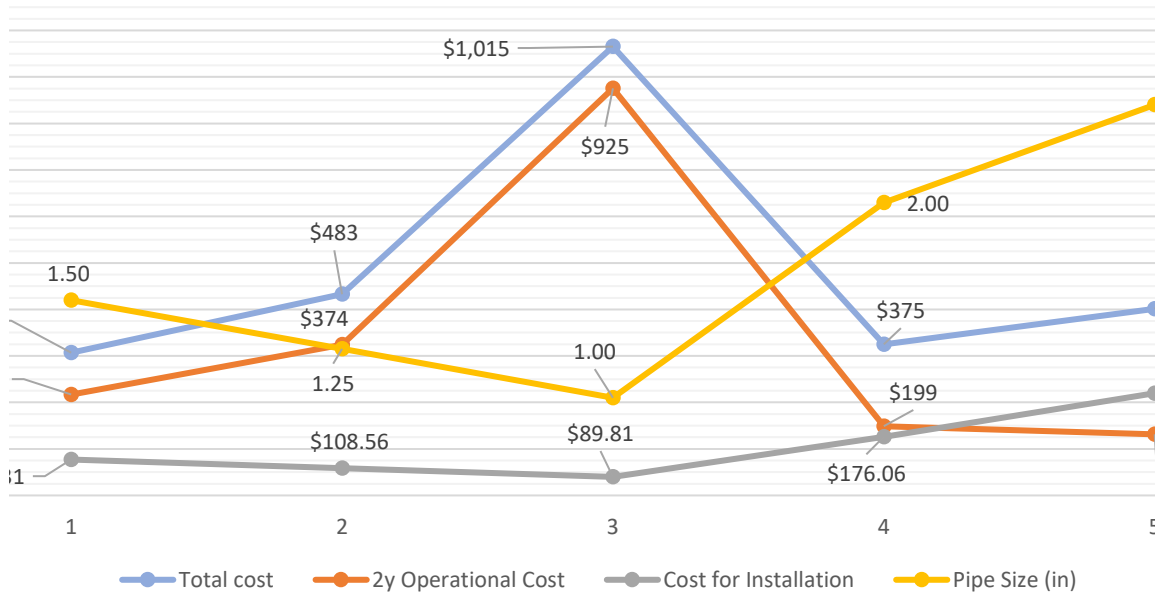
<u>Pipe Size (in)</u>	<u>Operation Cost per kW</u>	<u>2y Operational Cost</u>	<u>Power (kW)</u>	<u>Total cost</u>
1.50	\$730	\$267.09	0.3659	\$356.90
1.25	\$730	\$374.05	0.5124	\$482.62
1.00	\$730	\$925.44	1.2677	\$1,015.25
2.00	\$730	\$198.92	0.2725	\$374.98
2.50	\$730	\$181.39	0.2485	\$451.21

\$1,050	
\$950	
\$850	
\$750	
\$650	
\$550	
\$450	\$357
\$350	\$267
\$250	
\$150	
\$50	\$127.3

<u>D/E (ft)</u>	<u>HL (Suction, ft)</u>	<u>HL (Filter, ft)</u>	<u>HL (Gate Valve, ft)</u>	<u>HL (Check Valve, ft)</u>
894.6667	2.0687	2.5679	0.2221	2.7762
766.6667	4.6946	4.7561	0.4319	5.3988
582.6667	19.8463	14.2620	1.3568	16.9602
1148.6667	0.5623	0.9433	0.0775	0.9688
1372.0000	0.2255	0.4641	0.0361	0.4516

<u>Y (lb/ft^3)</u>	<u>P (Power added, HP)</u>	<u>Pump Head (ft)</u>	<u>P2 (Inlet Pressure, psig)</u>	<u>hA (ft)</u>
57.4080	0.4906	33.7722	-2.4904	35.1603
57.4080	0.6871	46.6708	-4.9648	49.2417
57.4080	1.7000	114.1181	-17.2122	121.8273
57.4080	0.3654	25.6765	-0.8344	26.1863
57.4080	0.3332	23.6284	-0.3894	23.8793

Costs for Selected Pipe Sizes as a Function of Nominal Diameter



HL (Discharge, ft)

4.1373

9.3893

39.6927

1.1246

0.4510

HL (Total, ft)

11.7722

24.6708

92.1181

3.6765

1.6284

