
TECHNICAL BULLETIN TB242

HEAD LOSS OF RAUGEO™ PEXa PIPE FOR GEOTHERMAL APPLICATIONS

Product: RAUGEO PEXa Pipe
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The tables on the following pages list pressure loss of RAUGEO PEXa pipe, in units of ft head per 100 ft of pipe, for various flow rates, water temperatures and antifreeze concentrations. This information is based on ASTM F876 size PEX pipe.

Summary of Tables

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Table 4: Pressure loss for a 10% ethylene glycol solution at 30°F, 35°F and 40°F

Table 5: Pressure loss for a 20% ethylene glycol solution at 25°F, 30°F and 35°F

Feet of head loss may be converted to psi pressure loss by using the following equation: $psi = \frac{feet\ head\ loss}{2.31}$

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Table 1: Pressure loss for water at 32°F, 40°F, and 50°F

Flow Rate GPM	Flow Velocity ft/sec					pressure loss in ft head per 100 ft of RAUPEX pipe														
						32°F (0°C) Water					40°F (4°C) Water					50°F (10°C) Water				
	3/4"	1"	1 1/4"	1 1/2"	2"	3/4"	1"	1 1/4"	1 1/2"	2"	3/4"	1"	1 1/4"	1 1/2"	2"	3/4"	1"	1 1/4"	1 1/2"	2"
1.0	0.88	0.53	0.36	0.26	0.15	0.99	0.19	0.09	0.04	0.02	0.95	0.29	0.07	0.04	0.01	0.90	0.28	0.06	0.03	0.01
1.2	1.06	0.64	0.43	0.31	0.18	1.35	0.42	0.10	0.05	0.02	1.29	0.40	0.09	0.05	0.02	1.22	0.38	0.15	0.04	0.01
1.4	1.23	0.75	0.50	0.36	0.21	1.75	0.54	0.21	0.06	0.02	1.67	0.52	0.20	0.05	0.02	1.59	0.49	0.19	0.09	0.02
1.6	1.41	0.85	0.57	0.41	0.24	2.19	0.68	0.26	0.07	0.02	2.10	0.64	0.25	0.12	0.02	2.00	0.61	0.24	0.11	0.03
1.8	1.59	0.96	0.64	0.46	0.27	2.68	0.82	0.32	0.15	0.03	2.56	0.79	0.31	0.14	0.02	2.44	0.75	0.29	0.13	0.04
2.0	1.76	1.07	0.71	0.51	0.30	3.20	0.98	0.38	0.18	0.03	3.07	0.94	0.37	0.17	0.05	2.93	0.90	0.35	0.16	0.05
2.2	1.94	1.17	0.79	0.56	0.33	3.77	1.16	0.45	0.21	0.06	3.61	1.11	0.43	0.20	0.06	3.45	1.05	0.41	0.19	0.05
2.4	2.11	1.28	0.86	0.61	0.36	4.37	1.34	0.52	0.24	0.07	4.20	1.28	0.50	0.23	0.06	4.01	1.22	0.48	0.22	0.06
2.6	2.29	1.39	0.93	0.67	0.39	5.02	1.54	0.60	0.27	0.08	4.82	1.47	0.57	0.26	0.07	4.61	1.40	0.55	0.25	0.07
2.8	2.47	1.49	1.00	0.72	0.42	5.70	1.74	0.68	0.31	0.09	5.48	1.67	0.65	0.30	0.08	5.24	1.59	0.62	0.28	0.08
3.0	2.64	1.60	1.07	0.77	0.45	6.42	1.96	0.76	0.35	0.10	6.18	1.88	0.73	0.33	0.09	5.91	1.80	0.70	0.32	0.09
3.2	2.82	1.71	1.14	0.82	0.48	7.18	2.19	0.85	0.39	0.11	6.91	2.10	0.82	0.37	0.11	6.61	2.01	0.78	0.35	0.10
3.4	2.99	1.81	1.22	0.87	0.51	7.97	2.43	0.94	0.43	0.12	7.68	2.33	0.91	0.41	0.12	7.35	2.23	0.86	0.39	0.11
3.6	3.17	1.92	1.29	0.92	0.54	8.81	2.68	1.04	0.47	0.13	8.48	2.58	1.00	0.45	0.13	8.13	2.46	0.95	0.43	0.12
3.8	3.35	2.03	1.36	0.97	0.57	9.67	2.94	1.14	0.52	0.15	9.32	2.83	1.10	0.50	0.14	8.94	2.71	1.05	0.48	0.13
4.0	3.52	2.13	1.43	1.02	0.60	10.58	3.22	1.25	0.57	0.16	10.19	3.09	1.20	0.54	0.15	9.78	2.96	1.14	0.52	0.15
4.2		2.24	1.50	1.08	0.63		3.50	1.36	0.62	0.17		3.37	1.30	0.59	0.17		3.22	1.24	0.56	0.16
4.4		2.35	1.57	1.13	0.66		3.79	1.47	0.67	0.19		3.65	1.41	0.64	0.18		3.49	1.35	0.61	0.17
4.6		2.45	1.64	1.18	0.69		4.10	1.59	0.72	0.20		3.94	1.52	0.69	0.19		3.78	1.46	0.66	0.19
4.8		2.56	1.72	1.23	0.72		4.41	1.71	0.78	0.22		4.25	1.64	0.74	0.21		4.07	1.57	0.71	0.20
5.0		2.67	1.79	1.28	0.75		4.73	1.83	0.83	0.23		4.56	1.76	0.80	0.22		4.37	1.68	0.76	0.21
5.2		2.77	1.86	1.33	0.78		5.07	1.96	0.89	0.25		4.88	1.88	0.85	0.24		4.68	1.80	0.82	0.23
5.4		2.88	1.93	1.38	0.81		5.41	2.09	0.95	0.27		5.21	2.01	0.91	0.26		5.00	1.93	0.87	0.24
5.6		2.99	2.00	1.43	0.84		5.76	2.23	1.01	0.28		5.56	2.14	0.97	0.27		5.33	2.05	0.93	0.26
5.8		3.09	2.07	1.49	0.87		6.13	2.37	1.07	0.30		5.91	2.28	1.03	0.29		5.67	2.18	0.99	0.28
6.0		3.20	2.14	1.54	0.90		6.50	2.51	1.14	0.32		6.27	2.42	1.09	0.31		6.02	2.31	1.05	0.29
6.2		3.31	2.22	1.59	0.93		6.88	2.66	1.20	0.34		6.64	2.56	1.16	0.32		6.38	2.45	1.11	0.31
6.4		3.41	2.29	1.64	0.96		7.28	2.81	1.27	0.36		7.02	2.70	1.22	0.34		6.74	2.59	1.17	0.33
6.6		3.52	2.36	1.69	0.99		7.68	2.96	1.34	0.38		7.41	2.85	1.29	0.36		7.12	2.73	1.24	0.34
6.8		3.63	2.43	1.74	1.02		8.09	3.12	1.41	0.40		7.81	3.00	1.36	0.38		7.50	2.88	1.30	0.36
7.0		3.73	2.50	1.79	1.05		8.51	3.28	1.49	0.42		8.22	3.16	1.43	0.40		7.90	3.03	1.37	0.38
7.5		4.00	2.68	1.92	1.12		9.61	3.70	1.68	0.47		9.28	3.57	1.61	0.45		8.92	3.42	1.54	0.43
8.0		4.27	2.86	2.05	1.20		10.76	4.14	1.87	0.52		10.40	3.99	1.80	0.50		10.00	3.83	1.73	0.48
8.5		4.54	3.04	2.18	1.27		11.98	4.60	2.08	0.58		11.57	4.44	2.01	0.56		11.14	4.27	1.92	0.53
9.0			3.22	2.30	1.35			5.09	2.30	0.64			4.91	2.22	0.62			4.72	2.13	0.59
10.0			3.57	2.56	1.49			6.12	2.76	0.77			5.91	2.67	0.74			5.68	2.56	0.71
12.0			4.29	3.07	1.79			8.44	3.80	1.06			8.16	3.67	1.02			7.86	3.53	0.98
14.0			5.00	3.59	2.09			11.08	4.99	1.38			10.73	4.82	1.33			10.34	4.64	1.28
16.0				4.10	2.39				6.31	1.75				6.11	1.69				5.88	1.62
18.0				4.61	2.69				7.78	2.15				7.53	2.07				7.26	2.00
20.0				5.12	2.99				9.38	2.59				9.08	2.50				8.76	2.40
25.0				6.40	3.74				13.96	3.84				13.54	3.71				13.09	3.58
30.0					4.48					5.30					5.14					4.96
35.0					5.23					6.98					6.76					6.53
40.0					5.98					8.86					8.59					8.31
45.0					6.73					10.94					10.62					10.28
50.0					7.47					13.22					12.85					12.44
55.0					8.2					15.70					15.26					14.79
60.0					9.0					18.37					17.87					17.33

Table 2: Pressure loss for a 10% propylene glycol solution at 30°F, 35°F, and 40°F

Flow Rate GPM	Flow Velocity					pressure loss in ft head per 100 ft of RAUPEX pipe														
	ft/sec					30°F (-1°C) 10% Propylene Glycol					35°F (2°C) 10% Propylene Glycol					40°F (4°C) 10% Propylene Glycol				
	3/4"	1"	1 1/4"	1 1/2"	2"	3/4"	1"	1 1/4"	1 1/2"	2"	3/4"	1"	1 1/4"	1 1/2"	2"	3/4"	1"	1 1/4"	1 1/2"	2"
1.0	0.88	0.53	0.36	0.26	0.15	0.82	0.30	0.13	0.07	0.02	0.74	0.27	0.12	0.06	0.02	0.67	0.25	0.11	0.06	0.02
1.2	1.06	0.64	0.43	0.31	0.18	0.98	0.36	0.16	0.08	0.03	0.89	0.33	0.15	0.08	0.03	1.47	0.29	0.13	0.07	0.02
1.4	1.23	0.75	0.50	0.36	0.21	2.04	0.42	0.19	0.10	0.03	1.98	0.38	0.17	0.09	0.03	1.91	0.34	0.15	0.08	0.03
1.6	1.41	0.85	0.57	0.41	0.24	2.55	0.48	0.22	0.11	0.04	2.47	0.77	0.20	0.10	0.03	2.39	0.74	0.18	0.09	0.03
1.8	1.59	0.96	0.64	0.46	0.27	3.11	0.96	0.24	0.12	0.04	3.01	0.93	0.22	0.11	0.04	2.91	0.90	0.35	0.10	0.03
2.0	1.76	1.07	0.71	0.51	0.30	3.71	1.15	0.27	0.14	0.05	3.60	1.11	0.44	0.13	0.04	3.48	1.07	0.42	0.11	0.04
2.2	1.94	1.17	0.79	0.56	0.33	4.36	1.35	0.53	0.15	0.05	4.23	1.30	0.51	0.14	0.05	4.09	1.26	0.49	0.23	0.04
2.4	2.11	1.28	0.86	0.61	0.36	5.05	1.56	0.61	0.17	0.06	4.90	1.51	0.59	0.27	0.05	4.74	1.46	0.57	0.26	0.05
2.6	2.29	1.39	0.93	0.67	0.39	5.78	1.78	0.70	0.32	0.06	5.61	1.73	0.68	0.31	0.06	5.44	1.67	0.65	0.30	0.05
2.8	2.47	1.49	1.00	0.72	0.42	6.56	2.02	0.79	0.36	0.07	6.37	1.96	0.76	0.35	0.06	6.17	1.89	0.74	0.34	0.10
3.0	2.64	1.60	1.07	0.77	0.45	7.37	2.27	0.89	0.41	0.07	7.16	2.20	0.86	0.39	0.06	6.94	2.13	0.83	0.38	0.11
3.2	2.82	1.71	1.14	0.82	0.48	8.23	2.53	0.99	0.45	0.08	8.00	2.45	0.96	0.44	0.12	7.76	2.38	0.93	0.42	0.12
3.4	2.99	1.81	1.22	0.87	0.51	9.13	2.80	1.09	0.50	0.14	8.88	2.72	1.06	0.49	0.14	8.61	2.63	1.03	0.47	0.13
3.6	3.17	1.92	1.29	0.92	0.54	10.07	3.09	1.20	0.55	0.16	9.79	3.00	1.17	0.53	0.15	9.50	2.90	1.13	0.52	0.15
3.8	3.35	2.03	1.36	0.97	0.57	11.05	3.38	1.32	0.60	0.17	10.75	3.29	1.28	0.59	0.17	10.43	3.19	1.24	0.57	0.16
4.0	3.52	2.13	1.43	1.02	0.60	12.07	3.69	1.44	0.66	0.19	11.74	3.59	1.40	0.64	0.18	11.40	3.48	1.35	0.62	0.17
4.2		2.24	1.50	1.08	0.63		4.01	1.56	0.71	0.20		3.90	1.52	0.69	0.20		3.78	1.47	0.67	0.19
4.4		2.35	1.57	1.13	0.66		4.35	1.69	0.77	0.22		4.23	1.64	0.75	0.21		4.10	1.59	0.73	0.20
4.6		2.45	1.64	1.18	0.69		4.69	1.82	0.83	0.24		4.56	1.77	0.81	0.23		4.42	1.72	0.78	0.22
4.8		2.56	1.72	1.23	0.72		5.04	1.96	0.90	0.25		4.91	1.91	0.87	0.25		4.76	1.85	0.84	0.24
5.0		2.67	1.79	1.28	0.75		5.41	2.10	0.96	0.27		5.26	2.04	0.93	0.26		5.11	1.98	0.90	0.25
5.2		2.77	1.86	1.33	0.78		5.79	2.25	1.03	0.29		5.63	2.19	1.00	0.28		5.46	2.12	0.96	0.27
5.4		2.88	1.93	1.38	0.81		6.18	2.40	1.09	0.31		6.01	2.33	1.06	0.30		5.83	2.26	1.03	0.29
5.6		2.99	2.00	1.43	0.84		6.57	2.55	1.16	0.33		6.40	2.48	1.13	0.32		6.21	2.41	1.09	0.31
5.8		3.09	2.07	1.49	0.87		6.98	2.71	1.23	0.35		6.80	2.63	1.20	0.34		6.60	2.56	1.16	0.33
6.0		3.20	2.14	1.54	0.90		7.40	2.87	1.31	0.37		7.21	2.79	1.27	0.36		7.00	2.71	1.23	0.35
6.2		3.31	2.22	1.59	0.93		7.84	3.04	1.38	0.39		7.63	2.95	1.34	0.38		7.41	2.87	1.30	0.37
6.4		3.41	2.29	1.64	0.96		8.28	3.21	1.46	0.41		8.06	3.12	1.42	0.40		7.83	3.03	1.38	0.39
6.6		3.52	2.36	1.69	0.99		8.73	3.38	1.54	0.43		8.50	3.29	1.50	0.42		8.26	3.19	1.45	0.41
6.8		3.63	2.43	1.74	1.02		9.19	3.56	1.62	0.46		8.95	3.46	1.57	0.44		8.70	3.36	1.53	0.43
7.0		3.73	2.50	1.79	1.05		9.67	3.74	1.70	0.48		9.42	3.64	1.66	0.47		9.15	3.54	1.61	0.45
7.5		4.00	2.68	1.92	1.12		10.89	4.22	1.92	0.54		10.62	4.10	1.86	0.52		10.32	3.98	1.81	0.51
8.0		4.27	2.86	2.05	1.20		12.19	4.71	2.14	0.60		11.88	4.59	2.08	0.58		11.55	4.46	2.02	0.57
8.5		4.54	3.04	2.18	1.27		13.54	5.23	2.38	0.67		13.20	5.10	2.31	0.65		12.85	4.95	2.24	0.63
9.0			3.22	2.30	1.35			5.78	2.62	0.74			5.63	2.55	0.71			5.47	2.48	0.69
10.0			3.57	2.56	1.49			6.94	3.14	0.88			6.76	3.06	0.86			6.57	2.97	0.83
12.0			4.29	3.07	1.79			9.53	4.31	1.21			9.29	4.20	1.17			9.04	4.09	1.14
14.0			5.00	3.59	2.09			12.48	5.64	1.57			12.18	5.50	1.53			11.86	5.35	1.49
16.0				4.10	2.39				7.12	1.98				6.95	1.93				6.76	1.88
18.0				4.61	2.69				8.75	2.43				8.54	2.37				8.32	2.31
20.0				5.12	2.99				10.53	2.92				10.28	2.85				10.02	2.77
25.0				6.40	3.74				15.61	4.32				15.26	4.21				14.88	4.10
30.0					4.48					5.95					5.81					5.66
35.0					5.23					7.81					7.63					7.44
40.0					5.98					9.89					9.67					9.44
45.0					6.73					12.19					11.92					11.64
50.0					7.47					14.70					14.39					14.06
55.0					8.2					17.42					17.06					16.67
60.0					9.0					20.35					8.64					19.49

Table 3: Pressure loss for a 20% propylene glycol solution at 25°F, 30°F, and 35°F

Flow Rate GPM	Flow Velocity ft/sec					pressure loss in ft head per 100 ft of RAUPEX pipe														
						25°F (-4°C) 20% Propylene Glycol					30°F (-1°C) 20% Propylene Glycol					35°F (2°C) 20% Propylene Glycol				
	3/4"	1"	1 1/4"	1 1/2"	2"	3/4"	1"	1 1/4"	1 1/2"	2"	3/4"	1"	1 1/4"	1 1/2"	2"	3/4"	1"	1 1/4"	1 1/2"	2"
1.0	0.88	0.53	0.36	0.26	0.15	1.40	0.52	0.23	0.12	0.04	1.24	0.45	0.20	0.10	0.04	1.12	0.41	0.18	0.09	0.03
1.2	1.06	0.64	0.43	0.31	0.18	1.69	0.62	0.28	0.14	0.05	1.49	0.55	0.24	0.13	0.04	1.34	0.49	0.22	0.11	0.04
1.4	1.23	0.75	0.50	0.36	0.21	1.97	0.72	0.32	0.17	0.06	1.73	0.64	0.29	0.15	0.05	1.57	0.57	0.26	0.13	0.05
1.6	1.41	0.85	0.57	0.41	0.24	2.25	0.82	0.37	0.19	0.06	1.98	0.73	0.33	0.17	0.06	1.79	0.66	0.29	0.15	0.05
1.8	1.59	0.96	0.64	0.46	0.27	2.53	0.93	0.42	0.21	0.07	2.23	0.82	0.37	0.19	0.06	2.01	0.74	0.33	0.17	0.06
2.0	1.76	1.07	0.71	0.51	0.30	2.81	1.03	0.46	0.24	0.08	2.48	0.91	0.41	0.21	0.07	4.14	0.82	0.37	0.19	0.06
2.2	1.94	1.17	0.79	0.56	0.33	3.09	1.13	0.51	0.26	0.09	5.02	1.00	0.45	0.23	0.08	4.85	0.90	0.41	0.21	0.07
2.4	2.11	1.28	0.86	0.61	0.36	6.05	1.24	0.56	0.28	0.10	5.80	1.09	0.49	0.25	0.09	5.61	1.74	0.44	0.23	0.08
2.6	2.29	1.39	0.93	0.67	0.39	6.92	1.34	0.60	0.31	0.11	6.63	1.18	0.53	0.27	0.09	6.42	1.99	0.48	0.25	0.08
2.8	2.47	1.49	1.00	0.72	0.42	7.83	1.44	0.65	0.33	0.11	7.51	2.33	0.57	0.29	0.10	7.27	2.25	0.52	0.26	0.09
3.0	2.64	1.60	1.07	0.77	0.45	8.79	2.72	0.69	0.36	0.12	8.44	2.61	0.61	0.31	0.11	8.17	2.52	0.99	0.28	0.10
3.2	2.82	1.71	1.14	0.82	0.48	9.79	3.03	0.74	0.38	0.13	9.40	2.91	1.14	0.33	0.11	9.11	2.81	1.10	0.30	0.10
3.4	2.99	1.81	1.22	0.87	0.51	10.84	3.35	0.79	0.40	0.14	10.42	3.22	1.26	0.36	0.12	10.09	3.11	1.22	0.32	0.11
3.6	3.17	1.92	1.29	0.92	0.54	11.94	3.69	0.83	0.43	0.15	11.48	3.54	1.39	0.38	0.13	11.12	3.42	1.34	0.62	0.12
3.8	3.35	2.03	1.36	0.97	0.57	13.08	4.04	1.58	0.45	0.15	12.58	3.88	1.52	0.70	0.14	12.19	3.75	1.47	0.67	0.12
4.0	3.52	2.13	1.43	1.02	0.60	14.26	4.40	1.73	0.47	0.16	13.72	4.23	1.65	0.76	0.14	13.30	4.09	1.60	0.73	0.13
4.2		2.24	1.50	1.08	0.63		4.78	1.87	0.50	0.17		4.59	1.79	0.82	0.15		4.44	1.74	0.80	0.14
4.4		2.35	1.57	1.13	0.66		5.16	2.02	0.93	0.18		4.96	1.94	0.89	0.16		4.81	1.88	0.86	0.14
4.6		2.45	1.64	1.18	0.69		5.57	2.18	1.00	0.19		5.35	2.09	0.96	0.16		5.18	2.02	0.93	0.26
4.8		2.56	1.72	1.23	0.72		5.98	2.34	1.07	0.19		5.75	2.25	1.03	0.17		5.57	2.17	0.99	0.28
5.0		2.67	1.79	1.28	0.75		6.41	2.51	1.15	0.20		6.16	2.41	1.10	0.31		5.97	2.33	1.07	0.30
5.2		2.77	1.86	1.33	0.78		6.85	2.68	1.23	0.21		6.58	2.57	1.18	0.33		6.38	2.49	1.14	0.32
5.4		2.88	1.93	1.38	0.81		7.30	2.85	1.31	0.22		7.02	2.74	1.25	0.36		6.81	2.65	1.21	0.34
5.6		2.99	2.00	1.43	0.84		7.76	3.03	1.39	0.23		7.47	2.91	1.33	0.38		7.24	2.82	1.29	0.37
5.8		3.09	2.07	1.49	0.87		8.24	3.22	1.47	0.42		7.93	3.09	1.41	0.40		7.69	2.99	1.37	0.39
6.0		3.20	2.14	1.54	0.90		8.72	3.40	1.56	0.44		8.40	3.27	1.50	0.42		8.15	3.17	1.45	0.41
6.2		3.31	2.22	1.59	0.93		9.22	3.60	1.65	0.47		8.88	3.46	1.58	0.45		8.62	3.35	1.53	0.43
6.4		3.41	2.29	1.64	0.96		9.74	3.80	1.74	0.49		9.38	3.65	1.67	0.47		9.10	3.54	1.62	0.46
6.6		3.52	2.36	1.69	0.99		10.26	4.00	1.83	0.52		9.88	3.85	1.76	0.50		9.59	3.73	1.70	0.48
6.8		3.63	2.43	1.74	1.02		10.80	4.21	1.92	0.55		10.40	4.05	1.85	0.52		10.10	3.92	1.79	0.51
7.0		3.73	2.50	1.79	1.05		11.34	4.42	2.02	0.57		10.93	4.25	1.94	0.55		10.61	4.12	1.88	0.53
7.5		4.00	2.68	1.92	1.12		12.76	4.97	2.27	0.64		12.30	4.78	2.18	0.62		11.95	4.64	2.11	0.60
8.0		4.27	2.86	2.05	1.20		14.25	5.54	2.53	0.72		13.75	5.34	2.43	0.69		13.35	5.18	2.36	0.67
8.5		4.54	3.04	2.18	1.27		15.81	6.15	2.80	0.79		15.26	5.92	2.70	0.76		14.83	5.75	2.62	0.74
9.0			3.22	2.30	1.35			6.78	3.09	0.87			6.53	2.97	0.84			6.34	2.89	0.81
10.0			3.57	2.56	1.49			8.11	3.70	1.04			7.83	3.56	1.00			7.60	3.46	0.97
12.0			4.29	3.07	1.79			11.10	5.05	1.42			10.71	4.87	1.37			10.42	4.73	1.33
14.0			5.00	3.59	2.09			14.48	6.58	1.85			13.99	6.35	1.78			13.61	6.17	1.73
16.0				4.10	2.39				8.28	2.32				8.00	2.24				7.78	2.17
18.0				4.61	2.69				10.15	2.84				9.81	2.74				9.54	2.66
20.0				5.12	2.99				12.18	3.40				11.78	3.29				11.47	3.20
25.0				6.40	3.74				17.96	5.00				17.39	4.84				16.95	4.71
30.0					4.48					6.87					6.65					6.47
35.0					5.23					8.98					8.70					8.48
40.0					5.98					11.35					11.00					10.72
45.0					6.73					13.95					13.53					13.20
50.0					7.47					16.79					16.29					15.90
55.0					8.2					19.86					19.28					18.82
60.0					9.0					20.35					22.49					21.96

Table 4: Pressure loss for a 10% ethylene glycol solution at 30°F, 35°F, and 40°F

Flow Rate GPM	Flow Velocity ft/sec					pressure loss in ft head per 100 ft of RAUPEX pipe														
						30°F (-1°C) 10% Propylene Glycol					35°F (2°C) 10% Propylene Glycol					40°F (4°C) 10% Propylene Glycol				
	3/4"	1"	1 1/4"	1 1/2"	2"	3/4"	1"	1 1/4"	1 1/2"	2"	3/4"	1"	1 1/4"	1 1/2"	2"	3/4"	1"	1 1/4"	1 1/2"	2"
1.0	0.88	0.53	0.36	0.26	0.15	0.63	0.23	0.10	0.05	0.02	1.04	0.21	0.10	0.05	0.02	1.01	0.20	0.09	0.05	0.02
1.2	1.06	0.64	0.43	0.31	0.18	1.45	0.28	0.13	0.06	0.02	1.41	0.26	0.12	0.06	0.02	1.37	0.43	0.11	0.05	0.02
1.4	1.23	0.75	0.50	0.36	0.21	1.88	0.58	0.15	0.07	0.03	1.83	0.57	0.13	0.07	0.02	1.78	0.55	0.22	0.06	0.02
1.6	1.41	0.85	0.57	0.41	0.24	2.36	0.73	0.17	0.09	0.03	2.30	0.71	0.28	0.08	0.03	2.23	0.69	0.27	0.07	0.02
1.8	1.59	0.96	0.64	0.46	0.27	2.87	0.89	0.35	0.10	0.03	2.80	0.86	0.34	0.16	0.03	2.73	0.84	0.33	0.15	0.03
2.0	1.76	1.07	0.71	0.51	0.30	3.44	1.06	0.41	0.19	0.04	3.35	1.03	0.40	0.19	0.03	3.26	1.00	0.39	0.18	0.03
2.2	1.94	1.17	0.79	0.56	0.33	4.04	1.24	0.49	0.22	0.04	3.94	1.21	0.47	0.22	0.04	3.84	1.18	0.46	0.21	0.06
2.4	2.11	1.28	0.86	0.61	0.36	4.69	1.44	0.56	0.26	0.04	4.57	1.40	0.55	0.25	0.07	4.46	1.37	0.53	0.24	0.07
2.6	2.29	1.39	0.93	0.67	0.39	5.37	1.65	0.64	0.29	0.08	5.25	1.61	0.63	0.29	0.08	5.11	1.56	0.61	0.28	0.08
2.8	2.47	1.49	1.00	0.72	0.42	6.10	1.87	0.73	0.33	0.09	5.96	1.82	0.71	0.33	0.09	5.81	1.78	0.69	0.32	0.09
3.0	2.64	1.60	1.07	0.77	0.45	6.87	2.10	0.82	0.37	0.11	6.71	2.05	0.80	0.37	0.10	6.54	2.00	0.78	0.35	0.10
3.2	2.82	1.71	1.14	0.82	0.48	7.68	2.35	0.91	0.42	0.12	7.50	2.29	0.89	0.41	0.12	7.31	2.23	0.87	0.40	0.11
3.4	2.99	1.81	1.22	0.87	0.51	8.52	2.60	1.01	0.46	0.13	8.33	2.54	0.99	0.45	0.13	8.12	2.48	0.96	0.44	0.12
3.6	3.17	1.92	1.29	0.92	0.54	9.40	2.87	1.12	0.51	0.14	9.19	2.80	1.09	0.50	0.14	8.97	2.73	1.06	0.48	0.14
3.8	3.35	2.03	1.36	0.97	0.57	10.33	3.15	1.22	0.56	0.16	10.10	3.08	1.19	0.54	0.15	9.85	3.00	1.16	0.53	0.15
4.0	3.52	2.13	1.43	1.02	0.60	11.29	3.44	1.34	0.61	0.17	11.04	3.36	1.30	0.59	0.17	10.78	3.28	1.27	0.58	0.16
4.2		2.24	1.50	1.08	0.63		3.74	1.45	0.66	0.19		3.66	1.42	0.65	0.18		3.56	1.38	0.63	0.18
4.4		2.35	1.57	1.13	0.66		4.05	1.57	0.72	0.20		3.96	1.54	0.70	0.20		3.86	1.50	0.68	0.19
4.6		2.45	1.64	1.18	0.69		4.38	1.70	0.77	0.22		4.28	1.66	0.75	0.21		4.17	1.62	0.73	0.21
4.8		2.56	1.72	1.23	0.72		4.71	1.83	0.83	0.23		4.60	1.78	0.81	0.23		4.49	1.74	0.79	0.22
5.0		2.67	1.79	1.28	0.75		5.05	1.96	0.89	0.25		4.94	1.91	0.87	0.24		4.82	1.87	0.85	0.24
5.2		2.77	1.86	1.33	0.78		5.41	2.10	0.95	0.27		5.29	2.05	0.93	0.26		5.16	2.00	0.91	0.25
5.4		2.88	1.93	1.38	0.81		5.77	2.24	1.02	0.29		5.65	2.18	0.99	0.28		5.51	2.13	0.97	0.27
5.6		2.99	2.00	1.43	0.84		6.15	2.38	1.08	0.30		6.01	2.33	1.06	0.30		5.87	2.27	1.03	0.29
5.8		3.09	2.07	1.49	0.87		6.54	2.53	1.15	0.32		6.39	2.47	1.12	0.32		6.24	2.41	1.09	0.31
6.0		3.20	2.14	1.54	0.90		6.93	2.68	1.22	0.34		6.78	2.62	1.19	0.33		6.62	2.56	1.16	0.33
6.2		3.31	2.22	1.59	0.93		7.34	2.84	1.29	0.36		7.18	2.77	1.26	0.35		7.01	2.71	1.23	0.34
6.4		3.41	2.29	1.64	0.96		7.76	3.00	1.36	0.38		7.59	2.93	1.33	0.37		7.41	2.86	1.30	0.36
6.6		3.52	2.36	1.69	0.99		8.18	3.16	1.44	0.40		8.01	3.09	1.40	0.39		7.82	3.02	1.37	0.38
6.8		3.63	2.43	1.74	1.02		8.62	3.33	1.51	0.42		8.44	3.26	1.48	0.41		8.24	3.18	1.44	0.40
7.0		3.73	2.50	1.79	1.05		9.07	3.50	1.59	0.45		8.88	3.42	1.55	0.43		8.67	3.34	1.51	0.42
7.5		4.00	2.68	1.92	1.12		10.23	3.95	1.79	0.50		10.01	3.86	1.75	0.49		9.79	3.77	1.71	0.48
8.0		4.27	2.86	2.05	1.20		11.45	4.41	2.00	0.56		11.21	4.32	1.96	0.55		10.97	4.22	1.91	0.53
8.5		4.54	3.04	2.18	1.27		12.73	4.91	2.22	0.62		12.47	4.80	2.17	0.61		12.20	4.69	2.12	0.59
9.0			3.22	2.30	1.35			5.42	2.45	0.69			5.30	2.40	0.67			5.18	2.34	0.65
10.0			3.57	2.56	1.49			6.51	2.95	0.82			6.38	2.88	0.80			6.24	2.82	0.78
12.0			4.29	3.07	1.79			8.97	4.05	1.13			8.79	3.96	1.10			8.60	3.88	1.08
14.0			5.00	3.59	2.09			11.76	5.30	1.47			11.53	5.20	1.44			11.29	5.08	1.41
16.0				4.10	2.39				6.71	1.86				6.57	1.82				6.43	1.78
18.0				4.61	2.69				8.25	2.29				8.09	2.24				7.92	2.19
20.0				5.12	2.99				9.94	2.75				9.75	2.69				9.55	2.63
25.0				6.40	3.74				14.78	4.07				14.50	3.99				14.22	3.91
30.0					4.48					5.62					5.51					5.40
35.0					5.23					7.39					7.25					7.11
40.0					5.98					9.37					9.20					9.02
45.0					6.73					11.56					11.36					11.14
50.0					7.47					13.97					13.72					13.47
55.0					8.2					16.57					16.29					15.99
60.0					9.0					19.38					19.05					18.71

Table 5: Pressure loss for a 20% ethylene glycol solution at 25°F, 30°F, and 35°F

Flow Rate GPM	Flow Velocity ft/sec					pressure loss in ft head per 100 ft of RAUPEX pipe														
						25°F (-4°C) 20% Ethylene Glycol					30°F (-1°C) 20% Ethylene Glycol					35°F (2°C) 20% Ethylene Glycol				
	3/4"	1"	1 1/4"	1 1/2"	2"	3/4"	1"	1 1/4"	1 1/2"	2"	3/4"	1"	1 1/4"	1 1/2"	2"	3/4"	1"	1 1/4"	1 1/2"	2"
1.0	0.88	0.53	0.36	0.26	0.15	1.03	0.38	0.17	0.09	0.03	0.92	0.34	0.15	0.08	0.03	0.84	0.31	0.14	0.07	0.02
1.2	1.06	0.64	0.43	0.31	0.18	1.24	0.45	0.20	0.10	0.04	1.10	0.41	0.18	0.09	0.03	1.01	0.37	0.17	0.09	0.03
1.4	1.23	0.75	0.50	0.36	0.21	1.44	0.53	0.24	0.12	0.04	1.29	0.47	0.21	0.11	0.04	2.09	0.43	0.19	0.10	0.03
1.6	1.41	0.85	0.57	0.41	0.24	1.65	0.61	0.27	0.14	0.05	2.69	0.54	0.24	0.12	0.04	2.61	0.49	0.22	0.11	0.04
1.8	1.59	0.96	0.64	0.46	0.27	3.40	0.68	0.31	0.16	0.05	3.27	0.61	0.27	0.14	0.05	3.18	0.98	0.25	0.13	0.04
2.0	1.76	1.07	0.71	0.51	0.30	4.06	0.76	0.34	0.17	0.06	3.91	1.21	0.30	0.16	0.05	3.79	1.17	0.28	0.14	0.05
2.2	1.94	1.17	0.79	0.56	0.33	4.76	1.47	0.37	0.19	0.07	4.58	1.42	0.33	0.17	0.06	4.45	1.38	0.54	0.16	0.05
2.4	2.11	1.28	0.86	0.61	0.36	5.50	1.70	0.41	0.21	0.07	5.31	1.64	0.64	0.19	0.06	5.16	1.59	0.62	0.17	0.06
2.6	2.29	1.39	0.93	0.67	0.39	6.30	1.95	0.44	0.23	0.08	6.08	1.88	0.74	0.20	0.07	5.91	1.82	0.71	0.33	0.06
2.8	2.47	1.49	1.00	0.72	0.42	7.14	2.20	0.86	0.24	0.08	6.89	2.12	0.83	0.38	0.07	6.70	2.06	0.81	0.37	0.07
3.0	2.64	1.60	1.07	0.77	0.45	8.02	2.47	0.97	0.26	0.09	7.75	2.39	0.93	0.43	0.08	7.54	2.32	0.91	0.42	0.07
3.2	2.82	1.71	1.14	0.82	0.48	8.95	2.76	1.08	0.50	0.10	8.65	2.66	1.04	0.48	0.08	8.41	2.58	1.01	0.46	0.08
3.4	2.99	1.81	1.22	0.87	0.51	9.92	3.05	1.20	0.55	0.10	9.59	2.95	1.15	0.53	0.09	9.33	2.86	1.12	0.51	0.15
3.6	3.17	1.92	1.29	0.92	0.54	10.93	3.36	1.32	0.60	0.11	10.57	3.25	1.27	0.58	0.10	10.29	3.16	1.23	0.56	0.16
3.8	3.35	2.03	1.36	0.97	0.57	11.99	3.68	1.44	0.66	0.11	11.60	3.56	1.39	0.64	0.18	11.29	3.46	1.35	0.62	0.18
4.0	3.52	2.13	1.43	1.02	0.60	13.09	4.02	1.57	0.72	0.12	12.66	3.88	1.51	0.69	0.20	12.33	3.77	1.47	0.67	0.19
4.2		2.24	1.50	1.08	0.63		4.37	1.70	0.78	0.22		4.22	1.64	0.75	0.21		4.10	1.60	0.73	0.21
4.4		2.35	1.57	1.13	0.66		4.72	1.84	0.84	0.24		4.56	1.78	0.81	0.23		4.44	1.73	0.79	0.22
4.6		2.45	1.64	1.18	0.69		5.09	1.99	0.91	0.26		4.92	1.92	0.88	0.25		4.79	1.86	0.85	0.24
4.8		2.56	1.72	1.23	0.72		5.48	2.14	0.98	0.28		5.30	2.06	0.94	0.27		5.16	2.00	0.91	0.26
5.0		2.67	1.79	1.28	0.75		5.87	2.29	1.05	0.30		5.68	2.21	1.01	0.29		5.53	2.15	0.98	0.28
5.2		2.77	1.86	1.33	0.78		6.28	2.45	1.12	0.32		6.07	2.36	1.08	0.31		5.91	2.30	1.05	0.30
5.4		2.88	1.93	1.38	0.81		6.70	2.61	1.19	0.34		6.48	2.52	1.15	0.33		6.31	2.45	1.12	0.32
5.6		2.99	2.00	1.43	0.84		7.13	2.77	1.27	0.36		6.90	2.68	1.22	0.35		6.72	2.61	1.19	0.34
5.8		3.09	2.07	1.49	0.87		7.57	2.94	1.34	0.38		7.33	2.85	1.30	0.37		7.14	2.77	1.26	0.36
6.0		3.20	2.14	1.54	0.90		8.02	3.12	1.42	0.40		7.76	3.02	1.37	0.39		7.57	2.94	1.34	0.38
6.2		3.31	2.22	1.59	0.93		8.49	3.30	1.50	0.43		8.22	3.19	1.45	0.41		8.01	3.10	1.41	0.40
6.4		3.41	2.29	1.64	0.96		8.96	3.48	1.59	0.45		8.68	3.37	1.53	0.43		8.46	3.28	1.49	0.42
6.6		3.52	2.36	1.69	0.99		9.45	3.67	1.67	0.47		9.15	3.55	1.62	0.46		8.92	3.46	1.57	0.44
6.8		3.63	2.43	1.74	1.02		9.95	3.86	1.76	0.50		9.63	3.74	1.70	0.48		9.39	3.64	1.66	0.47
7.0		3.73	2.50	1.79	1.05		10.45	4.06	1.85	0.52		10.13	3.93	1.79	0.50		9.88	3.82	1.74	0.49
7.5		4.00	2.68	1.92	1.12		11.78	4.57	2.08	0.59		11.41	4.42	2.01	0.57		11.13	4.31	1.96	0.55
8.0		4.27	2.86	2.05	1.20		13.16	5.10	2.32	0.65		12.76	4.94	2.25	0.63		12.45	4.81	2.19	0.61
8.5		4.54	3.04	2.18	1.27		14.62	5.66	2.58	0.73		14.18	5.48	2.49	0.70		13.84	5.35	2.43	0.68
9.0			3.22	2.30	1.35			6.25	2.84	0.80			6.05	2.75	0.77			5.90	2.68	0.75
10.0			3.57	2.56	1.49			7.49	3.40	0.96			7.26	3.30	0.92			7.09	3.21	0.90
12.0			4.29	3.07	1.79			10.28	4.66	1.31			9.97	4.52	1.26			9.73	4.41	1.23
14.0			5.00	3.59	2.09			13.44	6.08	1.70			13.05	5.90	1.65			12.75	5.76	1.61
16.0				4.10	2.39				7.67	2.14				7.45	2.08				7.27	2.02
18.0				4.61	2.69				9.42	2.63				9.15	2.55				8.94	2.48
20.0				5.12	2.99				11.33	3.15				11.01	3.06				10.76	2.99
25.0				6.40	3.74				16.75	4.65				16.30	4.51				15.94	4.41
30.0					4.48					6.39					6.22					6.08
35.0					5.23					8.38					8.15					7.98
40.0					5.98					10.60					10.32					10.10
45.0					6.73					13.06					12.72					12.45
50.0					7.47					15.73					15.33					15.02
55.0					8.2					18.64					18.16					17.80
60.0					9.0					21.75					21.21					20.79