

GSC ENERGY PRO PIPE

FLOW CHARACTERISTICS

<i>DR15.5</i>	<i>139 PSI</i>	<i>3.00" - 12.00"</i>
<i>DR11</i>	<i>202 PSI</i>	<i>0.75" - 12.00"</i>
<i>DR9</i>	<i>252 PSI</i>	<i>1.00" - 8.00"</i>

GSC ENERGY PRO PIPE

1.00" IPS PE4710 DR9 252 PSI

PIPE INFORMATION

CELL CLASS: PE445574C
 PIPE SIZE: 1.00"
 OD: 1.315"
 ID: 1.005"
 DR: 9
 MAX VEL: 15
 VOL/100 FT: 4.27 GAL

FLUID INFORMATION

TEMP (F): 40.0
 FREEZE PT (F): 32.0
 VISC (CP): 1.55
 DENSITY 62.43
 WATER - NO INHIBITORS

** CONVERSION RULE OF THUMB #1 **

WATER AND ANTIFREEZE
 SOLUTION AT 25° F

20% PROYLENE GLYCOL: 1.36
 20% METHANOL ALCOHOL: 1.25

UBEND PURGING GPM

FT/SEC = GPM x # Bores/Circuit = Purging GPM

2.05 = 5.25 x # B/C = Purging GPM

3.03 = 8.25 x # B/C = Purging GPM

4.00 = 10.50 x # B/C = Purging GPM

5.07 = 13.00 x # B/C = Purging GPM

* Head Loss is determined by using
 the Darcy-Weisbach Equation*
 $(HL)f = f(L/D)((V*V)/2g)$

GPM	VELOCITY (ft/sec)	RE NUMBER	HL* (ft/100 ft)	PD (lbs/100 ft)
0.50	0.20	998	0.04	0.02
1.00	0.39	1,996	0.09	0.04
1.50	0.59	2,994	0.13	0.06
2.00	0.78	3,992	0.18	0.08
2.50	0.98	4,990	0.65	0.28
3.00	1.17	5,988	0.90	0.39
3.50	1.37	6,986	1.18	0.51
4.00	1.56	7,984	1.49	0.64
4.50	1.76	8,982	1.83	0.79
5.00	1.95	9,980	2.20	0.95
5.50	2.15	10,978	2.31	1.00
6.00	2.34	11,976	2.70	1.17
6.50	2.54	12,974	3.12	1.35
7.00	2.73	13,972	3.56	1.54
7.50	2.93	14,971	4.03	1.75
8.00	3.12	15,969	4.53	1.96
8.50	3.32	16,967	5.05	2.19
9.00	3.51	17,965	5.59	2.42
9.50	3.71	18,963	6.16	2.67
10.00	3.90	19,961	6.76	2.93
11.00	4.29	21,957	8.02	3.47
12.00	4.68	23,953	9.37	4.06
13.00	5.07	25,949	10.82	4.69
14.00	5.46	27,945	12.36	5.36
15.00	5.86	29,941	13.99	6.06
16.00	6.25	31,937	15.71	6.81
17.00	6.64	33,933	17.52	7.59
18.00	7.03	35,929	19.42	8.41
19.00	7.42	37,925	21.40	9.27
20.00	7.81	39,921	23.47	10.17



Geothermal Supply Company, Inc
 106 Cherry Street Horse Cave, KY 42749
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 www.geothermalsupply.com

GSC ENERGY PRO PIPE

1.25" IPS PE4710 DR9 252 PSI

PIPE INFORMATION

CELL CLASS: PE445574C
 PIPE SIZE: 1.25"
 OD: 1.660"
 ID: 1.269"
 DR: 9
 MAX VEL: 15
 VOL/100 FT: 6.81 GAL

FLUID INFORMATION

TEMP (F): 40.0
 FREEZE PT (F): 32.0
 VISC (CP): 1.55
 DENSITY 62.43
 WATER - NO INHIBITORS

** CONVERSION RULE OF THUMB #1 **

WATER AND ANTIFREEZE
 SOLUTION AT 25° F

20% PROYLENE GLYCOL: 1.36
 20% METHANOL ALCOHOL: 1.25

UBEND PURGING GPM

FT/SEC = GPM x # Bores/Circuit = Purging GPM

2.08 = 8.50 x # B/C = Purging GPM

3.06 = 12.50 x # B/C = Purging GPM

4.04 = 16.50 x # B/C = Purging GPM

5.02 = 20.50 x # B/C = Purging GPM

* Head Loss is determined by using
 the Darcy-Weisbach Equation*
 $(HL)f = f(L/D)((V*V)/2g)$

GPM	VELOCITY (ft/sec)	RE NUMBER	HL* (ft/100 ft)	PD (lbs/100 ft)
1.50	0.37	2,371	0.05	0.02
2.00	0.49	3,161	0.07	0.03
2.50	0.61	3,951	0.09	0.04
3.00	0.73	4,741	0.30	0.13
3.50	0.86	5,532	0.39	0.17
4.00	0.98	6,322	0.49	0.21
4.50	1.10	7,112	0.60	0.26
5.00	1.22	7,902	0.72	0.31
5.50	1.35	8,693	0.86	0.37
6.00	1.47	9,483	1.00	0.43
6.50	1.59	10,273	1.02	0.44
7.00	1.71	11,063	1.16	0.50
7.50	1.84	11,854	1.32	0.57
8.00	1.96	12,644	1.48	0.64
8.50	2.08	13,434	1.65	0.71
9.00	2.20	14,224	1.83	0.79
9.50	2.32	15,015	2.01	0.87
10.00	2.45	15,805	2.21	0.96
10.50	2.57	16,595	2.41	1.04
11.00	2.69	17,385	2.62	1.13
12.00	2.94	18,966	3.06	1.33
13.00	3.18	20,546	3.53	1.53
14.00	3.43	22,127	4.04	1.75
15.00	3.67	23,707	4.57	1.98
16.00	3.92	25,288	5.13	2.22
17.00	4.16	26,868	5.72	2.48
18.00	4.40	28,449	6.34	2.75
19.00	4.65	30,029	6.98	3.03
20.00	4.89	31,610	7.66	3.32
21.00	5.14	33,190	8.36	3.62



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GSC ENERGY PRO PIPE

1.50" IPS PE4710 DR9 252 PSI

PIPE INFORMATION

CELL CLASS: PE445574C
 PIPE SIZE: 1.50"
 OD: 1.900"
 ID: 1.452"
 DR: 9
 MAX VEL: 15
 VOL/100 FT: 8.91 GAL

FLUID INFORMATION

TEMP (F): 40.0
 FREEZE PT (F): 32.0
 VISC (CP): 1.55
 DENSITY 62.43
 WATER - NO INHIBITORS

** CONVERSION RULE OF THUMB #1 **

WATER AND ANTIFREEZE
 SOLUTION AT 25° F

20% PROYPLENE GLYCOL: 1.36
 20% METHANOL ALCOHOL: 1.25

* Head Loss is determined by using
 the Darcy-Weisbach Equation*
 $(HL)f = f(L/D)((V*V)/2g)$

GPM	VELOCITY (ft/sec)	RE NUMBER	HL* (ft/100 ft)	PD (lbs/100 ft)
2.00	0.37	2,763	0.04	0.02
3.00	0.56	4,145	0.16	0.07
4.00	0.75	5,526	0.26	0.11
5.00	0.94	6,908	0.38	0.17
6.00	1.12	8,290	0.53	0.23
7.00	1.31	9,671	0.69	0.30
8.00	1.50	11,053	0.78	0.34
9.00	1.68	12,434	0.96	0.42
10.00	1.87	13,816	1.16	0.50
11.00	2.06	15,197	1.37	0.60
12.00	2.24	16,579	1.61	0.70
13.00	2.43	17,961	1.85	0.80
14.00	2.62	19,342	2.12	0.92
15.00	2.81	20,724	2.40	1.04
16.00	2.99	22,105	2.69	1.17
17.00	3.18	23,487	3.00	1.30
18.00	3.37	24,869	3.32	1.44
19.00	3.55	26,250	3.66	1.59
20.00	3.74	27,632	4.02	1.74
21.00	3.93	29,013	4.38	1.90
23.00	4.30	31,776	5.16	2.24
25.00	4.68	34,540	6.00	2.60
27.00	5.05	37,303	6.89	2.98
29.00	5.42	40,066	7.83	3.39
31.00	5.80	42,829	8.83	3.83
33.00	6.17	45,592	9.88	4.28
35.00	6.55	48,355	10.99	4.76
37.00	6.92	51,119	12.14	5.26
39.00	7.29	53,882	13.35	5.79
41.00	7.67	56,645	14.61	6.33



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GSC ENERGY PRO PIPE

2.00" IPS PE4710 DR9 252 PSI

PIPE INFORMATION

CELL CLASS: PE445574C
 PIPE SIZE: 2.00"
 OD: 2.375"
 ID: 1.816"
 DR: 9
 MAX VEL: 15
 VOL/100 FT: 13.92 GAL

FLUID INFORMATION

TEMP (F): 40.0
 FREEZE PT (F): 32.0
 VISC (CP): 1.55
 DENSITY 62.43
 WATER - NO INHIBITORS

** CONVERSION RULE OF THUMB #1 **

WATER AND ANTIFREEZE
 SOLUTION AT 25° F

20% PROYPLENE GLYCOL: 1.36
 20% METHANOL ALCOHOL: 1.25

* Head Loss is determined by using
 the Darcy-Weisbach Equation*
 $(HL)f = f(L/D)((V*V)/2g)$

GPM	VELOCITY (ft/sec)	RE NUMBER	HL* (ft/100 ft)	PD (lbs/100 ft)
2.50	0.30	2,764	0.02	0.01
4.00	0.48	4,422	0.09	0.04
5.50	0.66	6,081	0.16	0.07
7.00	0.84	7,739	0.24	0.10
8.50	1.02	9,397	0.34	0.15
10.00	1.20	11,056	0.40	0.17
11.50	1.38	12,714	0.51	0.22
13.00	1.56	14,372	0.64	0.28
14.50	1.74	16,031	0.77	0.34
16.00	1.92	17,689	0.92	0.40
17.50	2.10	19,347	1.09	0.47
19.00	2.28	21,006	1.26	0.55
20.50	2.45	22,664	1.44	0.62
22.00	2.63	24,322	1.64	0.71
23.50	2.81	25,981	1.84	0.80
25.00	2.99	27,639	2.06	0.89
26.50	3.17	29,297	2.29	0.99
28.00	3.35	30,956	2.52	1.09
29.50	3.53	32,614	2.77	1.20
31.00	3.71	34,273	3.03	1.31
34.00	4.07	37,589	3.58	1.55
37.00	4.43	40,906	4.17	1.81
40.00	4.79	44,223	4.79	2.08
43.00	5.15	47,539	5.46	2.37
46.00	5.51	50,856	6.17	2.67
49.00	5.87	54,173	6.91	2.99
52.00	6.23	57,489	7.69	3.33
55.00	6.59	60,806	8.51	3.69
58.00	6.95	64,123	9.36	4.06
61.00	7.30	67,440	10.25	4.44



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GSC ENERGY PRO PIPE

3.00" IPS PE4710 DR9 252 PSI

PIPE INFORMATION

CELL CLASS: PE445574C
 PIPE SIZE: 3.00"
 OD: 3.500"
 ID: 2.676"
 DR: 9
 MAX VEL: 15
 VOL/100 FT: 30.23 GAL

FLUID INFORMATION

TEMP (F): 40.0
 FREEZE PT (F): 32.0
 VISC (CP): 1.55
 DENSITY 62.43
 WATER - NO INHIBITORS

** CONVERSION RULE OF THUMB #1 **

WATER AND ANTIFREEZE
 SOLUTION AT 25° F

20% PROYPLENE GLYCOL: 1.36
 20% METHANOL ALCOHOL: 1.25

* Head Loss is determined by using
 the Darcy-Weisbach Equation*
 $(HL)f = f(L/D)((V*V)/2g)$

GPM	VELOCITY (ft/sec)	RE NUMBER	HL* (ft/100 ft)	PD (lbs/100 ft)
15.00	0.83	11,253	0.13	0.06
20.00	1.10	15,004	0.21	0.09
25.00	1.38	18,754	0.32	0.14
30.00	1.65	22,505	0.44	0.19
35.00	1.93	26,256	0.59	0.25
40.00	2.21	30,007	0.75	0.32
45.00	2.48	33,758	0.92	0.40
50.00	2.76	37,509	1.11	0.48
55.00	3.03	41,260	1.32	0.57
60.00	3.31	45,011	1.55	0.67
65.00	3.58	48,761	1.79	0.77
70.00	3.86	52,512	2.04	0.88
75.00	4.14	56,263	2.31	1.00
80.00	4.41	60,014	2.60	1.12
85.00	4.69	63,765	2.90	1.25
90.00	4.96	67,516	3.21	1.39
95.00	5.24	71,267	3.54	1.53
100.00	5.51	75,018	3.88	1.68
105.00	5.79	78,769	4.24	1.84
110.00	6.06	82,519	4.61	2.00
120.00	6.62	90,021	5.39	2.34
130.00	7.17	97,523	6.23	2.70
140.00	7.72	105,025	7.12	3.09
150.00	8.27	112,526	8.07	3.50
160.00	8.82	120,028	9.07	3.93
170.00	9.37	127,530	10.12	4.38
180.00	9.92	135,032	11.22	4.86
190.00	10.48	142,534	12.37	5.36
200.00	11.03	150,035	13.58	5.88
210.00	11.58	157,537	14.83	6.43



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GSC ENERGY PRO PIPE

4.00" IPS PE4710 DR9 252 PSI

PIPE INFORMATION

CELL CLASS: PE445574C
 PIPE SIZE: 4.00"
 OD: 4.500"
 ID: 3.440"
 DR: 9
 MAX VEL: 15
 VOL/100 FT: 49.98 GAL

FLUID INFORMATION

TEMP (F): 40.0
 FREEZE PT (F): 32.0
 VISC (CP): 1.55
 DENSITY 62.43
 WATER - NO INHIBITORS

** CONVERSION RULE OF THUMB #1 **

WATER AND ANTIFREEZE
 SOLUTION AT 25° F

20% PROYPLENE GLYCOL: 1.36
 20% METHANOL ALCOHOL: 1.25

* Head Loss is determined by using
 the Darcy-Weisbach Equation*
 $(HL)f = f(L/D)((V*V)/2g)$

GPM	VELOCITY (ft/sec)	RE NUMBER	HL* (ft/100 ft)	PD (lbs/100 ft)
25.50	0.85	14,877	0.10	0.04
31.00	1.03	18,086	0.14	0.06
36.50	1.22	21,295	0.19	0.08
42.00	1.40	24,504	0.24	0.11
47.50	1.58	27,713	0.30	0.13
53.00	1.77	30,921	0.37	0.16
58.50	1.95	34,130	0.44	0.19
64.00	2.13	37,339	0.52	0.23
69.50	2.32	40,548	0.60	0.26
75.00	2.50	43,757	0.69	0.30
80.50	2.68	46,966	0.79	0.34
86.00	2.87	50,174	0.88	0.38
91.50	3.05	53,383	0.99	0.43
97.00	3.23	56,592	1.10	0.48
102.50	3.42	59,801	1.21	0.53
108.00	3.60	63,010	1.33	0.58
113.50	3.78	66,219	1.46	0.63
119.00	3.97	69,427	1.59	0.69
124.50	4.15	72,636	1.72	0.75
130.00	4.34	75,845	1.86	0.81
141.00	4.70	82,263	2.16	0.93
152.00	5.07	88,680	2.47	1.07
163.00	5.44	95,098	2.80	1.21
174.00	5.80	101,516	3.15	1.37
185.00	6.17	107,933	3.52	1.53
196.00	6.54	114,351	3.91	1.69
207.00	6.90	120,769	4.31	1.87
218.00	7.27	127,186	4.74	2.05
229.00	7.64	133,604	5.18	2.24
240.00	8.00	140,022	5.64	2.44



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GSC ENERGY PRO PIPE

6.00" IPS PE4710 DR9 252 PSI

PIPE INFORMATION

CELL CLASS: PE445574C
 PIPE SIZE: 6.00"
 OD: 6.625"
 ID: 5.064"
 DR: 9
 MAX VEL: 15
 VOL/100 FT: 108.34 GAL

FLUID INFORMATION

TEMP (F): 40.0
 FREEZE PT (F): 32.0
 VISC (CP): 1.55
 DENSITY 62.43
 WATER - NO INHIBITORS

** CONVERSION RULE OF THUMB #1 **

WATER AND ANTIFREEZE
 SOLUTION AT 25° F

20% PROYPLENE GLYCOL: 1.36
 20% METHANOL ALCOHOL: 1.25

* Head Loss is determined by using
 the Darcy-Weisbach Equation*
 $(HL)f = f(L/D)((V*V)/2g)$

GPM	VELOCITY (ft/sec)	RE NUMBER	HL* (ft/100 ft)	PD (lbs/100 ft)
100.00	1.54	39,627	0.18	0.08
120.00	1.85	47,552	0.25	0.11
140.00	2.15	55,478	0.33	0.14
160.00	2.46	63,403	0.42	0.18
180.00	2.77	71,329	0.52	0.23
200.00	3.08	79,254	0.63	0.27
220.00	3.38	87,179	0.75	0.33
240.00	3.69	95,105	0.88	0.38
260.00	4.00	103,030	1.01	0.44
280.00	4.31	110,956	1.16	0.50
300.00	4.62	118,881	1.31	0.57
320.00	4.92	126,806	1.48	0.64
340.00	5.23	134,732	1.65	0.71
360.00	5.54	142,657	1.83	0.79
380.00	5.85	150,583	2.01	0.87
400.00	6.15	158,508	2.21	0.96
420.00	6.46	166,433	2.41	1.05
440.00	6.77	174,359	2.63	1.14
460.00	7.08	182,284	2.85	1.23
480.00	7.38	190,210	3.07	1.33
520.00	8.00	206,060	3.55	1.54
560.00	8.62	221,911	4.07	1.76
600.00	9.23	237,762	4.61	2.00
640.00	9.85	253,613	5.18	2.24
680.00	10.46	269,464	5.78	2.51
720.00	11.08	285,315	6.41	2.78
760.00	11.69	301,165	7.08	3.07
800.00	12.31	317,016	7.77	3.37
840.00	12.92	332,867	8.49	3.68
880.00	13.54	348,718	9.24	4.00



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GSC ENERGY PRO PIPE

8.00" IPS PE4710 DR9 252 PSI

PIPE INFORMATION

CELL CLASS: PE445574C
 PIPE SIZE: 8.00"
 OD: 8.625"
 ID: 6.593"
 DR: 9
 MAX VEL: 15
 VOL/100 FT: 183.64 GAL

FLUID INFORMATION

TEMP (F): 40.0
 FREEZE PT (F): 32.0
 VISC (CP): 1.55
 DENSITY 62.43
 WATER - NO INHIBITORS

** CONVERSION RULE OF THUMB #1 **

WATER AND ANTIFREEZE
 SOLUTION AT 25° F

20% PROYPLENE GLYCOL: 1.36
 20% METHANOL ALCOHOL: 1.25

* Head Loss is determined by using
 the Darcy-Weisbach Equation*
 $(HL)f = f(L/D)((V*V)/2g)$

GPM	VELOCITY (ft/sec)	RE NUMBER	HL* (ft/100 ft)	PD (lbs/100 ft)
200.00	1.82	60,873	0.18	0.08
220.00	2.00	66,960	0.21	0.09
240.00	2.18	73,047	0.25	0.11
260.00	2.36	79,135	0.29	0.12
280.00	2.54	85,222	0.33	0.14
300.00	2.72	91,309	0.37	0.16
320.00	2.90	97,397	0.42	0.18
340.00	3.09	103,484	0.46	0.20
360.00	3.27	109,571	0.51	0.22
380.00	3.45	115,658	0.57	0.25
400.00	3.63	121,746	0.62	0.27
420.00	3.81	127,833	0.68	0.29
440.00	3.99	133,920	0.74	0.32
460.00	4.17	140,008	0.80	0.35
480.00	4.36	146,095	0.86	0.37
500.00	4.54	152,182	0.93	0.40
520.00	4.72	158,269	1.00	0.43
540.00	4.90	164,357	1.07	0.46
560.00	5.08	170,444	1.14	0.49
580.00	5.26	176,531	1.22	0.53
620.00	5.63	188,706	1.37	0.60
660.00	5.99	200,880	1.54	0.67
700.00	6.35	213,055	1.71	0.74
740.00	6.72	225,230	1.89	0.82
780.00	7.08	237,404	2.08	0.90
820.00	7.44	249,579	2.28	0.99
860.00	7.81	261,753	2.49	1.08
900.00	8.17	273,928	2.70	1.17
940.00	8.53	286,102	2.92	1.27
980.00	8.89	298,277	3.15	1.37



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GSC ENERGY PRO PIPE

0.75" IPS PE4710 DR11 202 PSI

PIPE INFORMATION

CELL CLASS: PE445574C
 PIPE SIZE: 0.75"
 OD: 1.050"
 ID: 0.860"
 DR: 11
 MAX VEL: 15
 VOL/100 FT: 3.02 GAL

FLUID INFORMATION

TEMP (F): 40.0
 FREEZE PT (F): 32.0
 VISC (CP): 1.55
 DENSITY 62.43
 WATER - NO INHIBITORS

** CONVERSION RULE OF THUMB #1 **

WATER AND ANTIFREEZE
 SOLUTION AT 25° F

20% PROYLENE GLYCOL: 1.36
 20% METHANOL ALCOHOL: 1.25

UBEND PURGING GPM

FT/SEC = GPM x # Bores/Circuit = Purging GPM

2.07 = 3.75 x # B/C = Purging GPM

3.04 = 5.50 x # B/C = Purging GPM

4.01 = 7.25 x # B/C = Purging GPM

5.11 = 9.25 x # B/C = Purging GPM

* Head Loss is determined by using
 the Darcy-Weisbach Equation*
 $(HL)f = f(L/D)((V*V)/2g)$

GPM	VELOCITY (ft/sec)	RE NUMBER	HL* (ft/100 ft)	PD (lbs/100 ft)
0.75	0.41	1,781	0.13	0.06
1.00	0.55	2,374	0.18	0.08
1.25	0.69	2,968	0.22	0.10
1.50	0.83	3,562	0.27	0.12
1.75	0.97	4,155	0.80	0.35
2.00	1.10	4,749	1.01	0.44
2.25	1.24	5,342	1.24	0.54
2.50	1.38	5,936	1.49	0.65
2.75	1.52	6,530	1.46	0.76
3.00	1.66	7,123	2.05	0.89
3.25	1.80	7,717	2.36	1.02
3.50	1.93	8,310	2.68	1.16
3.75	2.07	8,904	3.03	1.13
4.00	2.21	9,498	3.39	1.47
4.25	2.35	10,091	3.35	1.45
4.50	2.49	10,685	3.71	1.61
4.75	2.62	11,278	4.09	1.77
5.00	2.76	11,872	4.48	1.94
5.25	2.90	12,466	4.89	2.12
5.50	3.04	13,059	5.32	2.30
6.00	3.31	14,246	6.21	2.69
6.50	3.59	15,434	7.17	3.11
7.00	3.87	16,621	8.19	3.55
7.50	4.14	17,808	9.27	4.02
8.00	4.42	18,995	10.41	4.51
8.50	4.69	20,182	11.60	5.03
9.00	4.97	21,370	12.85	5.57
9.50	5.25	22,557	14.16	6.14
10.00	5.52	23,744	15.53	6.73
10.50	5.80	24,931	16.95	7.34



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GSC ENERGY PRO PIPE

1.00" IPS PE4710 DR11 202 PSI

PIPE INFORMATION

CELL CLASS: PE445574C
 PIPE SIZE: 1.00"
 OD: 1.315"
 ID: 1.062"
 DR: 11
 MAX VEL: 15
 VOL/100 FT: 4.71 GAL

FLUID INFORMATION

TEMP (F): 40.0
 FREEZE PT (F): 32.0
 VISC (CP): 1.55
 DENSITY 62.43
 WATER - NO INHIBITORS

** CONVERSION RULE OF THUMB #1 **

WATER AND ANTIFREEZE
 SOLUTION AT 25° F

20% PROYLENE GLYCOL: 1.36
 20% METHANOL ALCOHOL: 1.25

UBEND PURGING GPM

FT/SEC = GPM x # Bores/Circuit = Purging GPM

2.03 = 5.75 x # B/C = Purging GPM

3.00 = 8.50 x # B/C = Purging GPM

4.07 = 11.50 x # B/C = Purging GPM

5.13 = 14.50 x # B/C = Purging GPM

* Head Loss is determined by using
 the Darcy-Weisbach Equation*
 $(HL)f = f(L/D)((V*V)/2g)$

GPM	VELOCITY (ft/sec)	RE NUMBER	HL* (ft/100 ft)	PD (lbs/100 ft)
0.50	0.18	950	0.04	0.02
1.00	0.35	1,900	0.07	0.03
1.50	0.53	2,849	0.11	0.05
2.00	0.71	3,799	0.15	0.06
2.50	0.88	4,749	0.52	0.22
3.00	1.06	5,699	0.71	0.31
3.50	1.24	6,648	0.93	0.40
4.00	1.41	7,598	1.17	0.51
4.50	1.59	8,548	1.44	0.63
5.00	1.77	9,498	1.74	0.75
5.50	1.94	10,447	1.82	0.79
6.00	2.12	11,397	2.13	0.92
6.50	2.30	12,347	2.46	1.07
7.00	2.47	13,297	2.81	1.22
7.50	2.65	14,246	3.18	1.38
8.00	2.83	15,196	3.57	1.55
8.50	3.00	16,146	3.98	1.72
9.00	3.18	17,096	4.41	1.91
9.50	3.36	18,045	4.86	2.11
10.00	3.53	18,995	5.33	2.31
11.00	3.89	20,895	6.32	2.74
12.00	4.24	22,794	7.39	3.20
13.00	4.60	24,694	8.53	3.70
14.00	4.95	26,593	9.75	4.22
15.00	5.30	28,493	11.03	4.78
16.00	5.66	30,392	12.39	5.37
17.00	6.01	32,292	13.81	5.99
18.00	6.36	34,191	15.31	6.63
19.00	6.72	36,091	16.87	7.31
20.00	7.07	37,990	18.50	8.02



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GSC ENERGY PRO PIPE

1.25" IPS PE4710 DR11 202 PSI

PIPE INFORMATION

CELL CLASS: PE445574C
 PIPE SIZE: 1.25"
 OD: 1.660"
 ID: 1.340"
 DR: 11
 MAX VEL: 15
 VOL/100 FT: 7.52 GAL

FLUID INFORMATION

TEMP (F): 40.0
 FREEZE PT (F): 32.0
 VISC (CP): 1.55
 DENSITY 62.43
 WATER - NO INHIBITORS

** CONVERSION RULE OF THUMB #1 **

WATER AND ANTIFREEZE
 SOLUTION AT 25° F

20% PROYLENE GLYCOL: 1.36
 20% METHANOL ALCOHOL: 1.25

UBEND PURGING GPM

FT/SEC = GPM x # Bores/Circuit = Purging GPM

2.05 = 9.25 x # B/C = Purging GPM

3.10 = 14.00 x # B/C = Purging GPM

4.10 = 18.50 x # B/C = Purging GPM

5.09 = 23.00 x # B/C = Purging GPM

* Head Loss is determined by using
 the Darcy-Weisbach Equation*
 $(HL)f = f(L/D)((V*V)/2g)$

GPM	VELOCITY (ft/sec)	RE NUMBER	HL* (ft/100 ft)	PD (lbs/100 ft)
1.50	0.33	2,256	0.04	0.02
2.00	0.44	3,007	0.06	0.02
2.50	0.55	3,759	0.07	0.03
3.00	0.66	4,511	0.23	0.10
3.50	0.78	5,263	0.31	0.13
4.00	0.89	6,015	0.39	0.17
4.50	1.00	6,767	0.48	0.21
5.00	1.11	7,518	0.57	0.25
5.50	1.22	8,270	0.68	0.29
6.00	1.33	9,022	0.79	0.34
6.50	1.44	9,774	0.91	0.39
7.00	1.55	10,526	0.92	0.40
7.50	1.66	11,278	1.04	0.45
8.00	1.77	12,029	1.17	0.50
8.50	1.88	12,781	1.30	0.56
9.00	1.99	13,533	1.44	0.62
9.50	2.10	14,285	1.59	0.69
10.00	2.22	15,037	1.74	0.75
10.50	2.33	15,789	1.90	0.82
11.00	2.44	16,540	2.06	0.89
12.00	2.66	18,044	2.41	1.04
13.00	2.88	19,548	2.78	1.21
14.00	3.10	21,051	3.18	1.38
15.00	3.32	22,555	3.60	1.56
16.00	3.54	24,059	4.04	1.75
17.00	3.77	25,562	4.50	1.95
18.00	3.99	27,066	4.99	2.16
19.00	4.21	28,570	5.50	2.38
20.00	4.43	30,073	6.03	2.61
21.00	4.65	31,577	6.58	2.85



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GSC ENERGY PRO PIPE

1.50" IPS PE4710 DR11 202 PSI

PIPE INFORMATION

CELL CLASS: PE445574C
 PIPE SIZE: 1.500"
 OD: 1.900"
 ID: 1.534"
 DR: 11
 MAX VEL: 15
 VOL/100 FT: 9.85 GAL

FLUID INFORMATION

TEMP (F): 40.0
 FREEZE PT (F): 32.0
 VISC (CP): 1.55
 DENSITY 62.43
 WATER - NO INHIBITORS

** CONVERSION RULE OF THUMB #1 **

WATER AND ANTIFREEZE
 SOLUTION AT 25° F

20% PROYPLENE GLYCOL: 1.36
 20% METHANOL ALCOHOL: 1.25

* Head Loss is determined by using
 the Darcy-Weisbach Equation*
 $(HL)f = f(L/D)((V*V)/2g)$

GPM	VELOCITY (ft/sec)	RE NUMBER	HL* (ft/100 ft)	PD (lbs/100 ft)
2.00	0.34	2,628	0.03	0.01
3.00	0.51	3,942	0.05	0.02
4.00	0.68	5,256	0.20	0.09
5.00	0.85	6,570	0.30	0.13
6.00	1.01	7,884	0.41	0.18
7.00	1.18	9,198	0.54	0.24
8.00	1.35	10,512	0.61	0.26
9.00	1.52	11,826	0.75	0.33
10.00	1.69	13,140	0.91	0.39
11.00	1.86	14,454	1.08	0.47
12.00	2.03	15,768	1.26	0.55
13.00	2.20	17,082	1.46	0.63
14.00	2.37	18,396	1.67	0.72
15.00	2.54	19,710	1.88	0.82
16.00	2.71	21,024	2.12	0.92
17.00	2.88	22,338	2.36	1.02
18.00	3.04	23,652	2.61	1.13
19.00	3.21	24,966	2.88	1.25
20.00	3.38	26,280	3.16	1.37
21.00	3.55	27,594	3.45	1.49
23.00	3.89	30,222	4.06	1.76
25.00	4.23	32,850	4.72	2.04
27.00	4.57	35,478	5.42	2.35
29.00	4.91	38,106	6.16	2.67
31.00	5.24	40,734	6.94	3.01
33.00	5.58	43,363	7.77	3.37
35.00	5.92	45,991	8.64	3.74
37.00	6.26	48,619	9.55	4.14
39.00	6.60	51,247	10.50	4.55
41.00	6.94	53,875	11.48	4.98



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GSC ENERGY PRO PIPE

2.00" IPS PE4710 DR11 202 PSI

PIPE INFORMATION

CELL CLASS: PE445574C
 PIPE SIZE: 2.00"
 OD: 2.375"
 ID: 1.917"
 DR: 11
 MAX VEL: 15
 VOL/100 FT: 15.40 GAL

FLUID INFORMATION

TEMP (F): 40.0
 FREEZE PT (F): 32.0
 VISC (CP): 1.55
 DENSITY 62.43
 WATER - NO INHIBITORS

** CONVERSION RULE OF THUMB #1 **

WATER AND ANTIFREEZE
 SOLUTION AT 25° F

20% PROYPLENE GLYCOL: 1.36
 20% METHANOL ALCOHOL: 1.25

* Head Loss is determined by using
 the Darcy-Weisbach Equation*
 $(HL)f = f(L/D)((V*V)/2g)$

GPM	VELOCITY (ft/sec)	RE NUMBER	HL* (ft/100 ft)	PD (lbs/100 ft)
2.50	0.27	2,627	0.02	0.01
4.00	0.43	4,204	0.07	0.03
5.50	0.60	5,780	0.12	0.05
7.00	0.76	7,357	0.19	0.08
8.50	0.92	8,933	0.26	0.11
10.00	1.08	10,509	0.31	0.14
11.50	1.24	12,086	0.40	0.17
13.00	1.41	13,662	0.40	0.22
14.50	1.57	15,239	0.61	0.26
16.00	1.73	16,815	0.73	0.31
17.50	1.89	18,391	0.85	0.37
19.00	2.06	19,968	0.99	0.43
20.50	2.22	21,544	1.13	0.49
22.00	2.38	23,121	1.28	0.56
23.50	2.54	24,697	1.45	0.63
25.00	2.71	26,274	1.62	0.70
26.50	2.87	27,850	1.79	0.78
28.00	3.03	29,426	1.98	0.86
29.50	3.19	31,003	2.17	0.94
31.00	3.35	32,579	2.38	1.03
34.00	3.68	35,732	2.81	1.22
37.00	4.00	38,885	3.27	1.42
40.00	4.33	42,038	3.76	1.63
43.00	4.65	45,191	4.28	1.86
46.00	4.98	48,343	4.83	2.09
49.00	5.30	51,496	5.42	2.35
52.00	5.63	54,649	6.03	2.61
55.00	5.95	57,802	6.67	2.89
58.00	6.28	60,955	7.34	3.18
61.00	6.60	64,107	8.04	3.48



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GSC ENERGY PRO PIPE

3.00" IPS PE4710 DR11 202 PSI

PIPE INFORMATION

CELL CLASS: PE445574C
 PIPE SIZE: 3.00"
 OD: 3.500"
 ID: 2.825"
 DR: 11
 MAX VEL: 15
 VOL/100 FT: 33.47 GAL

FLUID INFORMATION

TEMP (F): 40.0
 FREEZE PT (F): 32.0
 VISC (CP): 1.55
 DENSITY 62.43
 WATER - NO INHIBITORS

** CONVERSION RULE OF THUMB #1 **

WATER AND ANTIFREEZE
 SOLUTION AT 25° F

20% PROYPLENE GLYCOL: 1.36
 20% METHANOL ALCOHOL: 1.25

* Head Loss is determined by using
 the Darcy-Weisbach Equation*
 $(HL)f = f(L/D)((V*V)/2g)$

GPM	VELOCITY (ft/sec)	RE NUMBER	HL* (ft/100 ft)	PD (lbs/100 ft)
15.00	0.75	10,695	0.10	0.04
20.00	1.00	14,260	0.17	0.07
25.00	1.25	17,825	0.25	0.11
30.00	1.49	21,389	0.35	0.15
35.00	1.74	24,954	0.46	0.20
40.00	1.99	28,519	0.58	0.25
45.00	2.24	32,084	0.72	0.31
50.00	2.49	35,649	0.87	0.38
55.00	2.74	39,214	1.04	0.45
60.00	2.99	42,779	1.21	0.52
65.00	3.24	46,344	1.40	0.61
70.00	3.49	49,909	1.60	0.69
75.00	3.74	53,474	1.81	0.78
80.00	3.98	57,039	2.03	0.88
85.00	4.23	60,603	2.27	0.98
90.00	4.48	64,168	2.51	1.09
95.00	4.73	67,733	2.77	1.20
100.00	4.98	71,298	3.04	1.32
105.00	5.23	74,863	3.32	1.44
110.00	5.48	78,428	3.61	1.56
120.00	5.98	85,558	4.22	1.83
130.00	6.47	92,688	4.88	2.11
140.00	6.97	99,817	5.58	2.42
150.00	7.47	106,947	6.32	2.74
160.00	7.97	114,077	7.10	3.08
170.00	8.47	121,207	7.92	3.43
180.00	8.96	128,337	8.79	3.81
190.00	9.46	135,467	9.69	4.20
200.00	9.96	142,596	10.63	4.61
210.00	10.46	149,726	11.61	5.03



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GSC ENERGY PRO PIPE

4.00" IPS PE4710 DR11 202 PSI

PIPE INFORMATION

CELL CLASS: PE445574C
 PIPE SIZE: 4.00"
 OD: 4.500"
 ID: 3.633"
 DR: 11
 MAX VEL: 15
 VOL/100 FT: 55.31 GAL

FLUID INFORMATION

TEMP (F): 40.0
 FREEZE PT (F): 32.0
 VISC (CP): 1.55
 DENSITY 62.43
 WATER - NO INHIBITORS

** CONVERSION RULE OF THUMB #1 **

WATER AND ANTIFREEZE
 SOLUTION AT 25° F

20% PROYPLENE GLYCOL: 1.36
 20% METHANOL ALCOHOL: 1.25

* Head Loss is determined by using
 the Darcy-Weisbach Equation*
 $(HL)f = f(L/D)((V*V)/2g)$

GPM	VELOCITY (ft/sec)	RE NUMBER	HL* (ft/100 ft)	PD (lbs/100 ft)
25.00	0.75	13,865	0.08	0.03
30.50	0.92	16,915	0.11	0.05
36.00	1.08	19,965	0.14	0.06
41.50	1.25	23,015	0.19	0.08
47.00	1.42	26,065	0.23	0.10
52.50	1.58	29,116	0.29	0.12
58.00	1.75	32,166	0.34	0.15
63.50	1.91	35,216	0.40	0.17
69.00	2.08	38,266	0.47	0.20
74.50	2.24	41,317	0.54	0.23
80.00	2.41	44,367	0.61	0.26
85.50	2.58	47,417	0.69	0.30
91.00	2.74	50,467	0.77	0.33
96.50	2.91	53,517	0.85	0.37
102.00	3.07	56,568	0.94	0.41
107.50	3.24	59,618	1.04	0.45
113.00	3.40	62,668	1.13	0.49
118.50	3.57	65,718	1.24	0.54
124.00	3.74	68,768	1.34	0.58
129.50	3.90	71,819	1.45	0.63
140.50	4.23	77,919	1.68	0.73
151.50	4.56	84,020	1.92	0.83
162.50	4.90	90,120	2.18	0.95
173.50	5.23	96,220	2.46	1.06
184.50	5.56	102,321	2.75	1.19
195.50	5.89	108,421	3.05	1.32
206.50	6.22	114,522	3.37	1.46
217.50	6.55	120,622	3.70	1.60
228.50	6.89	126,723	4.04	1.75
239.50	7.22	132,823	4.40	1.91



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GSC ENERGY PRO PIPE

6.00" IPS PE4710 DR11 202 PSI

PIPE INFORMATION

CELL CLASS: PE445574C
 PIPE SIZE: 6.00"
 OD: 6.625"
 ID: 5.348"
 DR: 11
 MAX VEL: 15
 VOL/100 FT: 119.90 GAL

FLUID INFORMATION

TEMP (F): 40.0
 FREEZE PT (F): 32.0
 VISC (CP): 1.55
 DENSITY 62.43
 WATER - NO INHIBITORS

** CONVERSION RULE OF THUMB #1 **

WATER AND ANTIFREEZE
 SOLUTION AT 25° F

20% PROYPLENE GLYCOL: 1.36
 20% METHANOL ALCOHOL: 1.25

* Head Loss is determined by using
 the Darcy-Weisbach Equation*
 $(HL)f = f(L/D)((V*V)/2g)$

GPM	VELOCITY (ft/sec)	RE NUMBER	HL* (ft/100 ft)	PD (lbs/100 ft)
100.00	1.39	37,668	0.14	0.06
120.00	1.67	45,202	0.20	0.09
140.00	1.95	52,735	0.26	0.11
160.00	2.22	60,269	0.33	0.14
180.00	2.50	67,802	0.41	0.18
200.00	2.78	75,336	0.50	0.21
220.00	3.06	82,870	0.59	0.25
240.00	3.34	90,403	0.69	0.30
260.00	3.61	97,937	0.79	0.34
280.00	3.89	105,470	0.91	0.39
300.00	4.17	113,004	1.03	0.45
320.00	4.45	120,537	1.16	0.50
340.00	4.73	128,071	1.26	0.56
360.00	5.00	135,605	1.43	0.62
380.00	5.28	143,138	1.58	0.68
400.00	5.56	150,672	1.73	0.75
420.00	5.84	158,205	1.89	0.82
440.00	6.12	165,739	2.06	0.89
460.00	6.39	173,273	2.23	0.97
480.00	6.67	180,806	2.41	1.04
520.00	7.23	195,873	2.79	1.21
560.00	7.78	210,941	3.19	1.38
600.00	8.34	226,008	3.61	1.56
640.00	8.90	241,075	4.06	1.76
680.00	9.45	256,142	4.53	1.96
720.00	10.01	271,209	5.03	2.18
760.00	10.56	286,277	5.54	2.40
800.00	11.12	301,344	6.08	2.64
840.00	11.68	316,411	6.65	2.88
880.00	12.23	331,478	7.23	3.13



Geothermal Supply Company, Inc
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GSC ENERGY PRO PIPE

8.00" IPS PE4710 DR11 202 PSI

PIPE INFORMATION

CELL CLASS: PE445574C
 PIPE SIZE: 8.00"
 OD: 8.625"
 ID: 6.963"
 DR: 11
 MAX VEL: 15
 VOL/100 FT: 203.19 GAL

FLUID INFORMATION

TEMP (F): 40.0
 FREEZE PT (F): 32.0
 VISC (CP): 1.55
 DENSITY 62.43
 WATER - NO INHIBITORS

** CONVERSION RULE OF THUMB #1 **

WATER AND ANTIFREEZE
 SOLUTION AT 25° F

20% PROYPLENE GLYCOL: 1.36
 20% METHANOL ALCOHOL: 1.25

* Head Loss is determined by using
 the Darcy-Weisbach Equation*
 $(HL)f = f(L/D)((V*V)/2g)$

GPM	VELOCITY (ft/sec)	RE NUMBER	HL* (ft/100 ft)	PD (lbs/100 ft)
200.00	1.64	57,871	0.14	0.06
220.00	1.80	63,658	0.17	0.07
240.00	1.97	69,445	0.19	0.08
260.00	2.13	75,232	0.22	0.10
280.00	2.30	81,019	0.26	0.11
300.00	2.46	86,807	0.29	0.13
320.00	2.62	92,594	0.33	0.14
340.00	2.79	98,381	0.36	0.16
360.00	2.95	104,168	0.40	0.17
380.00	3.12	109,955	0.44	0.19
400.00	3.28	115,742	0.49	0.21
420.00	3.45	121,529	0.53	0.23
440.00	3.61	127,316	0.58	0.25
460.00	3.77	133,103	0.63	0.27
480.00	3.94	138,891	0.68	0.29
500.00	4.10	144,678	0.73	0.32
520.00	4.27	150,465	0.78	0.34
540.00	4.43	156,252	0.84	0.36
560.00	4.59	162,039	0.90	0.39
580.00	4.76	167,826	0.95	0.41
620.00	5.09	179,400	1.08	0.47
660.00	5.41	190,974	1.21	0.52
700.00	5.74	202,549	1.34	0.58
740.00	6.07	214,123	1.48	0.64
780.00	6.40	225,697	1.63	0.71
820.00	6.73	237,271	1.79	0.77
860.00	7.05	248,846	1.95	0.84
900.00	7.38	260,420	2.12	0.92
940.00	7.71	271,994	2.29	0.99
980.00	8.04	283,568	2.47	1.07



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GSC ENERGY PRO PIPE

10.00" IPS PE4710 DR11 202 PSI

PIPE INFORMATION

CELL CLASS: PE445574C
 PIPE SIZE: 10.00"
 OD: 10.750"
 ID: 8.678"
 DR: 11
 MAX VEL: 15
 VOL/100 FT: 315.67 GAL

FLUID INFORMATION

TEMP (F): 40.0
 FREEZE PT (F): 32.0
 VISC (CP): 1.55
 DENSITY 62.43
 WATER - NO INHIBITORS

** CONVERSION RULE OF THUMB #1 **

WATER AND ANTIFREEZE
 SOLUTION AT 25° F

20% PROYPLENE GLYCOL: 1.36
 20% METHANOL ALCOHOL: 1.25

* Head Loss is determined by using
 the Darcy-Weisbach Equation*
 $(HL)f = f(L/D)((V*V)/2g)$

GPM	VELOCITY (ft/sec)	RE NUMBER	HL* (ft/100 ft)	PD (lbs/100 ft)
300.00	1.58	69,645	0.10	0.04
350.00	1.85	81,252	0.13	0.06
400.00	2.11	92,859	0.17	0.07
450.00	2.38	104,467	0.21	0.09
500.00	2.64	116,074	0.25	0.11
550.00	2.90	127,682	0.30	0.13
600.00	3.17	139,289	0.35	0.15
650.00	3.43	150,897	0.41	0.18
700.00	3.70	162,504	0.46	0.20
750.00	3.96	174,112	0.53	0.23
800.00	4.22	185,719	0.59	0.26
850.00	4.49	197,326	0.66	0.29
900.00	4.75	208,934	0.73	0.32
950.00	5.02	220,541	0.81	0.35
1000.00	5.28	232,149	0.89	0.38
1050.00	5.54	243,756	0.97	0.42
1100.00	5.81	255,364	1.05	0.46
1150.00	6.07	266,971	1.14	0.50
1200.00	6.34	278,578	1.23	0.54
1250.00	6.60	290,186	1.33	0.58
1300.00	6.86	301,793	1.43	0.62
1400.00	7.39	325,008	1.63	0.71
1500.00	7.92	348,223	1.85	0.80
1600.00	8.45	371,438	2.08	0.90
1700.00	8.98	394,653	2.33	1.01
1800.00	9.50	417,868	2.58	1.12
1900.00	10.03	441,083	2.85	1.23
2000.00	10.56	464,297	3.13	1.35
2100.00	11.09	487,512	3.42	1.48
2200.00	11.62	510,727	3.72	1.61



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GSC ENERGY PRO PIPE

12.00" IPS PE4710 DR11 202 PSI

PIPE INFORMATION

CELL CLASS: PE445574C
 PIPE SIZE: 12.00"
 OD: 12.750"
 ID: 10.293"
 DR: 11
 MAX VEL: 15
 VOL/100 FT: 444.01 GAL

FLUID INFORMATION

TEMP (F): 40.0
 FREEZE PT (F): 32.0
 VISC (CP): 1.55
 DENSITY 62.43
 WATER - NO INHIBITORS

** CONVERSION RULE OF THUMB #1 **

WATER AND ANTIFREEZE
 SOLUTION AT 25° F

20% PROYPLENE GLYCOL: 1.36
 20% METHANOL ALCOHOL: 1.25

* Head Loss is determined by using
 the Darcy-Weisbach Equation*
 $(HL)f = f(L/D)((V*V)/2g)$

GPM	VELOCITY (ft/sec)	RE NUMBER	HL* (ft/100 ft)	PD (lbs/100 ft)
400.00	1.50	78,297	0.07	0.03
500.00	1.88	97,871	0.11	0.05
600.00	2.25	117,445	0.15	0.07
700.00	2.63	137,019	0.20	0.09
800.00	3.00	156,594	0.26	0.11
900.00	3.38	176,168	0.32	0.14
1000.00	3.75	195,742	0.39	0.17
1100.00	4.13	215,316	0.46	0.20
1200.00	4.50	234,890	0.54	0.24
1300.00	4.88	254,465	0.63	0.27
1400.00	5.26	274,039	0.72	0.31
1500.00	5.63	293,613	0.81	0.35
1600.00	6.01	313,187	0.92	0.40
1700.00	6.38	332,761	1.02	0.44
1800.00	6.76	352,336	1.13	0.49
1900.00	7.13	371,910	1.25	0.54
2000.00	7.51	391,484	1.37	0.60
2100.00	7.88	411,058	1.50	0.65
2200.00	8.26	430,632	1.63	0.71
2300.00	8.63	450,207	1.77	0.77
2400.00	9.01	469,781	1.91	0.83
2500.00	9.38	489,355	2.06	0.89
2600.00	9.76	508,929	2.21	0.96
2700.00	10.13	528,503	2.37	1.03
2800.00	10.51	548,078	2.53	1.10
3000.00	11.26	587,226	2.87	1.25
3200.00	12.01	626,374	3.23	1.40
3400.00	12.76	665,523	3.61	1.56
3600.00	13.51	704,671	4.01	1.74
3800.00	14.26	743,819	4.42	1.92



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GSC ENERGY PRO PIPE

3.00" IPS PE4710 DR15.5 139 PSI

PIPE INFORMATION

CELL CLASS: PE445574C
 PIPE SIZE: 3.00"
 OD: 3.500"
 ID: 3.021"
 DR: 15.5
 MAX VEL: 15
 VOL/100 FT: 37.90 GAL

FLUID INFORMATION

TEMP (F): 40.0
 FREEZE PT (F): 32.0
 VISC (CP): 1.55
 DENSITY 62.43
 WATER - NO INHIBITORS

** CONVERSION RULE OF THUMB #1 **

WATER AND ANTIFREEZE
 SOLUTION AT 25° F

20% PROYPLENE GLYCOL: 1.36
 20% METHANOL ALCOHOL: 1.25

* Head Loss is determined by using
 the Darcy-Weisbach Equation*
 $(HL)f = f(L/D)((V*V)/2g)$

GPM	VELOCITY (ft/sec)	RE NUMBER	HL* (ft/100 ft)	PD (lbs/100 ft)
15.00	0.66	10,049	0.07	0.03
20.00	0.88	13,399	0.13	0.05
25.00	1.10	16,749	0.19	0.08
30.00	1.32	20,098	0.26	0.11
35.00	1.54	23,448	0.34	0.15
40.00	1.76	26,798	0.43	0.19
45.00	1.98	30,147	0.54	0.23
50.00	2.20	33,497	0.65	0.28
55.00	2.42	36,847	0.77	0.33
60.00	2.64	40,196	0.90	0.39
65.00	2.86	43,546	1.04	0.45
70.00	3.08	46,896	1.19	0.51
75.00	3.30	50,246	1.34	0.58
80.00	3.52	53,595	1.51	0.65
85.00	3.74	56,945	1.68	0.73
90.00	3.96	60,295	1.86	0.81
95.00	4.18	63,644	2.06	0.89
100.00	4.40	66,994	2.25	0.98
105.00	4.62	70,344	2.46	1.07
110.00	4.84	73,694	2.68	1.16
120.00	5.28	80,393	3.13	1.36
130.00	5.75	87,092	3.62	1.57
140.00	6.16	93,792	4.14	1.79
150.00	6.60	100,491	4.69	2.03
160.00	7.04	107,191	5.26	2.28
170.00	7.47	113,890	5.87	2.55
180.00	7.91	120,589	6.51	2.82
190.00	8.35	127,289	7.18	3.11
200.00	8.79	133,988	7.88	3.41
210.00	9.23	140,688	8.61	3.73



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GSC ENERGY PRO PIPE

4.00" IPS PE4710 DR15.5 139 PSI

PIPE INFORMATION

CELL CLASS: PE445574C
 PIPE SIZE: 4.00"
 OD: 4.500"
 ID: 3.885"
 DR: 15.5
 MAX VEL: 15
 VOL/100 FT: 62.69 GAL

FLUID INFORMATION

TEMP (F): 40.0
 FREEZE PT (F): 32.0
 VISC (CP): 1.55
 DENSITY 62.43
 WATER - NO INHIBITORS

** CONVERSION RULE OF THUMB #1 **

WATER AND ANTIFREEZE
 SOLUTION AT 25° F

20% PROYPLENE GLYCOL: 1.36
 20% METHANOL ALCOHOL: 1.25

* Head Loss is determined by using
 the Darcy-Weisbach Equation*
 $(HL)f = f(L/D)((V*V)/2g)$

GPM	VELOCITY (ft/sec)	RE NUMBER	HL* (ft/100 ft)	PD (lbs/100 ft)
25.50	0.68	13,283	0.06	0.03
31.00	0.82	16,148	0.08	0.04
36.50	0.97	19,013	0.11	0.05
42.00	1.12	21,878	0.14	0.06
47.50	1.26	24,743	0.18	0.08
53.00	1.41	27,608	0.21	0.09
58.50	1.56	30,473	0.26	0.11
64.00	1.70	33,338	0.30	0.13
69.50	1.85	36,203	0.35	0.15
75.00	1.99	39,068	0.40	0.17
80.50	2.14	41,934	0.46	0.20
86.00	2.29	44,799	0.51	0.22
91.50	2.43	47,664	0.57	0.25
97.00	2.58	50,529	0.64	0.28
102.50	2.72	53,394	0.70	0.31
108.00	2.87	56,259	0.77	0.34
113.50	3.02	59,124	0.85	0.37
119.00	3.16	61,989	0.92	0.40
124.50	3.31	64,854	1.00	0.43
130.00	3.46	67,719	1.08	0.47
141.00	3.75	73,449	1.25	0.54
152.00	4.04	79,179	1.43	0.62
163.00	4.33	84,909	1.62	0.70
174.00	4.63	90,639	1.83	0.79
185.00	4.92	96,369	2.04	0.88
196.00	5.21	102,099	2.27	0.98
207.00	5.50	107,829	2.50	1.08
218.00	5.80	113,559	2.75	1.19
229.00	6.09	119,289	3.00	1.30
240.00	6.38	125,019	3.27	1.42



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GSC ENERGY PRO PIPE

6.00" IPS PE4710 DR15.5 139 PSI

PIPE INFORMATION

CELL CLASS: PE445574C
 PIPE SIZE: 6.00"
 OD: 6.625"
 ID: 5.719"
 DR: 15.5
 MAX VEL: 15
 VOL/100 FT: 135.88 GAL

FLUID INFORMATION

TEMP (F): 40.0
 FREEZE PT (F): 32.0
 VISC (CP): 1.55
 DENSITY 62.43
 WATER - NO INHIBITORS

** CONVERSION RULE OF THUMB #1 **

WATER AND ANTIFREEZE
 SOLUTION AT 25° F

20% PROYPLENE GLYCOL: 1.36
 20% METHANOL ALCOHOL: 1.25

* Head Loss is determined by using
 the Darcy-Weisbach Equation*
 $(HL)f = f(L/D)((V*V)/2g)$

GPM	VELOCITY (ft/sec)	RE NUMBER	HL* (ft/100 ft)	PD (lbs/100 ft)
100.00	1.23	35,383	0.11	0.05
120.00	1.47	42,460	0.15	0.06
140.00	1.72	49,537	0.19	0.08
160.00	1.96	56,614	0.25	0.11
180.00	2.21	63,690	0.30	0.13
200.00	2.45	70,767	0.37	0.16
220.00	2.70	77,844	0.44	0.19
240.00	2.94	84,920	0.51	0.22
260.00	3.19	91,997	0.59	0.25
280.00	3.43	99,074	0.67	0.29
300.00	3.68	106,150	0.76	0.33
320.00	3.93	113,227	0.86	0.37
340.00	4.17	120,304	0.96	0.41
360.00	4.42	127,381	1.06	0.46
380.00	4.66	134,457	1.17	0.51
400.00	4.91	141,534	1.28	0.56
420.00	5.15	148,611	1.40	0.61
440.00	5.40	155,687	1.52	0.66
460.00	5.64	162,764	1.65	0.72
480.00	5.89	169,841	1.78	0.77
520.00	6.38	183,994	2.06	0.89
560.00	6.87	198,147	2.36	1.02
600.00	7.36	212,301	2.67	1.16
640.00	7.85	226,454	3.00	1.30
680.00	8.34	240,608	3.35	1.45
720.00	8.83	254,761	3.72	1.61
760.00	9.32	268,914	4.10	1.78
800.00	9.81	283,068	4.50	1.95
840.00	10.30	297,221	4.92	2.13
880.00	10.79	311,375	5.35	2.32



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GSC ENERGY PRO PIPE

8.00" IPS PE4710 DR15.5 139 PSI

PIPE INFORMATION

CELL CLASS: PE445574C
 PIPE SIZE: 8.00"
 OD: 8.625"
 ID: 7.445"
 DR: 15.5
 MAX VEL: 15
 VOL/100 FT: 230.30 GAL

FLUID INFORMATION

TEMP (F): 40.0
 FREEZE PT (F): 32.0
 VISC (CP): 1.55
 DENSITY 62.43
 WATER - NO INHIBITORS

** CONVERSION RULE OF THUMB #1 **

WATER AND ANTIFREEZE
 SOLUTION AT 25° F

20% PROYPLENE GLYCOL: 1.36
 20% METHANOL ALCOHOL: 1.25

* Head Loss is determined by using
 the Darcy-Weisbach Equation*
 $(HL)f = f(L/D)((V*V)/2g)$

GPM	VELOCITY (ft/sec)	RE NUMBER	HL* (ft/100 ft)	PD (lbs/100 ft)
200.00	1.45	54,359	0.10	0.04
220.00	1.59	59,794	0.12	0.05
240.00	1.74	65,230	0.14	0.06
260.00	1.88	70,666	0.17	0.07
280.00	2.03	76,102	0.19	0.08
300.00	2.17	81,538	0.21	0.09
320.00	2.32	86,974	0.24	0.10
340.00	2.46	92,410	0.27	0.12
360.00	2.61	97,845	0.30	0.13
380.00	2.75	103,281	0.33	0.14
400.00	2.89	108,717	0.36	0.16
420.00	3.04	114,153	0.39	0.17
440.00	3.18	119,589	0.43	0.19
460.00	3.33	125,025	0.46	0.20
480.00	3.47	130,461	0.50	0.22
500.00	3.62	135,896	0.54	0.23
520.00	3.76	141,332	0.58	0.25
540.00	3.91	146,768	0.62	0.27
560.00	4.05	152,204	0.66	0.29
580.00	4.20	157,640	0.71	0.31
600.00	4.35	163,076	0.75	0.33
620.00	4.49	168,512	0.80	0.35
640.00	4.64	173,948	0.84	0.37
660.00	4.78	179,383	0.89	0.39
680.00	4.92	184,819	0.93	0.41
700.00	5.07	190,255	0.99	0.43
720.00	5.21	195,691	1.03	0.45
740.00	5.36	201,127	1.10	0.48
760.00	5.50	206,563	1.14	0.50
780.00	5.64	211,998	1.21	0.52
800.00	5.79	217,434	1.25	0.54
820.00	5.93	222,870	1.32	0.57
840.00	6.07	228,306	1.36	0.59
860.00	6.22	233,742	1.44	0.62
880.00	6.36	239,178	1.48	0.64
900.00	6.51	244,614	1.57	0.68
920.00	6.65	250,050	1.61	0.70
940.00	6.80	255,485	1.69	0.73
960.00	6.94	260,921	1.73	0.75
980.00	7.09	266,357	1.83	0.79



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GSC ENERGY PRO PIPE

10.00" IPS PE4710 DR15.5 139 PSI

PIPE INFORMATION

CELL CLASS: PE445574C
 PIPE SIZE: 10.00"
 OD: 10.750"
 ID: 9.280"
 DR: 15.5
 MAX VEL: 15
 VOL/100 FT: 357.60 GAL

FLUID INFORMATION

TEMP (F): 40.0
 FREEZE PT (F): 32.0
 VISC (CP): 1.55
 DENSITY 62.43
 WATER - NO INHIBITORS

** CONVERSION RULE OF THUMB #1 **

WATER AND ANTIFREEZE
 SOLUTION AT 25° F

20% PROYPLENE GLYCOL: 1.36
 20% METHANOL ALCOHOL: 1.25

* Head Loss is determined by using
 the Darcy-Weisbach Equation*
 $(HL)f = f(L/D)((V*V)/2g)$

GPM	VELOCITY (ft/sec)	RE NUMBER	HL* (ft/100 ft)	PD (lbs/100 ft)
300.00	1.40	65,434	0.07	0.03
350.00	1.63	76,340	0.10	0.04
400.00	1.86	87,245	0.13	0.05
450.00	2.10	98,151	0.15	0.07
500.00	2.33	109,057	0.19	0.08
550.00	2.56	119,963	0.22	0.10
600.00	2.80	130,868	0.26	0.11
650.00	3.03	141,774	0.30	0.13
700.00	3.26	152,680	0.34	0.15
750.00	3.50	163,585	0.39	0.17
800.00	3.73	174,491	0.44	0.19
850.00	3.96	185,397	0.49	0.21
900.00	4.19	196,302	0.54	0.24
950.00	4.43	207,208	0.60	0.26
1000.00	4.66	218,114	0.66	0.28
1050.00	4.89	229,019	0.72	0.31
1100.00	5.13	239,925	0.78	0.34
1150.00	5.36	250,831	0.85	0.37
1200.00	5.59	261,736	0.91	0.40
1250.00	5.83	272,642	0.98	0.43
1350.00	6.29	294,453	1.13	0.49
1450.00	6.76	316,265	1.29	0.56
1550.00	7.22	338,076	1.46	0.63
1650.00	7.69	359,888	1.63	0.71
1750.00	8.16	381,699	1.82	0.79
1850.00	8.62	403,510	2.01	0.87
1950.00	9.09	425,322	2.21	0.96
2050.00	9.55	447,133	2.42	1.05
2150.00	10.02	468,944	2.64	1.14
2250.00	10.49	490,756	2.87	1.24



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GSC ENERGY PRO PIPE

12.00" IPS PE4710 DR15.5 139 PSI

PIPE INFORMATION

CELL CLASS: PE445574C
 PIPE SIZE: 12.00"
 OD: 12.750"
 ID: 11.006"
 DR: 15.5
 MAX VEL: 15
 VOL/100 FT: 503.06 GAL

FLUID INFORMATION

TEMP (F): 40.0
 FREEZE PT (F): 32.0
 VISC (CP): 1.55
 DENSITY 62.43
 WATER - NO INHIBITORS

** CONVERSION RULE OF THUMB #1 **

WATER AND ANTIFREEZE
 SOLUTION AT 25° F

20% PROYPLENE GLYCOL: 1.36
 20% METHANOL ALCOHOL: 1.25

* Head Loss is determined by using
 the Darcy-Weisbach Equation*
 $(HL)f = f(L/D)((V*V)/2g)$

GPM	VELOCITY (ft/sec)	RE NUMBER	HL* (ft/100 ft)	PD (lbs/100 ft)
400.00	1.33	73,558	0.06	0.02
500.00	1.66	91,948	0.08	0.04
600.00	1.99	110,338	0.11	0.05
700.00	2.32	128,727	0.15	0.07
800.00	2.65	147,117	0.19	0.08
900.00	2.98	165,506	0.24	0.10
1000.00	3.31	183,896	0.29	0.13
1100.00	3.64	202,286	0.34	0.15
1200.00	3.98	220,675	0.40	0.17
1300.00	4.31	239,065	0.47	0.20
1400.00	4.64	257,454	0.53	0.23
1500.00	4.97	275,844	0.60	0.26
1600.00	5.30	294,233	0.68	0.29
1700.00	5.63	312,623	0.76	0.33
1800.00	5.96	331,013	0.84	0.36
1900.00	6.29	349,402	0.93	0.40
2000.00	6.63	367,792	1.02	0.44
2100.00	6.96	386,181	1.11	0.48
2200.00	7.29	404,571	1.21	0.52
2300.00	7.62	422,961	1.31	0.57
2500.00	8.28	459,740	1.53	0.66
2700.00	8.95	496,519	1.76	0.76
2900.00	9.61	533,298	2.00	0.87
3100.00	10.27	570,077	2.26	0.98
3300.00	10.93	606,857	2.53	1.10
3500.00	11.60	643,636	2.82	1.22
3700.00	12.26	680,415	3.12	1.35
3900.00	12.92	717,194	3.43	1.49
4100.00	13.58	753,973	3.76	1.63
4300.00	14.25	790,752	4.10	1.78



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