

... **Fire Protection by Computer Design**

Dean and Allyn Inc
116 Lewiston Road
Your Street Address 2
Gray ME, 04039
(207)657-5646

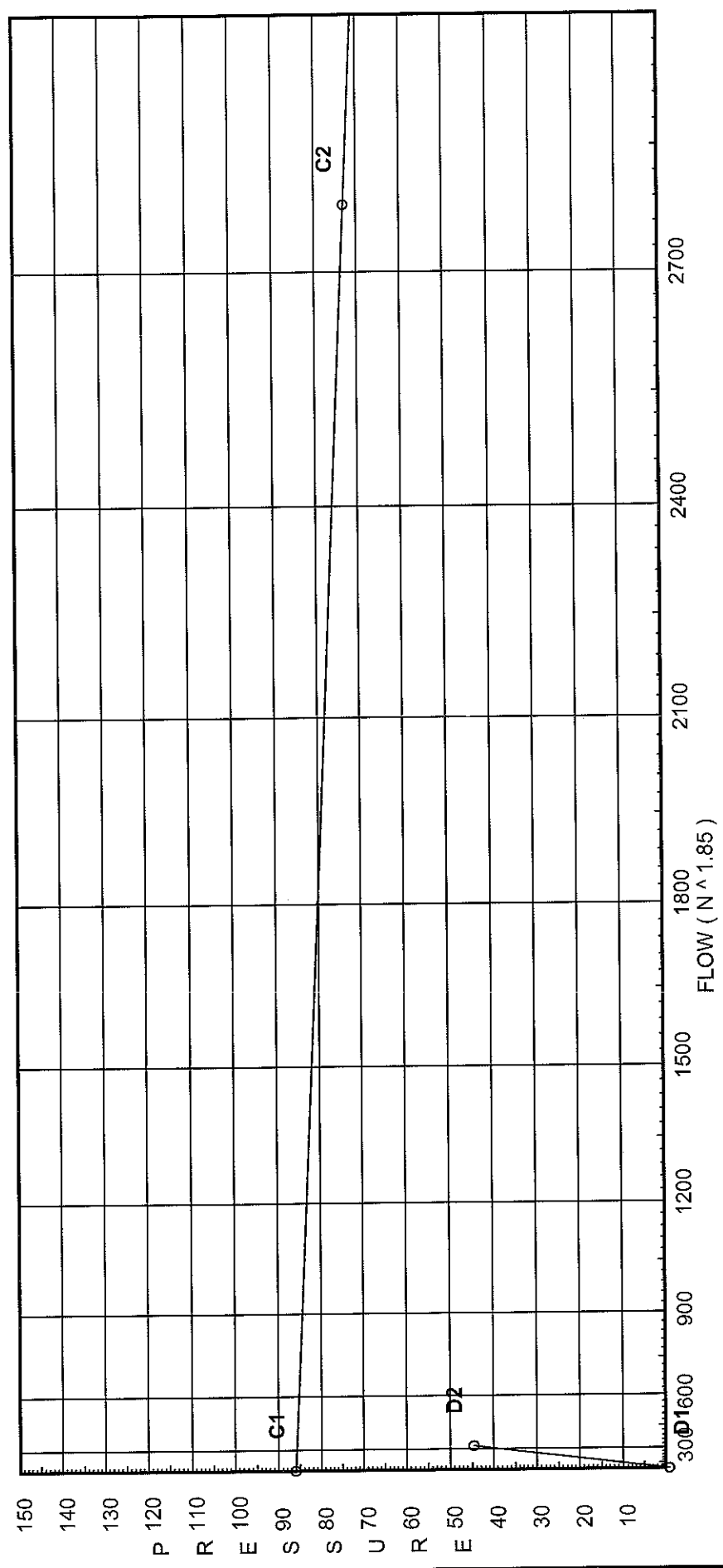
Job Name : Portland Jetport Repipe '13 ZONE 2
Building : Parking Garage
Location : Portland Maine
System :
Contract : C131180
Data File : PJPREPIPEzone2.WXF

Water Supply Curve (C)

Dean and Allyn Inc
 Portland Jetport Repipe '13 ZONE 2

City Water Supply:
 C1 - Static Pressure : 86
 C2 - Residual Pressure: 73
 C2 - Residual Flow : 2781

Demand:
 D1 - Elevation : -0.866
 D2 - System Flow : 323.152
 D2 - System Pressure : 44.604
 Hose (Adj City) : _____
 Hose (Demand) : _____
 D3 - System Demand : 323.152
 Safety Margin : 41.154



Fittings Used Summary

Dean and Allyn Inc
 Portland Jetport Repipe '13 ZONE 2

Fitting Legend Abbrev. Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
B NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
Dvc Dry Vic 756	0	0	0	0	3	9	8	17	0	21	0	22	50	0	0	0	0	0	0	0
E NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
F NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
H 45' Grnd-Vic Elbow #11	0	0	1	1.5	2	2	3	3	3.5	3.5	4.5	5	6.5	8.5	10	18	20	23	25	30
T NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Zlu Wilkins 975	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

- Diameter Units Inches
- Length Units Feet
- Flow Units US Gallons per Minute
- Pressure Units Pounds per Square Inch

Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
99	0.0		75.34	na				
99A	0.0		75.34	na				
100	0.0		75.34	na				
101	0.0		75.34	na				
102	0.0		75.34	na				
103	0.0		75.34	na				
104	0.0		75.34	na				
104A	0.0		75.34	na				
105	0.0		75.34	na				
106	0.0		75.34	na				
107	0.0		75.34	na				
108	0.0		75.34	na				
109	0.0		75.34	na				
109A	0.0		75.34	na				
110	0.0		75.34	na				
111	0.0		75.34	na				
112	0.0		75.34	na				
113	0.0		75.34	na				
114	0.0		75.34	na				
115	0.0		75.34	na				
89	0.0		75.34	na				
88	0.0		75.34	na				
87	0.0		75.34	na				
86	0.0		75.34	na				
86A	0.0		75.34	na				
85	0.0		75.34	na				
84	0.0		75.34	na				
83	0.0		75.34	na				
200	98.0	5.6	8.43	na	16.26	0.15	97.125	7.0
201	98.0	5.6	8.63	na	16.45	0.15	97.125	7.0
202	97.875	5.6	9.42	na	17.18	0.15	97.125	7.0
203	97.75	5.6	11.07	na	18.63	0.15	97.125	7.0
204	97.75	5.6	13.95	na	20.92	0.15	97.125	7.0
200A	98.0		8.54	na				
201A	98.0		8.75	na				
202A	97.875		9.54	na				
203A	97.75		11.22	na				
204A	97.75		14.14	na				
205	98.0	5.6	10.09	na	17.79	0.15	97.125	7.0
206	98.0	5.6	10.23	na	17.91	0.15	97.125	7.0
207	97.875	5.6	10.78	na	18.38	0.15	97.125	7.0
208	97.75	5.6	11.9	na	19.32	0.15	97.125	7.0
209	97.75	5.6	13.78	na	20.79	0.15	97.125	7.0
210	98.0	5.6	10.24	na	17.92	0.15	119.438	10.24
211	98.0	5.6	10.38	na	18.04	0.15	119.438	10.24
212	97.875	5.6	10.93	na	18.52	0.15	119.438	10.24
213	97.75	5.6	12.07	na	19.46	0.15	119.438	10.24
214	97.75	5.6	13.98	na	20.94	0.15	119.438	10.24
215	98.0	5.6	15.79	na	22.25	0.15	125.559	12.208
216	98.0	5.6	16.0	na	22.4	0.15	125.559	12.208
79	96.75		18.96	na				
78	96.75		19.04	na				
77	96.75		19.3	na				
76	96.75		20.0	na				
76A	96.125		21.03	na				
75	96.75		26.97	na				
74	96.042		28.5	na				
73	95.792		32.93	na				
TR	107.0		29.0	na				
BR	103.0		31.89	na				
BASE	100.0		44.28	na				
HOSE	100.0		44.38	na				

Flow Summary - Standard

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
TEST	100.0		44.6	na				

The maximum velocity is 14.95 and it occurs in the pipe between nodes 214 and 77

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
99 to 99A	0.0	1.049 120.0 0.0	4E	8.0 0.0 0.0	9.208 8.000 17.208	75.345 0.0 0.0				Vel = 0
99A to 100	0.0	1.61 120.0 0.0		0.0 0.0 0.0	0.500 0.0 0.500	75.345 0.0 0.0				Vel = 0
100 to 101	0.0	1.61 120.0 0.0		0.0 0.0 0.0	10.000 0.0 10.000	75.345 0.0 0.0				Vel = 0
101 to 102	0.0	1.61 120.0 0.0		0.0 0.0 0.0	10.000 0.0 10.000	75.345 0.0 0.0				Vel = 0
102 to 103	0.0	1.61 120.0 0.0		0.0 0.0 0.0	10.000 0.0 10.000	75.345 0.0 0.0				Vel = 0
103 to 89	0.0	1.61 120.0 0.0	2E	8.0 0.0 0.0	23.500 8.000 31.500	75.345 0.0 0.0				Vel = 0
	0.0 0.0					75.345				K Factor = 0
104 to 104A	0.0	1.049 120.0 0.0	4E	8.0 0.0 0.0	9.208 8.000 17.208	75.345 0.0 0.0				Vel = 0
104A to 105	0.0	1.61 120.0 0.0		0.0 0.0 0.0	0.500 0.0 0.500	75.345 0.0 0.0				Vel = 0
105 to 106	0.0	1.61 120.0 0.0		0.0 0.0 0.0	10.000 0.0 10.000	75.345 0.0 0.0				Vel = 0
106 to 107	0.0	1.61 120.0 0.0		0.0 0.0 0.0	10.000 0.0 10.000	75.345 0.0 0.0				Vel = 0
107 to 108	0.0	1.61 120.0 0.0		0.0 0.0 0.0	10.000 0.0 10.000	75.345 0.0 0.0				Vel = 0
108 to 88	0.0	1.61 120.0 0.0	3E	12.0 0.0 0.0	24.542 12.000 36.542	75.345 0.0 0.0				Vel = 0
	0.0 0.0					75.345				K Factor = 0
109 to 109A	0.0	1.049 120.0 0.0	3E	6.0 0.0 0.0	9.208 6.000 15.208	75.345 0.0 0.0				Vel = 0
109A to 110	0.0	1.61 120.0 0.0		0.0 0.0 0.0	0.500 0.0 0.500	75.345 0.0 0.0				Vel = 0
110 to 111	0.0	1.61 120.0 0.0		0.0 0.0 0.0	10.000 0.0 10.000	75.345 0.0 0.0				Vel = 0

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Fting's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
111	0.0	1.61		10.000	75.345				
to 112	0.0	120.0	0.0	0.0	0.0		Vel = 0		
112	0.0	1.61		10.000	75.345				
to 113	0.0	120.0	0.0	0.0	0.0		Vel = 0		
113	0.0	1.61	3E 12.0	24.583	75.345				
to 87	0.0	120.0	0.0	12.000	0.0		Vel = 0		
	0.0	0.0	0.0	36.583	0.0				
	0.0				75.345		K Factor = 0		
114	0.0	1.61		10.000	75.345				
to 115	0.0	120.0	0.0	0.0	0.0		Vel = 0		
115	0.0	1.61	2E 8.0	23.500	75.345				
to 86	0.0	120.0	0.0	8.000	0.0		Vel = 0		
	0.0	0.0	0.0	31.500	0.0				
	0.0				75.345		K Factor = 0		
89	0.0	4.26		9.250	75.345				
to 88	0.0	120.0	0.0	0.0	0.0		Vel = 0		
88	0.0	4.26		4.750	75.345				
to 87	0.0	120.0	0.0	0.0	0.0		Vel = 0		
	0.0	0.0	0.0	4.750	0.0				
87	0.0	4.26		11.375	75.345				
to 86	0.0	120.0	0.0	0.0	0.0		Vel = 0		
	0.0	0.0	0.0	11.375	0.0				
86	0.0	4.26		31.333	75.345				
to 86A	0.0	120.0	0.0	0.0	0.0		Vel = 0		
	0.0	0.0	0.0	31.333	0.0				
86A	0.0	4.26	2F 10.534	246.125	75.345				
to 85	0.0	120.0	0.0	10.534	0.0		Vel = 0		
	0.0	0.0	0.0	256.659	0.0				
85	0.0	4.26	2E 26.334	34.125	75.345				
to 84	0.0	120.0	0.0	26.334	0.0		Vel = 0		
	0.0	0.0	0.0	60.459	0.0				
84	0.0	4.26	3E 39.501	130.917	75.345				
to 83	0.0	120.0	0.0	39.501	0.0		Vel = 0		
	0.0	0.0	0.0	170.418	0.0				
83	0.0	4.26	2E 26.334	12.000	75.345				
to TR	0.0	120.0	0.0	26.334	-46.342		Vel = 0		
	0.0	0.0	0.0	38.334	0.0				
	0.0				29.003		K Factor = 0		
200	16.26	1.049		1.290	8.429		K Factor = 5.60		
to 200A	16.26	120.0	0.0	0.0	0.0		Vel = 6.04		
	0.0884	0.0	0.0	1.290	0.114				

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 16.26					8.543		K Factor = 5.56	
201 to 201A	16.45	1.049 120.0 0.0907	0.0 0.0 0.0	1.290 0.0 1.290	8.630 0.0 0.117			K Factor = 5.60 Vel = 6.11	
	0.0 16.45					8.747		K Factor = 5.56	
202 to 202A	17.18	1.049 120.0 0.0984	0.0 0.0 0.0	1.290 0.0 1.290	9.417 0.0 0.127			K Factor = 5.60 Vel = 6.38	
	0.0 17.18					9.544		K Factor = 5.56	
203 to 203A	18.63	1.049 120.0 0.1140	0.0 0.0 0.0	1.290 0.0 1.290	11.072 0.0 0.147			K Factor = 5.60 Vel = 6.92	
	0.0 18.63					11.219		K Factor = 5.56	
204 to 204A	20.92	1.049 120.0 0.1411	0.0 0.0 0.0	1.290 0.0 1.290	13.954 0.0 0.182			K Factor = 5.60 Vel = 7.77	
	0.0 20.92					14.136		K Factor = 5.56	
200A to 201A	16.26	1.61 120.0 0.0110	1T 0.0 0.0	8.0 0.0 8.0	10.500 8.000 18.500	8.543 0.0 0.204		Vel = 2.56	
201A to 202A	16.45	1.61 120.0 0.0402	1T 0.0 0.0	8.0 0.0 8.0	10.500 8.000 18.500	8.747 0.054 0.743		Vel = 5.15	
202A to 203A	17.18	1.61 120.0 0.0876	1T 0.0 0.0	8.0 0.0 8.0	10.500 8.000 18.500	9.544 0.054 1.621		Vel = 7.86	
203A to 204A	18.64	1.61 120.0 0.1577	1T 0.0 0.0	8.0 0.0 8.0	10.500 8.000 18.500	11.219 0.0 2.917		Vel = 10.80	
204A to 79	20.92	1.61 120.0 0.2581	1E 1T 0.0	4.0 8.0 0.0	5.000 12.000 17.000	14.136 0.433 4.388		Vel = 14.10	
	0.0 89.45					18.957		K Factor = 20.54	
205 to 206	17.79	1.61 120.0 0.0130	0.0 0.0 0.0	10.500 0.0 10.500	10.089 0.0 0.137			K Factor = 5.60 Vel = 2.80	
206 to 207	17.91	1.61 120.0 0.0471	0.0 0.0 0.0	10.500 0.0 10.500	10.226 0.054 0.495			K Factor = 5.60 Vel = 5.63	
207 to 208	18.38	1.61 120.0 0.1018	0.0 0.0 0.0	10.500 0.0 10.500	10.775 0.054 1.069			K Factor = 5.60 Vel = 8.52	

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftnng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
208 to 209	19.31 73.39	1.61 120.0 0.1790		0.0 0.0 0.0	10.500 0.0 10.500	11.898 0.0 1.880		K Factor = 5.60 Vel = 11.57	
209 to 78	20.79 94.18	1.61 120.0 0.2839	1E 4.0 1T 8.0 0.0	4.0 8.0 0.0	5.000 12.000 17.000	13.778 0.433 4.827		K Factor = 5.60 Vel = 14.84	
	0.0 94.18					19.038		K Factor = 21.58	
210 to 211	17.92 17.92	1.61 120.0 0.0131		0.0 0.0 0.0	10.500 0.0 10.500	10.240 0.0 0.138		K Factor = 5.60 Vel = 2.82	
211 to 212	18.04 35.96	1.61 120.0 0.0479		0.0 0.0 0.0	10.500 0.0 10.500	10.378 0.054 0.503		K Factor = 5.60 Vel = 5.67	
212 to 213	18.52 54.48	1.61 120.0 0.1031		0.0 0.0 0.0	10.500 0.0 10.500	10.935 0.054 1.083		K Factor = 5.60 Vel = 8.59	
213 to 214	19.46 73.94	1.61 120.0 0.1814		0.0 0.0 0.0	10.500 0.0 10.500	12.072 0.0 1.905		K Factor = 5.60 Vel = 11.65	
214 to 77	20.93 94.87	1.61 120.0 0.2878	1E 4.0 1T 8.0 0.0	4.0 8.0 0.0	5.000 12.000 17.000	13.977 0.433 4.893		K Factor = 5.60 Vel = 14.95	
	0.0 94.87					19.303		K Factor = 21.59	
215 to 216	22.25 22.25	1.61 120.0 0.0197		0.0 0.0 0.0	10.500 0.0 10.500	15.792 0.0 0.207		K Factor = 5.60 Vel = 3.51	
216 to 76	22.40 44.65	1.61 120.0 0.0714	1E 4.0 1T 8.0 0.0	4.0 8.0 0.0	36.458 12.000 48.458	15.999 0.541 3.460		K Factor = 5.60 Vel = 7.04	
	0.0 44.65					20.000		K Factor = 9.98	
79 to 78	89.45 89.45	4.26 120.0 0.0023	1T	26.334 0.0 0.0	9.250 26.334 35.584	18.957 0.0 0.081		Vel = 2.01	
78 to 77	94.18 183.63	4.26 120.0 0.0085	1T	26.334 0.0 0.0	4.750 26.334 31.084	19.038 0.0 0.265		Vel = 4.13	
77 to 76	94.87 278.5	4.26 120.0 0.0185	1T	26.334 0.0 0.0	11.375 26.334 37.709	19.303 0.0 0.697		Vel = 6.27	
76 to 76A	44.65 323.15	4.26 120.0 0.0243		0.0 0.0 0.0	31.333 0.0 31.333	20.000 0.271 0.761		Vel = 7.27	
76A to 75	0.0 323.15	4.26 120.0 0.0243	2H	9.217 0.0 0.0	246.125 9.217 255.342	21.032 -0.271 6.208		Vel = 7.27	

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
75 to 74	0.0 323.15	4.26 120.0 0.0243	1E 1H	13.167 4.608 0.0	32.417 17.775 50.192	26.969 0.307 1.220			Vel = 7.27	
74 to 73	0.0 323.15	4.26 120.0 0.0243	4E	52.668 0.0 0.0	125.042 52.668 177.710	28.496 0.108 4.321			Vel = 7.27	
73 to TR	0.0 323.15	4.26 120.0 0.0243	2E	26.334 0.0 0.0	12.000 26.334 38.334	32.925 -4.854 0.932			Vel = 7.27	
TR to BR	0.0 323.15	4.26 120.0 0.0243	1Dvc 1B	27.651 15.8 0.0	4.000 43.451 47.451	29.003 1.732 1.154			Vel = 7.27	
BR to BASE	0.0 323.15	8.249 120.0 0.0010	1Ziu	0.0 0.0 0.0	7.000 0.0 7.000	31.889 12.383 0.007		* Fixed loss = 11.084	Vel = 1.94	
BASE to HOSE	0.0 323.15	8.27 140.0 0.0007	3E 1G	85.404 6.326 0.0	50.000 91.730 141.730	44.279 0.0 0.102			Vel = 1.93	
HOSE to TEST	0.0 323.15	12.34 140.0 0.0001	6F 1E	121.897 42.195 0.0	2000.000 164.092 2164.092	44.381 0.0 0.223			Vel = 0.87	
	0.0 323.15					44.604			K Factor = 48.39	