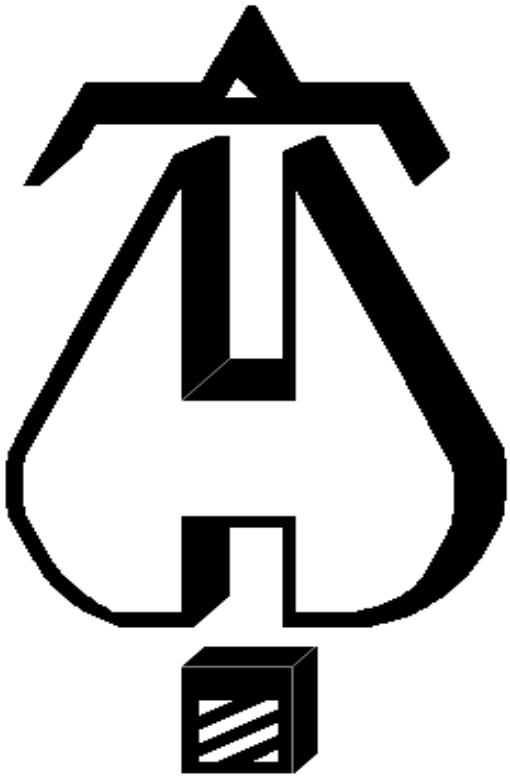


. . . Fire Protection by Computer Design

Residential Fire Protection
64 Daggett Hill Rd.
Greene, ME 04236
(207)946-343

Job Name : THOMAS STREET APARTMENTS
Building : WOOD STRUCTURE
Location : ATTIC #1
System : 2
Contract : C16021
Data File : THOMAS ST APT- ATTIC-C.WXF

Hydraulic Design Information Sheet

Name - 32 THOMAS STREET APARTMENTS Date - 8/23/16
Location - ATTIC #1
Building - WOOD STRUCTURE System No. - 2
Contractor - RSIDENTIAL FIRE PROTECTION Contract No. - C16021
Calculated By - T. PRAY Drawing No. - 1 OF 2
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height - VARIES
Occupancy - UNUSED ATTIC SPACE

SYSTEM DESIGN

(X) NFPA 13 (X) Lt. Haz. Ord.Haz.Gp. ( ) 1 ( ) 2 ( ) 3 ( ) Ex.Haz.
( ) NFPA 231 ( ) NFPA 231C ( ) Figure Curve
Other
Specific Ruling | Made By | Date

Area of Sprinkler Operation	- 1615	System Type	Sprinkler/Nozzle
Density	- .1	( ) Wet	Make VIKING
Area Per Sprinkler	- 120	(X) Dry	Model VK300
Elevation at Highest Outlet	- 137.92	( ) Deluge	Size 1/2"
Hose Allowance - Inside	-	( ) Preaction	K-Factor 5.6
Rack Sprinkler Allowance	-	( ) Other	Temp.Rat.200
Hose Allowance - Outside	- 100		

Note

Calculation Summary: Flow Required - 509.24 Press Required - 48.16 AT TEST
C-Factor Used: 120 Overhead 140 Underground

SUPPLY

Water Flow Test:		Pump Data:		Tank or Reservoir:
Date of Test	- 8/22/16			Cap. -
Time of Test	- 11:30 AM	Rated Cap.-		Elev.-
Static Press	- 51	@ Press	-	
Residual Press	- 49	Elev.	-	Well
Flow	- 903			Proof Flow
Elevation	- 100			

Location - HYDRANTS ARE LOCATED ON THOMAS STREET, SEE PLOT PLAN

Source of Information - PORTLAND WATER DISTRICT

COMMODITY

Commodity Class Location
Storage Ht. Area Aisle W.
Storage Method: Solid Piled % Palletized % Rack

( ) Single Row ( ) Conven. Pallet ( ) Auto. Storage ( ) Encap.
( ) Double Row ( ) Slave Pallet ( ) Solid Shelf ( ) Non
( ) Mult. Row ( ) Open Shelf

STORAGE

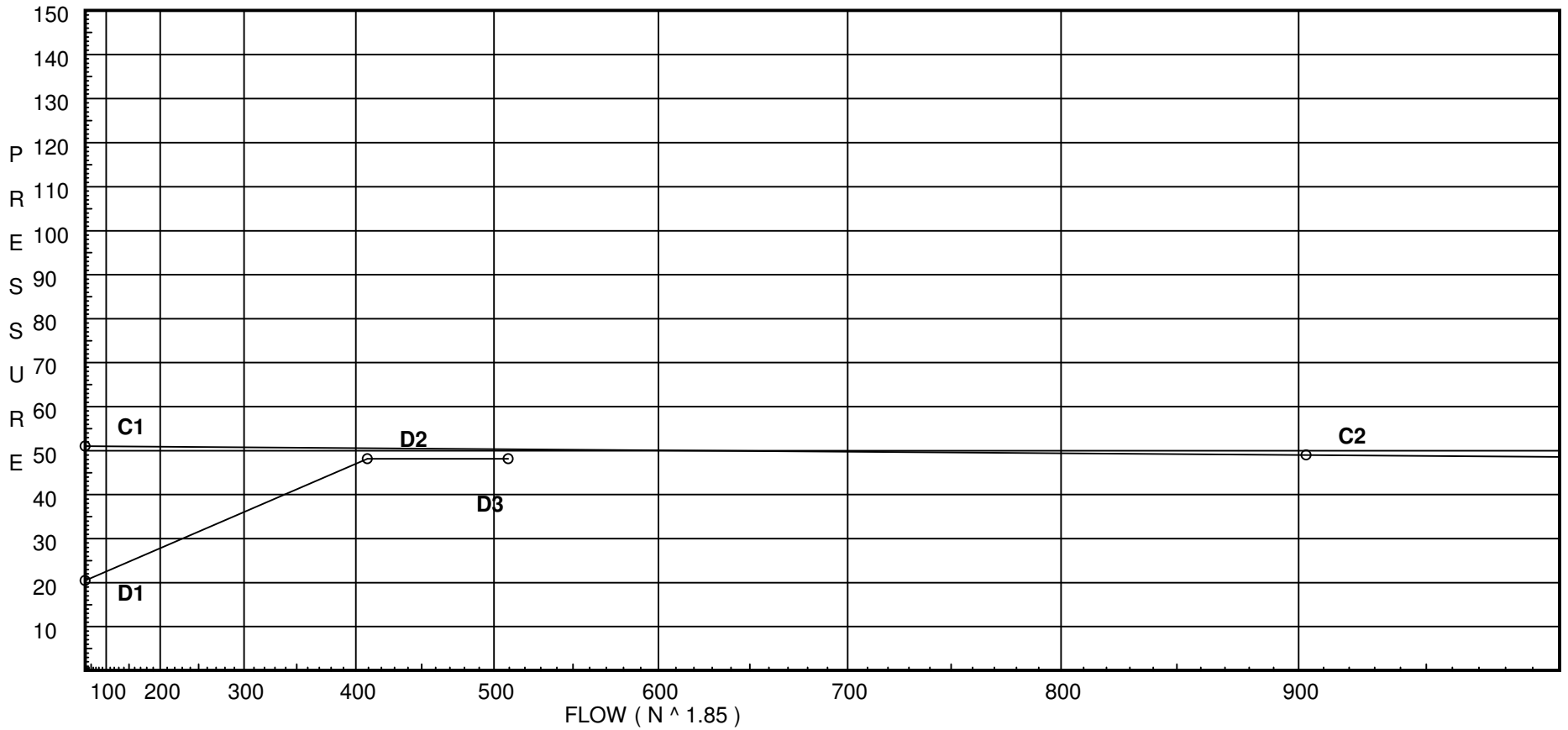
Flue Spacing Clearance:Storage to Ceiling
Longitudinal Transverse

Horizontal Barriers Provided:

City Water Supply:
- C1 - Static Pressure : 51
- C2 - Residual Pressure: 49
- C2 - Residual Flow : 903

Demand:

D1 - Elevation	:	20.464
D2 - System Flow	:	409.257
D2 - System Pressure	:	48.163
Hose (Adj City)	:	
Hose (Demand)	:	100
D3 - System Demand	:	509.257
Safety Margin	:	2.144



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
B	Generic Butterfly Valve	0	0	0	0	0	0	7	10	0	12	9	10	12	19	21	0	0	0	0	0
D	Generic Dry Pipe Valve	0	0	0	0	0	0	9.5	17	0	28	0	47	0	0	0	0	0	0	0	0
E	90' Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
G	Generic Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
I	90' Grvd-Vic Elbow #10	0	0	2	3	4	3.5	6	5	8	7	8.5	10	13	17	20	23	25	33	36	40
J	90'Tee-Branch Grv Vic #20	0	0	4.5	6	8	8.5	10.8	13	17	16	21	25	33	41	50	65	78	88	98	120
L	Long Turn Elbow	1	1	2	2	2	3	4	5	5	6	8	9	13	16	18	24	27	30	34	40
T	90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121

Pressure / Flow Summary - STANDARD

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
SP01	146.71	5.6	7.0	na	14.82	0.1	120	7.0
SP02	146.71	5.6	7.0	na	14.82	0.1	120	7.0
1	137.92	5.6	11.18	na	18.72	0.1	120	7.0
19	137.92	5.6	11.21	na	18.75	0.1	120	7.0
22	137.92	5.6	10.81	na	18.41	0.1	120	7.0
21	137.92	5.6	10.86	na	18.45	0.1	120	7.0
20	137.92	5.6	10.98	na	18.56	0.1	120	7.0
20A	137.92		11.43	na				
50	135.92		13.3	na				
2	140.42		11.25	na				
3	140.42		11.25	na				
4	140.42	5.6	11.25	na	18.79	0.1	120	7.0
5	144.42		9.5	na				
6	144.42		9.5	na				
7	144.42	5.6	9.5	na	17.26	0.1	120	7.0
8	144.42	5.6	9.5	na	17.26	0.1	120	7.0
52	144.42		9.55	na				
53	146.71		8.62	na				
9	140.42		11.24	na				
10	140.42		11.24	na				
11	140.42	5.6	11.24	na	18.77	0.1	120	7.0
54	135.92		13.63	na				
55	135.92		13.68	na				
12	137.92	5.6	8.58	na	16.41	0.1	120	7.0
13	137.92	5.6	8.61	na	16.43	0.1	120	7.0
14	137.92	5.6	8.77	na	16.58	0.1	120	7.0
15	137.92	5.6	8.96	na	16.76	0.1	120	7.0
16	137.92	5.6	9.36	na	17.13	0.1	120	7.0
31	137.92	5.6	9.18	na	16.97	0.1	120	7.0
36	137.92	5.6	9.21	na	16.99	0.1	120	7.0
18	137.92	5.6	9.31	na	17.09	0.1	120	7.0
17	137.92	5.6	9.65	na	17.39	0.1	120	7.0
16A	137.92		10.31	na				
23	144.42		9.51	na				
24	144.42		9.51	na				
25	144.42		9.51	na				
26	144.42		9.51	na				
27	144.42		9.51	na				
28	144.42		9.51	na				
29	144.42	K = K @ EQ01	9.51	na	16.58			
30	144.42	K = K @ EQ02	9.51	na	16.57			
58	144.42		9.55	na				
59	135.92		13.48	na				
32	147.25	5.6	7.0	na	14.82	0.1	120	7.0
33	147.25	5.6	7.02	na	14.84	0.1	120	7.0
34	147.25	5.6	7.03	na	14.85	0.1	120	7.0
35	147.25	5.6	7.05	na	14.87	0.1	120	7.0
60	147.25		7.18	na				
61	135.92		13.54	na				
62	135.92		13.93	na				
63	136.5		14.47	na				
TOR1	101.88		36.4	na				
DPV	97.88		39.63	na				
HDR1	97.88		41.29	na				
HDR	97.88		41.38	na				
BFP	97.88		41.4	na				
6UG	97.88		48.52	na				
TEST	100.0		48.16	na	100.0			

The maximum velocity is 13.32 and it occurs in the pipe between nodes 16A and 55

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
SP01	14.82	1.049	1E	2.0	1.000	7.000		K Factor = 5.60
to		120	1T	5.0	7.000	0.0		
EQ01	14.82	0.0748		0.0	8.000	0.598		Vel = 5.50
	0.0							
	14.82					7.598		K Factor = 5.38
SP02	14.82	1.049	1E	2.0	1.000	7.000		K Factor = 5.60
to		120	1T	5.0	7.000	0.0		
EQ02	14.82	0.0748		0.0	8.000	0.598		Vel = 5.50
	0.0							
	14.82					7.598		K Factor = 5.38
1	18.72	2.157		0.0	7.500	11.178		K Factor = 5.60
to		100		0.0	0.0	0.0		
19	18.72	0.0048		0.0	7.500	0.036		Vel = 1.64
19	18.76	2.157	1T	8.783	3.750	11.214		K Factor = 5.60
to		100		0.0	8.783	0.0		
20A	37.48	0.0174		0.0	12.533	0.218		Vel = 3.29
	0.0							
	37.48					11.432		K Factor = 11.09
22	18.41	2.157	1E	4.392	6.210	10.807		K Factor = 5.60
to		100		0.0	4.391	0.0		
21	18.41	0.0046		0.0	10.601	0.049		Vel = 1.62
21	18.45	2.157		0.0	7.460	10.856		K Factor = 5.60
to		100		0.0	0.0	0.0		
20	36.86	0.0169		0.0	7.460	0.126		Vel = 3.24
20	18.56	2.157	1T	8.783	3.750	10.982		K Factor = 5.60
to		100		0.0	8.783	0.0		
20A	55.42	0.0359		0.0	12.533	0.450		Vel = 4.87
20A	37.47	2.157	1T	8.783	2.000	11.432		
to		100		0.0	8.783	0.866		
50	92.89	0.0934		0.0	10.783	1.007		Vel = 8.16
50	-119.22	4.26	1I	6.578	24.250	13.305		
to		100		0.0	6.578	-4.673		
53	-26.33	-0.0004		0.0	30.828	-0.011		Vel = 0.59
	0.0							
	-26.33					8.621		K Factor = -8.97
2	0.0	2.157		0.0	8.000	11.253		
to		100		0.0	0.0	0.0		
3	0.0	0.0		0.0	8.000	0.0		Vel = 0
3	0.0	2.157		0.0	8.000	11.253		
to		100		0.0	0.0	0.0		
4	0.0	0.0		0.0	8.000	0.0		Vel = 0
4	18.79	2.157	1E	4.392	5.920	11.253		K Factor = 5.60
to		100	1T	8.783	13.174	-2.724		
53	18.79	0.0048		0.0	19.094	0.092		Vel = 1.65
	0.0							
	18.79					8.621		K Factor = 6.40
5	0.0	2.157		0.0	7.000	9.504		
to		100		0.0	0.0	0.0		
6	0.0	0.0		0.0	7.000	0.0		Vel = 0

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
6	0.0	2.157		0.0	7.000	9.504		
to		100		0.0	0.0	0.0		
7	0.0	0.0		0.0	7.000	0.0		Vel = 0
7	17.26	2.157	1T	8.783	3.000	9.504		K Factor = 5.60
to		100		0.0	8.783	0.0		
52	17.26	0.0042		0.0	11.783	0.049		Vel = 1.52
	0.0							
	17.26					9.553		K Factor = 5.58
8	17.26	2.157	1T	8.783	4.000	9.500		K Factor = 5.60
to		100		0.0	8.783	0.0		
52	17.26	0.0041		0.0	12.783	0.053		Vel = 1.52
52	17.26	2.157		0.0	4.000	9.553		
to		100		0.0	0.0	-0.992		
53	34.52	0.0150		0.0	4.000	0.060		Vel = 3.03
53	11.23	2.157	1T	8.783	4.500	8.621		
to		100		0.0	8.783	4.673		
54	45.75	0.0252		0.0	13.283	0.335		Vel = 4.02
	0.0							
	45.75					13.629		K Factor = 12.39
9	0.0	2.157		0.0	8.000	11.238		
to		100		0.0	0.0	0.0		
10	0.0	0.0		0.0	8.000	0.0		Vel = 0
10	0.0	2.157		0.0	8.000	11.238		
to		100		0.0	0.0	0.0		
11	0.0	0.0		0.0	8.000	0.0		Vel = 0
11	18.77	2.157	1E	4.392	8.950	11.238		K Factor = 5.60
to		100	1T	8.783	13.174	-2.724		
53	18.77	0.0048		0.0	22.124	0.107		Vel = 1.65
	0.0							
	18.77					8.621		K Factor = 6.39
54	45.75	4.26	1I	6.578	43.960	13.629		
to		100		0.0	6.578	0.0		
55	45.75	0.0009		0.0	50.538	0.046		Vel = 1.03
55	151.76	4.26	1I	6.578	12.370	13.675		
to		100		0.0	6.578	0.0		
62	197.51	0.0137		0.0	18.948	0.260		Vel = 4.45
	0.0							
	197.51					13.935		K Factor = 52.91
12	16.41	2.157		0.0	8.000	8.583		K Factor = 5.60
to		100		0.0	0.0	0.0		
13	16.41	0.0038		0.0	8.000	0.030		Vel = 1.44
13	16.43	2.157	1E	4.392	7.080	8.613		K Factor = 5.60
to		100		0.0	4.391	0.0		
14	32.84	0.0136		0.0	11.471	0.156		Vel = 2.88
14	16.58	2.157		0.0	6.500	8.769		K Factor = 5.60
to		100		0.0	0.0	0.0		
15	49.42	0.0291		0.0	6.500	0.189		Vel = 4.34

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
15	16.76	2.157		0.0	8.000	8.958		K Factor = 5.60
to		100		0.0	0.0	0.0		
16	66.18	0.0499		0.0	8.000	0.399		Vel = 5.81
16	17.13	2.157	1T	8.783	3.750	9.357		K Factor = 5.60
to		100		0.0	8.783	0.0		
16A	83.31	0.0764		0.0	12.533	0.957		Vel = 7.31
	0.0							
	83.31					10.314		K Factor = 25.94
31	16.97	2.157		0.0	7.170	9.180		K Factor = 5.60
to		100		0.0	0.0	0.0		
36	16.97	0.0040		0.0	7.170	0.029		Vel = 1.49
36	16.99	2.157		0.0	7.170	9.209		K Factor = 5.60
to		100		0.0	0.0	0.0		
18	33.96	0.0145		0.0	7.170	0.104		Vel = 2.98
18	17.09	2.157	1E	4.392	6.500	9.313		K Factor = 5.60
to		100		0.0	4.391	0.0		
17	51.05	0.0309		0.0	10.891	0.336		Vel = 4.48
17	17.39	2.157	1T	8.783	3.750	9.649		K Factor = 5.60
to		100		0.0	8.783	0.0		
16A	68.44	0.0531		0.0	12.533	0.665		Vel = 6.01
16A	83.32	2.157	1T	8.783	2.000	10.314		
to		100		0.0	8.783	0.866		
55	151.76	0.2314		0.0	10.783	2.495		Vel = 13.32
	0.0							
	151.76					13.675		K Factor = 41.04
50	119.23	4.26	1I	6.578	25.210	13.305		
to		100		0.0	6.578	0.0		
59	119.23	0.0054		0.0	31.788	0.171		Vel = 2.68
	0.0							
	119.23					13.476		K Factor = 32.48
23	0.0	2.157		0.0	7.210	9.509		
to		100		0.0	0.0	0.0		
24	0.0	0.0		0.0	7.210	0.0		Vel = 0
24	0.0	2.157		0.0	7.000	9.509		
to		100		0.0	0.0	0.0		
25	0.0	0.0		0.0	7.000	0.0		Vel = 0
25	0.0	2.157		0.0	5.500	9.509		
to		100		0.0	0.0	0.0		
26	0.0	0.0		0.0	5.500	0.0		Vel = 0
26	0.0	2.157		0.0	8.000	9.509		
to		100		0.0	0.0	0.0		
27	0.0	0.0		0.0	8.000	0.0		Vel = 0
27	0.0	2.157		0.0	7.000	9.509		
to		100		0.0	0.0	0.0		
28	0.0	0.0		0.0	7.000	0.0		Vel = 0
28	0.0	2.157		0.0	6.000	9.509		
to		100		0.0	0.0	0.0		
29	0.0	0.0		0.0	6.000	0.0		Vel = 0

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
29	16.58	2.157	1T	8.783	3.040	9.509		K Factor @ node EQ01
to		100		0.0	8.783	0.0		
58	16.58	0.0039		0.0	11.823	0.046		Vel = 1.46
	0.0							
	16.58					9.555		K Factor = 5.36
30	16.57	2.157	1T	8.783	3.580	9.507		K Factor @ node EQ02
to		100		0.0	8.783	0.0		
58	16.57	0.0039		0.0	12.363	0.048		Vel = 1.45
58	16.58	2.157	1T	8.783	8.500	9.555		
to		100		0.0	8.783	3.681		
59	33.15	0.0139		0.0	17.283	0.240		Vel = 2.91
59	119.23	4.26		0.0	7.050	13.476		
to		100		0.0	0.0	0.0		
61	152.38	0.0085		0.0	7.050	0.060		Vel = 3.43
	0.0							
	152.38					13.536		K Factor = 41.42
32	14.82	2.157		0.0	7.170	7.000		K Factor = 5.60
to		100		0.0	0.0	0.0		
33	14.82	0.0031		0.0	7.170	0.022		Vel = 1.30
33	14.84	2.157	1T	8.783	4.790	7.022		K Factor = 5.60
to		100		0.0	8.783	0.0		
60	29.66	0.0113		0.0	13.573	0.154		Vel = 2.60
	0.0							
	29.66					7.176		K Factor = 11.07
34	14.84	2.157		0.0	7.170	7.027		K Factor = 5.60
to		100		0.0	0.0	0.0		
35	14.84	0.0032		0.0	7.170	0.023		Vel = 1.30
35	14.87	2.157	1T	8.783	2.330	7.050		K Factor = 5.60
to		100		0.0	8.783	0.0		
60	29.71	0.0113		0.0	11.113	0.126		Vel = 2.61
60	29.66	2.157	1E	4.392	22.460	7.176		
to		100	1T	8.783	13.174	4.907		
61	59.37	0.0408		0.0	35.634	1.453		Vel = 5.21
61	152.38	4.26	1J	15.036	10.580	13.536		
to		100		0.0	15.035	0.0		
62	211.75	0.0156		0.0	25.615	0.399		Vel = 4.77
62	197.51	4.26	2I	13.156	1.830	13.935		
to		100		0.0	13.157	-0.251		
63	409.26	0.0527		0.0	14.987	0.790		Vel = 9.21
63	0.0	4.26	8I	52.625	63.870	14.474		
to		100	1J	15.036	67.660	14.994		
TOR1	409.26	0.0527		0.0	131.530	6.936		Vel = 9.21
TOR1	0.0	4.26	1D	26.313	2.000	36.404		
to		100		0.0	26.313	1.732		
DPV	409.26	0.0528		0.0	28.313	1.494		Vel = 9.21
DPV	0.0	4.26	1B	15.8	2.000	39.630		
to		120	1T	26.334	42.134	0.0		
HDR1	409.26	0.0376		0.0	44.134	1.661		Vel = 9.21

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
HDR1	0.0	4.26		0.0	2.500	41.291		
to		120		0.0	0.0	0.0		
HDR	409.26	0.0376		0.0	2.500	0.094		Vel = 9.21
HDR	0.0	4.26		0.0	0.500	41.385		
to		120		0.0	0.0	0.0		
BFP	409.26	0.0380		0.0	0.500	0.019		Vel = 9.21
BFP	0.0	4.26		0.0	3.000	41.404		
to		120		0.0	0.0	7.000		* Fixed loss = 7
6UG	409.26	0.0377		0.0	3.000	0.113		Vel = 9.21
6UG	0.0	6.16	1L	12.911	60.000	48.517		
to		140	1G	4.304	60.252	-0.918		
TEST	409.26	0.0047	1T	43.037	120.252	0.564		Vel = 4.41
	100.00							Qa = 100.00
	509.26					48.163		K Factor = 73.38