

... Fire Protection by Computer Design

SPRINKLER SYSTEMS INC.
4 AVON STREET
P O BOX 1285
LEWISTON, ME. 04243
207-782-0104

Job Name : 3 CANAL PLAZA MECH. ROOM AREA 1
Building : EXISTING
Location : 3 CANAL PLAZA PORTLAND, MAINE
System : 1 WET
Contract : 15100
Data File : 3 CANAL PLAZA MECH. ROOM AREA 1.WXF

Hydraulic Design Information Sheet

Name - 3 CANAL PLAZA PENTHOUSE MECH. ROOM Date - 10-06-15
 Location - 3 CANAL PLAZA PORTLAND, MAINE
 Building - EXISTING System No. - 1 WET
 Contractor - SPRINKLER SYSTEMS INC Contract No. - 15100
 Calculated By - CDS Drawing No. - 1-1 OF 1
 Construction: () Combustible (X) Non-Combustible Ceiling Height - VARIES
 Occupancy - MECHANICAL PENTHOUSE

S (X) NFPA 13 () Lt. Haz. Ord.Haz.Gp. (X) 1 () 2 () 3 () Ex.Haz.
 Y () NFPA 231 () NFPA 231C () Figure Curve

S Other

T Specific Ruling Made By Date

E				
M	Area of Sprinkler Operation	- 1125	System Type	Sprinkler/Nozzle
	Density	- .15	(X) Wet	Make RELIABLE
D	Area Per Sprinkler	- 130	() Dry	Model F1FR56
E	Elevation at Highest Outlet	- 199.500	() Deluge	Size 1/2" X 1/2"
S	Hose Allowance - Inside	- 0	() Preaction	K-Factor 5.6
I	Rack Sprinkler Allowance	- 0	() Other	Temp.Rat.200 DEG.
G	Hose Allowance - Outside	- 250		

N Note

Calculation Flow Required - 252.30 Press Required - 86.815 AT PUMP
 Summary C-Factor Used: 120 Overhead 120 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - N/A		Cap. -
T	Time of Test - N/A	Rated Cap.- 506	Elev.-
E	Static Press - N/A	@ Press - 130	
R	Residual Press - N/A	Elev. - 100	Well
	Flow - N/A		Proof Flow
S	Elevation - N/A		

U Location - PUMP FLOW TEST DATED 8/21/15

P Source of Information - OWNER

C	Commodity	Class	Location
O	Storage Ht.	Area	Aisle W.
M	Storage Method:	%	Palletized % Rack
	() Single Row	() Conven. Pallet	() Auto. Storage () Encap.
S	() Double Row	() Slave Pallet	() Solid Shelf () Non
T	() Mult. Row		() Open Shelf

R K Flue Spacing Clearance:Storage to Ceiling
 A Longitudinal Transverse

E Horizontal Barriers Provided:

Fittings Used Summary

SPRINKLER SYSTEMS INC.
3 CANAL PLAZA MECH. ROOM AREA 1

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Date

Fitting Legend		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
Abbrev.	Name																				
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
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
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
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

Units Summary

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

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with *. The fittings marked with a * show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a * will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

Pressure / Flow Summary - STANDARD

SPRINKLER SYSTEMS INC.
3 CANAL PLAZA MECH. ROOM AREA 1

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Date

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
TYP	0.0	5.6	12.13	na	19.5	0.15	130	7.0
14	199.5	5.6	20.53	na	25.37	0.15	130	7.0
13	199.5	K = K @ SPRG	23.16	na	23.15			
15	199.5		23.46	na				
7	199.5	K = K @ SPRG	16.94	na	19.8			
8	199.5	K = K @ SPRG	17.07	na	19.88			
9	199.5	K = K @ SPRG	18.04	na	20.43			
10	199.5	K = K @ SPRG	18.94	na	20.94			
11	199.5	K = K @ SPRG	20.39	na	21.72			
1	199.5	K = K @ SPRG	16.43	na	19.5			
2	199.5	K = K @ SPRG	16.66	na	19.64			
3	199.5	K = K @ SPRG	17.16	na	19.93			
4	199.5	K = K @ SPRG	18.15	na	20.49			
5	199.5	K = K @ SPRG	19.87	na	21.44			
6	199.5		22.98	na				
12	199.5		23.33	na				
16	199.5		24.03	na				
A	199.5		33.47	na				
TSP	199.5		38.13	na				
HOSE	100.0		86.81	na	250.0			
PUMP	100.0		86.85	na				

The maximum velocity is 14.84 and it occurs in the pipe between nodes 11 and 12

Final Calculations - Hazen-Williams

SPRINKLER SYSTEMS INC.
3 CANAL PLAZA MECH. ROOM AREA 1

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Date

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
TYP to SPRG	19.50 19.5	1.049 120.0 -0.1615	T	5.0 0.0 0.0	5.500 5.000 10.500	12.125 6.000 -1.696			K Factor = 5.60 * * Fixed Loss = 3 Vel = 7.24	
	0.0 19.50						16.429		K Factor = 4.81	
14 to 15	25.37 25.37	1.049 120.0 0.2021	E T	2.0 5.0 0.0	7.500 7.000 14.500	20.527 0.0 2.930			K Factor = 5.60 Vel = 9.42	
	0.0 25.37						23.457		K Factor = 5.24	
13 to 15	23.15 23.15	1.682 120.0 0.0171	T	9.9 0.0 0.0	7.750 9.900 17.650	23.155 0.0 0.302			K Factor @ node SPRG Vel = 3.34	
15 to 16	25.37 48.52	2.157 120.0 0.0200	E T	6.153 12.307 0.0	10.000 18.460 28.460	23.457 0.0 0.570			Vel = 4.26	
	0.0 48.52						24.027		K Factor = 9.90	
7 to 8	19.80 19.8	1.682 120.0 0.0128		0.0 0.0 0.0	10.250 0.0 10.250	16.941 0.0 0.131			K Factor @ node SPRG Vel = 2.86	
8 to 9	19.88 39.68	1.682 120.0 0.0464	2E	9.9 0.0 0.0	11.000 9.900 20.900	17.072 0.0 0.969			K Factor @ node SPRG Vel = 5.73	
9 to 10	20.43 60.11	1.682 120.0 0.1000		0.0 0.0 0.0	9.000 0.0 9.000	18.041 0.0 0.900			K Factor @ node SPRG Vel = 8.68	
10 to 11	20.94 81.05	1.682 120.0 0.1738		0.0 0.0 0.0	8.330 0.0 8.330	18.941 0.0 1.448			K Factor @ node SPRG Vel = 11.70	
11 to 12	21.72 102.77	1.682 120.0 0.2697	T	9.9 0.0 0.0	1.000 9.900 10.900	20.389 0.0 2.940			K Factor @ node SPRG Vel = 14.84	
	0.0 102.77						23.329		K Factor = 21.28	
1 to 2	19.50 19.5	1.682 120.0 0.0124	2E	9.9 0.0 0.0	8.500 9.900 18.400	16.429 0.0 0.229			K Factor @ node SPRG Vel = 2.82	
2 to 3	19.64 39.14	1.682 120.0 0.0453		0.0 0.0 0.0	11.000 0.0 11.000	16.658 0.0 0.498			K Factor @ node SPRG Vel = 5.65	
3 to 4	19.92 59.06	1.682 120.0 0.0968		0.0 0.0 0.0	10.250 0.0 10.250	17.156 0.0 0.992			K Factor @ node SPRG Vel = 8.53	
4 to 5	20.50 79.56	1.682 120.0 0.1679		0.0 0.0 0.0	10.250 0.0 10.250	18.148 0.0 1.721			K Factor @ node SPRG Vel = 11.49	

Final Calculations - Hazen-Williams

SPRINKLER SYSTEMS INC.
3 CANAL PLAZA MECH. ROOM AREA 1

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Date

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
5 to 6	21.44 101.0	1.682 120.0 0.2611	T 9.9 0.0	2.000 9.900	19.869 0.0			K Factor @ node SPRG	
6 to 12	0.0 101.0	2.635 120.0 0.0294	0.0 0.0	12.000 0.0	22.976 0.0			Vel = 14.58	
12 to 16	102.78 203.78	2.635 120.0 0.1074	0.0 0.0	6.500 0.0	23.329 0.0			Vel = 5.94	
16 to A	48.52 252.3	2.635 120.0 0.1596	3E 24.711 T 16.474 0.0	18.000 41.185 59.185	24.027 0.0 9.445			Vel = 11.99	
A to TSP	0.0 252.3	2.635 120.0 0.1596	E 8.237 T 16.474 0.0	4.500 24.711 29.211	33.472 0.0 4.662			Vel = 14.84	
TSP to HOSE	0.0 252.3	4.26 120.0 0.0154	10E 131.671 G 2.633 S 28.968	200.000 163.272 363.272	38.134 43.093 5.588			Vel = 14.84	
HOSE to PUMP	250.00 502.3	4.026 120.0 0.0720	0.0 0.0	0.500 0.0	86.815 0.0			Qa = 250.0	
	0.0 502.30		0.0 0.0	0.500	0.036			Vel = 12.66	
					86.851			K Factor = 53.90	

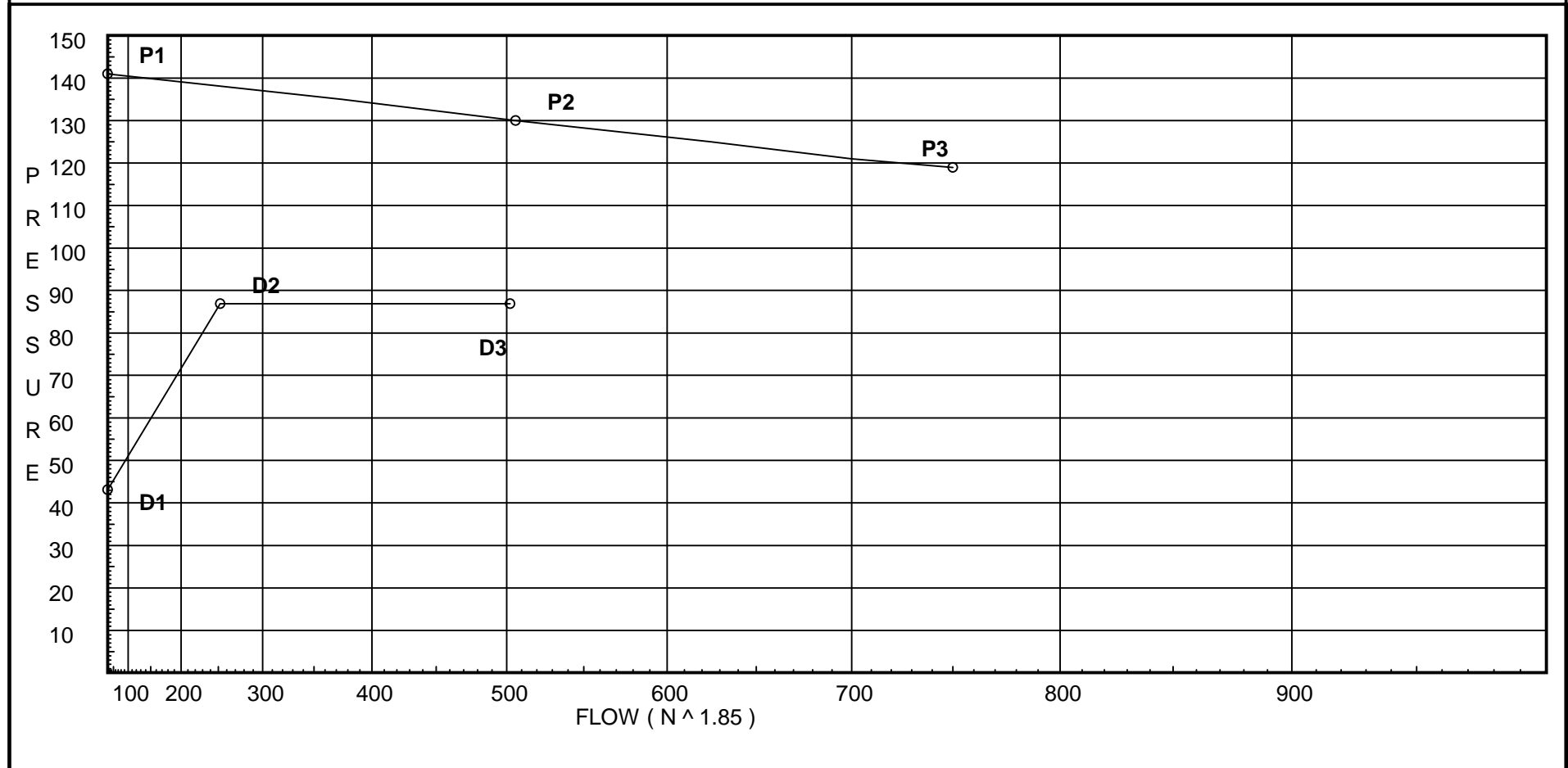
Water Supply Curve C

SPRINKLER SYSTEMS INC.
3 CANAL PLAZA MECH. ROOM AREA 1

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Date

Pump Data:
 P1 - Pump Churn Pressure : 141
 P2 - Pump Rated Pressure : 130
 P2 - Pump Rated Flow : 506
 P3 - Pump Pressure @ Max Flow : 119
 P3 - Pump Max Flow : 750

Demand:
 D1 - Elevation : 43.093
 D2 - System Flow : 252.297
 D2 - System Pressure : 86.851
 Hose (Demand) : 250
 D3 - System Demand : 502.297
 Safety Margin : 43.308



Hydraulic Design Information Sheet

Name - 3 CANAL PLAZA PENTHOUSE MECH. ROOM AREA 2 Date - 10-06-15
 Location - 3 CANAL PLAZA PORTLAND, MAINE
 Building - EXISTING System No. - 1 WET
 Contractor - SPRINKLER SYSTEMS INC Contract No. - 15100
 Calculated By - CDS Drawing No. - 1-1 OF 1
 Construction: () Combustible (X) Non-Combustible Ceiling Height - VARIES
 Occupancy - MECHANICAL PENTHOUSE

S (X) NFPA 13 () Lt. Haz. Ord.Haz.Gp. (X) 1 () 2 () 3 () Ex.Haz.
 Y () NFPA 231 () NFPA 231C () Figure Curve

S Other

T Specific Ruling Made By Date

E				
M	Area of Sprinkler Operation	- ENTIRE	System Type	Sprinkler/Nozzle
	Density	- .15	(X) Wet	Make RELIABLE
D	Area Per Sprinkler	- 130	() Dry	Model F1FR56
E	Elevation at Highest Outlet	- 208.500	() Deluge	Size 1/2" X 1/2"
S	Hose Allowance - Inside	- 0	() Preaction	K-Factor 5.6
I	Rack Sprinkler Allowance	- 0	() Other	Temp.Rat.200 DEG.
G	Hose Allowance - Outside	- 250		

N Note

Calculation Flow Required - 182.95 Press Required - 78.003 AT PUMP
 Summary C-Factor Used: 120 Overhead 120 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - N/A		Cap. -
T	Time of Test - N/A	Rated Cap.- 506	Elev.-
E	Static Press - N/A	@ Press - 130	
R	Residual Press - N/A	Elev. - 100	Well
	Flow - N/A		Proof Flow
S	Elevation - N/A		

U Location - PUMP FLOW TEST DATED 8/21/15

P Source of Information - OWNER

C	Commodity	Class	Location
O	Storage Ht.	Area	Aisle W.
M	Storage Method:	%	Palletized % Rack
	() Single Row	() Conven. Pallet	() Auto. Storage () Encap.
S	() Double Row	() Slave Pallet	() Solid Shelf () Non
T	() Mult. Row		() Open Shelf

R K Flue Spacing Clearance:Storage to Ceiling
 A Longitudinal Transverse

E Horizontal Barriers Provided:

Pressure / Flow Summary - STANDARD

SPRINKLER SYSTEMS INC.
3 CANAL PLAZA MECH. ROOM AREA 2

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Date

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
TYP	0.0	5.6	12.13	na	19.5	0.15	130	7.0
30	208.5	K = K @ SPRG	13.8	na	20.19			
31	208.5	K = K @ SPRG	14.2	na	20.48			
26	208.5	K = K @ SPRG	13.11	na	19.68			
27	208.5	K = K @ SPRG	13.48	na	19.96			
21	208.5	K = K @ SPRG	12.87	na	19.5			
22	208.5	K = K @ SPRG	13.24	na	19.78			
23	208.5		14.75	na				
24	208.5	K = K @ SPRG	14.76	na	20.88			
25	208.5	K = K @ SPRG	14.94	na	21.01			
28	208.5		15.02	na				
29	208.5	K = K @ SPRG	15.59	na	21.46			
32	208.5		15.81	na				
33	208.5		18.06	na				
34	199.5		25.44	na				
35	199.5		26.02	na				
A	199.5		29.25	na				
TSP	199.5		31.83	na				
HOSE	100.0		78.0	na	250.0			
PUMP	100.0		78.03	na				

The maximum velocity is 16.06 and it occurs in the pipe between nodes 32 and 33

Final Calculations - Hazen-Williams

SPRINKLER SYSTEMS INC.
3 CANAL PLAZA MECH. ROOM AREA 2

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Date

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
TYP to SPRG	19.50 19.5	1.049 120.0 0.1242	T	5.0 0.0 0.0	1.000 5.000 6.000	12.125 0.0 0.745			K Factor = 5.60	
	0.0 19.50									
							12.870		K Factor = 5.44	
30 to 31	20.19 20.19	1.442 120.0 0.0281		0.0 0.0 0.0	14.000 0.0 14.000	13.804 0.0 0.394			K Factor @ node SPRG	
									Vel = 3.97	
31 to 32	20.49 40.68	1.442 120.0 0.1027	T	7.432 0.0 0.0	8.250 7.432 15.682	14.198 0.0 1.611			K Factor @ node SPRG	
	0.0 40.68								Vel = 7.99	
							15.809		K Factor = 10.23	
26 to 27	19.68 19.68	1.442 120.0 0.0268		0.0 0.0 0.0	14.000 0.0 14.000	13.109 0.0 0.375			K Factor @ node SPRG	
									Vel = 3.87	
27 to 28	19.96 39.64	1.442 120.0 0.0979	T	7.432 0.0 0.0	8.250 7.432 15.682	13.484 0.0 1.536			K Factor @ node SPRG	
	0.0 39.64								Vel = 7.79	
							15.020		K Factor = 10.23	
21 to 22	19.50 19.5	1.442 120.0 0.0264		0.0 0.0 0.0	14.000 0.0 14.000	12.870 0.0 0.370			K Factor @ node SPRG	
									Vel = 3.83	
22 to 23	19.78 39.28	1.442 120.0 0.0963	T	7.432 0.0 0.0	8.250 7.432 15.682	13.240 0.0 1.510			K Factor @ node SPRG	
									Vel = 7.72	
23 to 24	0.0 39.28	2.157 120.0 0.0130		0.0 0.0 0.0	1.000 0.0 1.000	14.750 0.0 0.013				Vel = 3.45
									K Factor @ node SPRG	
24 to 25	20.88 60.16	2.157 120.0 0.0298		0.0 0.0 0.0	6.000 0.0 6.000	14.763 0.0 0.179				Vel = 5.28
									K Factor @ node SPRG	
25 to 28	21.01 81.17	2.157 120.0 0.0520		0.0 0.0 0.0	1.500 0.0 1.500	14.942 0.0 0.078				Vel = 7.13
28 to 29	39.64 120.81	2.157 120.0 0.1084		0.0 0.0 0.0	5.250 0.0 5.250	15.020 0.0 0.569				Vel = 10.61
									K Factor @ node SPRG	
29 to 32	21.46 142.27	2.157 120.0 0.1467		0.0 0.0 0.0	1.500 0.0 1.500	15.589 0.0 0.220				Vel = 12.49
32 to 33	40.68 182.95	2.157 120.0 0.2334	E	6.153 0.0 0.0	3.500 6.153 9.653	15.809 0.0 2.253				Vel = 16.06

Final Calculations - Hazen-Williams

SPRINKLER SYSTEMS INC.
3 CANAL PLAZA MECH. ROOM AREA 2

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Date

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
33	0.0	2.157	E	6.153	8.750	18.062			
to		120.0		0.0	6.153	3.898			
34	182.95	0.2334		0.0	14.903	3.478	Vel = 16.06		
34	0.0	2.157		0.0	2.500	25.438			
to		120.0		0.0	0.0	0.0			
35	182.95	0.2336		0.0	2.500	0.584	Vel = 16.06		
35	0.0	2.635	E	8.237	12.000	26.022			
to		120.0	T	16.474	24.711	0.0			
A	182.95	0.0880		0.0	36.711	3.232	Vel = 10.76		
A	0.0	2.635	E	8.237	4.500	29.254			
to		120.0	T	16.474	24.711	0.0			
TSP	182.95	0.0880		0.0	29.211	2.572	Vel = 10.76		
TSP	0.0	4.26	10E	131.671	200.000	31.826			
to		120.0	G	2.633	163.272	43.093			
HOSE	182.95	0.0085	S	28.968	363.272	3.084	Vel = 4.12		
HOSE	250.00	4.026		0.0	0.500	78.003	Qa = 250.0		
to		120.0		0.0	0.0	0.0			
PUMP	432.95	0.0540		0.0	0.500	0.027	Vel = 10.91		
	0.0								
	432.95					78.030	K Factor = 49.01		

Water Supply Curve C

SPRINKLER SYSTEMS INC.
3 CANAL PLAZA MECH. ROOM AREA 2

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Date

Pump Data:
 P1 - Pump Churn Pressure : 141
 P2 - Pump Rated Pressure : 130
 P2 - Pump Rated Flow : 506
 P3 - Pump Pressure @ Max Flow : 119
 P3 - Pump Max Flow : 750

Demand:
 D1 - Elevation : 46.991
 D2 - System Flow : 182.949
 D2 - System Pressure : 78.030
 Hose (Demand) : 250
 D3 - System Demand : 432.949
 Safety Margin : 54.914

