

... Fire Protection by Computer Design

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

Job Name : The Iris Network Area 1
Building : EXISTING
Location : 189 PARK AVENUE PORTLAND, MAINE
System : 1 WET
Contract : 14-121
Data File : The Iris Network Area 1.WXF

Hydraulic Design Information Sheet

Name - THE IRIS NETWORK Date - 12-12-14
 Location - 189 PARK AVENUE PORTLAND, MAINE
 Building - EXISTING System No. - 1 WET
 Contractor - SPRINKLER SYSTEMS INC. Contract No. - 14-121
 Calculated By - CDS Drawing No. - 1-1 OF 1
 Construction: (X) Combustible () Non-Combustible Ceiling Height - VARIES
 Occupancy - OFFICES

S (X) NFPA 13 (X) Lt. Haz. Ord.Haz.Gp. () 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	- 900	System Type	Sprinkler/Nozzle
	Density	- .10	(X) Wet	Make RELIABLE
D	Area Per Sprinkler	- 196	() Dry	Model F1FR56
E	Elevation at Highest Outlet	- 76.250	() 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.155 DEG.
G	Hose Allowance - Outside	- 100		

N Note

Calculation Flow Required - 168.74 Press Required - 56.671 AT BASE
 Summary C-Factor Used: 120 Overhead 140 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 7-30-07		Cap. -
T	Time of Test - AM	Rated Cap.-	Elev.-
E	Static Press - 108	@ Press -	
R	Residual Press - 107	Elev. -	Well
	Flow - 2122		Proof Flow
S	Elevation - 27.0'		

U Location - PARK AVE.

P Source of Information - OWNER AND WATER DISTRICT

C	Commodity	Class	Location
O	Storage Ht.	Area	Aisle W.
M	Storage Method: Solid Piled	%	Palletized % Rack
M	() 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.
The Iris Network 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
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
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
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
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
Zia	Wilkins 350	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

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.
The Iris Network Area 1

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
TYP	0.0	5.6	12.25	na	19.6	0.1	196	7.0
6	76.25	K = K @ ARM	14.43	na	19.64			
7	76.25	K = K @ ARM	14.83	na	19.9			
8	76.09	K = K @ ARM	17.8	na	21.81			
9	76.09	K = K @ ARM	19.98	na	23.1			
1	76.25	K = K @ ARM	14.38	na	19.6			
2	76.25	K = K @ ARM	14.78	na	19.87			
3	76.09	K = K @ ARM	17.73	na	21.77			
4	76.09	K = K @ ARM	19.9	na	23.06			
5	76.09		24.8	na				
10	76.09		24.89	na				
11	76.09		26.51	na				
12	76.09		27.29	na				
14	58.09		36.4	na				
15	58.09		36.98	na				
16	45.09		44.08	na				
17	45.09		45.62	na				
TOR	45.09		46.41	na				
FDC	43.0		47.39	na				
BKFL	41.0		51.27	na				
BASE	37.0		56.67	na				
HOSE	37.0		57.21	na	100.0			
1000	37.0		57.25	na				
2000	27.0		61.58	na				
TEST	27.0		61.67	na				

The maximum velocity is 18.11 and it occurs in the pipe between nodes 9 and 10

Final Calculations - Hazen-Williams

SPRINKLER SYSTEMS INC.
The Iris Network Area 1

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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	*****
TYP to ARM	19.60 19.6	1.049 120.0 0.1254	E 2.0 2T 10.0 0.0	5.000 12.000 17.000	12.250 0.0 2.131			K Factor = 5.60 Vel = 7.28	
	0.0 19.60					14.381		K Factor = 5.17	
6 to 7	19.64 19.64	1.38 120.0 0.0331	0.0 0.0 0.0	12.000 0.0 12.000	14.435 0.0 0.397			K Factor @ node ARM Vel = 4.21	
7 to 8	19.90 39.54	1.38 120.0 0.1208	4E 12.0 0.0 0.0	12.000 12.000 24.000	14.832 0.069 2.899			K Factor @ node ARM Vel = 8.48	
8 to 9	21.81 61.35	1.38 120.0 0.2721	0.0 0.0 0.0	8.000 0.0 8.000	17.800 0.0 2.177			K Factor @ node ARM Vel = 13.16	
9 to 10	23.10 84.45	1.38 120.0 0.4917	T 6.0 0.0 0.0	4.000 6.000 10.000	19.977 0.0 4.917			K Factor @ node ARM Vel = 18.11	
	0.0 84.45					24.894		K Factor = 16.93	
1 to 2	19.60 19.6	1.38 120.0 0.0330	0.0 0.0 0.0	12.000 0.0 12.000	14.381 0.0 0.396			K Factor @ node ARM Vel = 4.20	
2 to 3	19.87 39.47	1.38 120.0 0.1204	4E 12.0 0.0 0.0	12.000 12.000 24.000	14.777 0.069 2.889			K Factor @ node ARM Vel = 8.47	
3 to 4	21.76 61.23	1.38 120.0 0.2712	0.0 0.0 0.0	8.000 0.0 8.000	17.735 0.0 2.170			K Factor @ node ARM Vel = 13.13	
4 to 5	23.06 84.29	1.38 120.0 0.4899	T 6.0 0.0 0.0	4.000 6.000 10.000	19.905 0.0 4.899			K Factor @ node ARM Vel = 18.08	
5 to 10	0.0 84.29	3.26 120.0 0.0075	0.0 0.0 0.0	12.000 0.0 12.000	24.804 0.0 0.090			Vel = 3.24	
10 to 11	84.45 168.74	3.26 120.0 0.0269	T 20.159 0.0 0.0	40.000 20.159 60.159	24.894 0.0 1.617			Vel = 6.49	
11 to 12	0.0 168.74	3.26 120.0 0.0269	2E 18.815 0.0 0.0	10.000 18.815 28.815	26.511 0.0 0.775			Vel = 6.49	
12 to 14	0.0 168.74	3.26 120.0 0.0269	E 9.408 T 20.159 0.0	19.330 29.567 48.897	27.286 7.796 1.315			Vel = 6.49	
14 to 15	0.0 168.74	3.26 120.0 0.0269	2E 18.815 0.0 0.0	3.000 18.815 21.815	36.397 0.0 0.587			Vel = 6.49	

Final Calculations - Hazen-Williams

SPRINKLER SYSTEMS INC.
The Iris Network Area 1

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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	*****
15 to 16	0.0 168.74	3.26 120.0 0.0269	2E T	18.815 20.159 0.0	15.500 38.974 54.474	36.984 5.630 1.465			Vel = 6.49
16 to 17	0.0 168.74	3.068 120.0 0.0361	T	15.0 0.0 0.0	27.500 15.000 42.500	44.079 0.0 1.536			Vel = 7.32
17 to TOR	0.0 168.74	3.068 120.0 0.0361	2E	14.0 0.0 0.0	8.000 14.000 22.000	45.615 0.0 0.795			Vel = 7.32
TOR to FDC	0.0 168.74	3.068 120.0 0.0365		0.0 0.0 0.0	2.000 0.0 2.000	46.410 0.905 0.073			Vel = 7.32
FDC to BKFL	0.0 168.74	4.026 120.0 0.0095	Fsp	0.0 0.0 0.0	2.000 0.0 2.000	47.388 3.866 0.019		** Fixed Loss = 3	Vel = 4.25
BKFL to BASE	0.0 168.74	4.026 120.0 0.0096	E Zia	10.0 0.0 0.0	0.500 10.000 10.500	51.273 5.297 0.101		** Fixed Loss = 3.564	Vel = 4.25
BASE to HOSE	0.0 168.74	6.16 140.0 0.0009	4E T G	80.336 43.037 4.304	460.000 127.677 587.677	56.671 0.0 0.536			Vel = 1.82
HOSE to 1000	100.00 268.74	12.34 140.0 0.0001	F 2E T	20.316 84.39 93.767	400.000 198.473 598.473	57.207 0.0 0.043		Qa = 100	Vel = 0.72
1000 to 2000	0.0 268.74	24.73 140.0 0.0	F T	57.421 248.141 0.0	650.000 305.562 955.562	57.250 4.331 0.003			Vel = 0.18
2000 to TEST	0.0 268.74	8.27 140.0 0.0005	E T	28.468 55.354 0.0	75.000 83.822 158.822	61.584 0.0 0.082			Vel = 1.61
	0.0 268.74					61.666			K Factor = 34.22

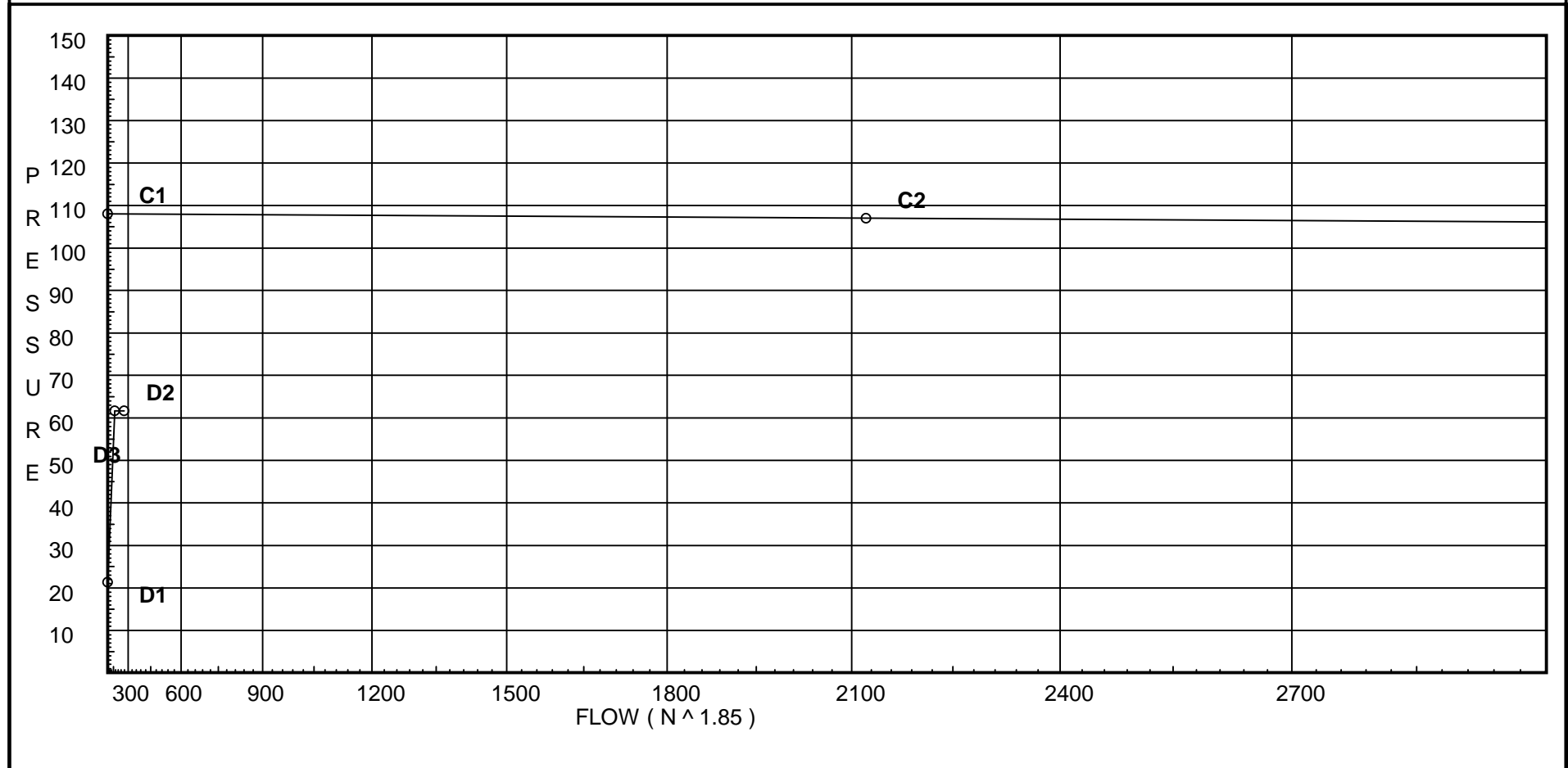
Water Supply Curve C

SPRINKLER SYSTEMS INC.
The Iris Network Area 1

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Date

City Water Supply:
C1 - Static Pressure : 108
C2 - Residual Pressure: 107
C2 - Residual Flow : 2122

Demand:
D1 - Elevation : 21.330
D2 - System Flow : 168.74
D2 - System Pressure : 61.666
Hose (Demand) : 100
D3 - System Demand : 268.74
Safety Margin : 46.313



Hydraulic Design Information Sheet

Name - THE IRIS NETWORK AREA 2 Date - 12-12-14
 Location - 189 PARK AVENUE PORTLAND, MAINE
 Building - EXISTING System No. - 1 WET
 Contractor - SPRINKLER SYSTEMS INC. Contract No. - 14-121
 Calculated By - CDS Drawing No. - 1-1 OF 1
 Construction: (X) Combustible () Non-Combustible Ceiling Height - VARIES
 Occupancy - OFFICES

S (X) NFPA 13 (X) Lt. Haz. Ord.Haz.Gp. () 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	- 900	System Type	Sprinkler/Nozzle
	Density	- .10	(X) Wet	Make RELIABLE
D	Area Per Sprinkler	- 324	() Dry	Model J112
E	Elevation at Highest Outlet	- 58.090	() Deluge	Size 5/8" X 3/4"
S	Hose Allowance - Inside	- 0	() Preaction	K-Factor 11.2
I	Rack Sprinkler Allowance	- 0	() Other	Temp.Rat.155 DEG.
G	Hose Allowance - Outside	- 100		

N Note

Calculation Flow Required - 181.28 Press Required - 60.495 AT BASE
 Summary C-Factor Used: 120 Overhead 140 Underground

W Water Flow Test: Pump Data: Tank or Reservoir:
 A Date of Test - 7-30-07 Cap. -
 T Time of Test - AM Rated Cap.- Elev.-
 E Static Press - 108 @ Press -
 R Residual Press - 107 Elev. - Well
 Flow - 2122 Proof Flow
 S Elevation - 27.0'

U Location - PARK AVE.

P Source of Information - OWNER AND WATER DISTRICT

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

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

G
 E Horizontal Barriers Provided:

Pressure / Flow Summary - STANDARD

SPRINKLER SYSTEMS INC.
The Iris Network Area 2

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Date

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
ARM1	58.09	11.2	8.7	na	33.04	0.1	324	8.7
ARM2	58.09	11.2	9.54	na	34.6	0.1	324	8.7
ARM3	58.09	11.2	10.82	na	36.84	0.1	324	8.7
ARM4	58.09	11.2	11.96	na	38.74	0.1	324	8.7
ARM5	58.09	11.2	11.55	na	38.07	0.1	324	8.7
24	58.09		12.82	na				
25	58.09		14.03	na				
26	58.09		18.67	na				
21	58.09		16.82	na				
22	58.09		18.83	na				
23	58.09		38.63	na				
27	58.09		38.72	na				
14	58.09		39.56	na				
15	58.09		40.23	na				
16	45.09		47.53	na				
17	45.09		49.29	na				
TOR	45.09		50.19	na				
FDC	43.0		51.18	na				
BKFL	41.0		55.07	na				
BASE	37.0		60.5	na				
HOSE	37.0		61.11	na	100.0			
1000	37.0		61.15	na				
2000	27.0		65.49	na				
TEST	27.0		65.58	na				

The maximum velocity is 22.41 and it occurs in the pipe between nodes 26 and 27

Final Calculations - Hazen-Williams

SPRINKLER SYSTEMS INC.
The Iris Network Area 2

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Date

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftnng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
ARM1 to 24	33.04	1.049 120.0	2E T	4.0 5.0 0.0	3.500 9.000 12.500	8.700 0.0 4.116		K Factor = 11.20	
	0.0 33.04					12.816		K Factor = 9.23	
ARM2 to 25	34.60	1.049 120.0	2E T	4.0 5.0 0.0	3.500 9.000 12.500	9.544 0.0 4.485		K Factor = 11.20	
	0.0 34.60					14.029		K Factor = 9.24	
ARM3 to 26	36.84	1.049 120.0	2E 2T	4.0 10.0 0.0	5.500 14.000 19.500	10.819 0.0 7.856		K Factor = 11.20	
	0.0 36.84					18.675		K Factor = 8.52	
ARM4 to 21	38.74	1.049 120.0	2E T	4.0 5.0 0.0	2.000 9.000 11.000	11.962 0.0 4.863		K Factor = 11.20	
	0.0 38.74					16.825		K Factor = 9.44	
ARM5 to 22	38.07	1.049 120.0	2E 2T	4.0 10.0 0.0	3.000 14.000 17.000	11.553 0.0 7.277		K Factor = 11.20	
	0.0 38.07					18.830		K Factor = 8.77	
24 to 25	33.04	1.38 120.0		0.0 0.0 0.0	14.000 0.0 14.000	12.816 0.0 1.213			Vel = 7.09
25 to 26	34.60	1.38 120.0		0.0 0.0 0.0	14.250 0.0 14.250	14.029 0.0 4.646			Vel = 14.51
26 to 27	36.84	1.38 120.0	T	6.0 0.0 0.0	21.500 6.000 27.500	18.675 0.0 20.042			Vel = 22.41
	0.0 104.48					38.717		K Factor = 16.79	
21 to 22	38.74	1.380 120.0		0.0 0.0 0.0	17.250 0.0 17.250	16.825 0.0 2.005			Vel = 8.31
22 to 23	38.06	1.380 120.0	2E T	6.0 6.0 0.0	36.000 12.000 48.000	18.830 0.0 19.800			Vel = 16.47
23 to 27	0.0	3.26 120.0		0.0 0.0 0.0	14.000 0.0 14.000	38.630 0.0 0.087			Vel = 2.95

Final Calculations - Hazen-Williams

SPRINKLER SYSTEMS INC.
The Iris Network Area 2

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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	*****
27	104.48	3.26	E	9.408	18.000	38.717			
to		120.0		0.0	9.408	0.0			
14	181.28	0.0307		0.0	27.408	0.842	Vel =	6.97	
14	0.0	3.26	2E	18.815	3.000	39.559			
to		120.0		0.0	18.815	0.0			
15	181.28	0.0307		0.0	21.815	0.670	Vel =	6.97	
15	0.0	3.26	2E	18.815	15.500	40.229			
to		120.0	T	20.159	38.974	5.630			
16	181.28	0.0307		0.0	54.474	1.673	Vel =	6.97	
16	0.0	3.068	T	15.0	27.500	47.532			
to		120.0		0.0	15.000	0.0			
17	181.28	0.0413		0.0	42.500	1.754	Vel =	7.87	
17	0.0	3.068	2E	14.0	8.000	49.286			
to		120.0		0.0	14.000	0.0			
TOR	181.28	0.0413		0.0	22.000	0.908	Vel =	7.87	
TOR	0.0	3.068		0.0	2.000	50.194			
to		120.0		0.0	0.0	0.905			
FDC	181.28	0.0410		0.0	2.000	0.082	Vel =	7.87	
FDC	0.0	4.026	Fsp	0.0	2.000	51.181			
to		120.0		0.0	0.0	3.866	** Fixed Loss = 3		
BKFL	181.28	0.0115		0.0	2.000	0.023	Vel =	4.57	
BKFL	0.0	4.026	E	10.0	0.500	55.070			
to		120.0	Zia	0.0	10.000	5.310	** Fixed Loss = 3.578		
BASE	181.28	0.0110		0.0	10.500	0.115	Vel =	4.57	
BASE	0.0	6.16	4E	80.336	460.000	60.495			
to		140.0	T	43.037	127.677	0.0			
HOSE	181.28	0.0010	G	4.304	587.677	0.612	Vel =	1.95	
HOSE	100.00	12.34	F	20.316	400.000	61.107	Qa =	100	
to		140.0	2E	84.39	198.473	0.0			
1000	281.28	0.0001	T	93.767	598.473	0.048	Vel =	0.75	
1000	0.0	24.73	F	57.421	650.000	61.155			
to		140.0	T	248.141	305.562	4.331			
2000	281.28	0.0		0.0	955.562	0.002	Vel =	0.19	
2000	0.0	8.27	E	28.468	75.000	65.488			
to		140.0	T	55.354	83.822	0.0			
TEST	281.28	0.0006		0.0	158.822	0.089	Vel =	1.68	
	0.0								
	281.28					65.577	K Factor =	34.73	

Water Supply Curve C

SPRINKLER SYSTEMS INC.
The Iris Network Area 2

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Date

City Water Supply:
C1 - Static Pressure : 108
C2 - Residual Pressure: 107
C2 - Residual Flow : 2122

Demand:
D1 - Elevation : 13.465
D2 - System Flow : 181.28
D2 - System Pressure : 65.577
Hose (Demand) : 100
D3 - System Demand : 281.28
Safety Margin : 42.399

