



. . . Fire Protection by Computer Design

Sprinkler Systems Inc.
2-4 Avon Street
P O Box 1285
Lewiston, Maine 04240
207-782-0104

Job Name : 111 COMMERCIAL STREET
Building :
Location : 111 COMMERCIAL STREET, PORTLAND, MAINE 04101
System : 1 OF 1
Contract : 13010
Data File : 13010111COMMERCIALSTPTLDA1.WXF

Hydraulic Design Information Sheet

Name - 111 COMMERCIAL STREET Date - 4-22-2013
 Location - 111 COMMERCIAL STREET, PORTLAND, MAINE 04101
 Building - System No. - 1 OF 1
 Contractor - SCOTT LINDSAY Contract No. - 13010
 Calculated By - SCOTT E. GARLAND Drawing No. - 1, 3 OF 4
 Construction: (X) Combustible () Non-Combustible Ceiling Height - VARIES
 Occupancy - OFFICES - LIGHT HAZARD

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

Specific Ruling	Made By	Date
M Area of Sprinkler Operation - 900	System Type	Sprinkler/Nozzle
Density - .10	(X) Wet	Make RELIABLE
D Area Per Sprinkler - 152	() Dry	Model F1FR56
E Elevation at Highest Outlet - 51.083	() Deluge	Size 1/2" X 1/2"
S Hose Allowance - Inside -	() Preaction	K-Factor 5.6
I Rack Sprinkler Allowance -	() Other	Temp.Rat.155 DEG
G Hose Allowance - Outside - 100		

N Note DESIGN AREA #1 - 4TH FLOOR OFFICES

Calculation Flow Required - 179.617 Press Required - 72.896 AT BASE OF RISER
 Summary C-Factor Used: 120 Overhead 140 Underground

Water Flow Test:	Pump Data:	Tank or Reservoir:
A Date of Test - 6-9-2000		Cap. -
T Time of Test -	Rated Cap.-	Elev.-
E Static Press - 102	@ Press -	
R Residual Press - 96	Elev. -	Well
Flow - 1162		Proof Flow
S Elevation - 10.0		

U Location - AT CORNER OF SILVER STREET AND COMMERCIAL STREET, 250"-0" FROM
 P BUILDING

L Source of Information - PORTLAND WATER DISTRICT

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

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

E Horizontal Barriers Provided:

Fittings Used Summary

Sprinkler Systems Inc.
111 COMMERCIAL STREET

Page 3
Date 4-22-2013

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	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
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
Zac	Ames 2000SS	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

Sprinkler Systems Inc.
111 COMMERCIAL STREET

Page 4
Date 4-22-2013

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
1	51.083	5.6	7.52	na	15.35	0.1	152	7.368
2	51.083	5.6	8.28	na	16.11	0.1	152	7.368
3	51.083	5.6	7.6	na	15.44	0.1	152	7.368
4	51.083	5.6	8.36	na	16.19	0.1	152	7.368
5	51.083	5.6	7.37	na	15.2	0.1	152	7.368
6	51.083	5.6	8.03	na	15.87	0.1	152	7.368
7	51.083	5.6	9.59	na	17.34	0.1	152	7.368
8	51.083	5.6	8.77	na	16.58	0.1	152	7.368
9	51.083	5.6	9.64	na	17.39	0.1	152	7.368
10	51.083	5.6	8.85	na	16.66	0.1	152	7.368
11	51.083	5.6	9.74	na	17.47	0.1	152	7.368
CT	51.083		10.19	na				
A	50.667		11.09	na				
B	50.667		11.2	na				
C	50.667		11.5	na				
E	50.667		12.86	na				
F	50.667		12.98	na				
D	50.667		13.5	na				
G	51.375		18.12	na				
H	51.375		22.65	na				
J	50.583		36.91	na				
K	41.0		41.87	na				
L	20.833		53.03	na				
M	9.583		65.08	na				
RT	9.583		65.58	na				
BR	5.75		70.38	na				
RB	5.75		72.9	na				
X1	5.75		73.28	na	100.0			
TEST	10.0		71.46	na				

The maximum velocity is 15.77 and it occurs in the pipe between nodes D and G

Final Calculations - Hazen-Williams

Sprinkler Systems Inc.
111 COMMERCIAL STREET

Page 5
Date 4-22-2013

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
1 to 2	15.35	1.049 120.0		0.0 0.0	9.500 0.0	7.518 0.0			K Factor = 5.60	
	15.35	0.0798		0.0	9.500	0.758			Vel = 5.70	
2 to A	16.11	1.049 120.0	1E 1T	2.0 5.0	1.750 7.000	8.276 0.180			K Factor = 5.60	
	31.46	0.3009		0.0	8.750	2.633			Vel = 11.68	
	0.0 31.46						11.089		K Factor = 9.45	
3 to 4	15.44	1.049 120.0		0.0 0.0	9.500 0.0	7.597 0.0			K Factor = 5.60	
	15.44	0.0806		0.0	9.500	0.766			Vel = 5.73	
4 to B	16.19	1.049 120.0	1E 1T	2.0 5.0	1.750 7.000	8.363 0.180			K Factor = 5.60	
	31.63	0.3039		0.0	8.750	2.659			Vel = 11.74	
	0.0 31.63						11.202		K Factor = 9.45	
5 to 6	15.20	1.049 120.0		0.0 0.0	8.500 0.0	7.368 0.0			K Factor = 5.60	
	15.2	0.0784		0.0	8.500	0.666			Vel = 5.64	
6 to CT	15.87	1.049 120.0	1T	5.0 0.0	2.333 5.000	8.034 0.0			K Factor = 5.60	
	31.07	0.2940		0.0	7.333	2.156			Vel = 11.53	
	0.0 31.07						10.190		K Factor = 9.73	
7 to CT	17.34	1.049 120.0	1T	5.0 0.0	1.000 5.000	9.590 0.0			K Factor = 5.60	
	17.34	0.1000		0.0	6.000	0.600			Vel = 6.44	
	0.0 17.34						10.190		K Factor = 5.43	
8 to 9	16.58	1.049 120.0		0.0 0.0	9.500 0.0	8.768 0.0			K Factor = 5.60	
	16.58	0.0921		0.0	9.500	0.875			Vel = 6.15	
9 to E	17.39	1.049 120.0	1E 1T	2.0 5.0	1.750 7.000	9.643 0.180			K Factor = 5.60	
	33.97	0.3467		0.0	8.750	3.034			Vel = 12.61	
	0.0 33.97						12.857		K Factor = 9.47	
10 to 11	16.66	1.049 120.0		0.0 0.0	9.500 0.0	8.854 0.0			K Factor = 5.60	
	16.66	0.0927		0.0	9.500	0.881			Vel = 6.18	
11 to F	17.48	1.049 120.0	1E 1T	2.0 5.0	1.750 7.000	9.735 0.180			K Factor = 5.60	
	34.14	0.3499		0.0	8.750	3.062			Vel = 12.67	
	0.0 34.14						12.977		K Factor = 9.48	
CT to C	48.42	1.380 120.0	1T	6.0 0.0	0.417 6.000	10.190 0.180				
	48.42	0.1756		0.0	6.417	1.127			Vel = 10.39	

Final Calculations - Hazen-Williams

Sprinkler Systems Inc.
111 COMMERCIAL STREET

Page 6
Date 4-22-2013

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftg's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 48.42					11.497			K Factor = 14.28	
A to B	31.46	2.157 120.0		0.0	12.500	11.089 0.0				
B to C	31.46	0.0090		0.0	12.500	0.113			Vel = 2.76	
B to C	31.63	2.157 120.0		0.0	9.083	11.202 0.0				
C to D	63.09	0.0325		0.0	9.083	0.295			Vel = 5.54	
C to D	48.42	2.157 120.0	1T	12.307	9.083	11.497 0.0				
D	111.51	0.0934		0.0	21.390	1.998			Vel = 9.79	
	0.0 111.51					13.495			K Factor = 30.35	
E to F	33.97	2.157 120.0		0.0	11.583	12.857 0.0				
F to D	33.97	0.0104		0.0	11.583	0.120			Vel = 2.98	
F to D	34.14	2.157 120.0	1T	12.307	1.500	12.977 0.0				
D	68.11	0.0375		0.0	13.807	0.518			Vel = 5.98	
	0.0 68.11					13.495			K Factor = 18.54	
D to G	179.62	2.157 120.0	1E	6.153	15.709	13.495 -0.307				
G to H	179.62	0.2256		0.0	21.862	4.932			Vel = 15.77	
G to H	0.0	2.157 120.0	1T	12.307	7.792	18.120 0.0				
H to J	179.62	0.2256		0.0	20.099	4.535			Vel = 15.77	
H to J	0.0	2.157 120.0	2E 1T	12.307 12.307	37.042 24.614	22.655 0.343				
J to K	179.62	0.2256		0.0	61.656	13.910			Vel = 15.77	
J to K	0.0	2.635 120.0		0.0	9.583	36.908 4.150				
K to L	179.62	0.0852		0.0	9.583	0.816			Vel = 10.57	
K to L	0.0	2.635 120.0	1E	8.237	20.167	41.874 8.734				
L to M	179.62	0.0851		0.0	28.404	2.418			Vel = 10.57	
L to M	0.0	2.635 120.0	6E	49.423	35.000	53.026 4.872				
M to RT	179.62	0.0851		0.0	84.423	7.186			Vel = 10.57	
M to RT	0.0	4.26 120.0	1E	13.167	47.875	65.084 0.0				
RT to BR	179.62	0.0082		0.0	61.042	0.500			Vel = 4.04	
RT to BR	0.0	4.26 120.0	1E 1Fsp	13.167 0.0	3.833 13.167	65.584 4.660			* Fixed loss = 3	
BR to RB	179.62	0.0082		0.0	17.000	0.140			Vel = 4.04	
BR to RB	0.0	4.26 120.0	1Zac	0.0	3.875	70.384 2.480			* Fixed loss = 2.48	
RB	179.62	0.0083		0.0	3.875	0.032			Vel = 4.04	

Final Calculations - Hazen-Williams

Sprinkler Systems Inc.
111 COMMERCIAL STREET

Page 7
Date 4-22-2013

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
RB to X1	0.0 179.62	4.1 140.0 0.0074	1G 2.907 1T 29.067	20.000 31.974	72.896 0.0				
X1 to TEST	100.00 279.62	12.34 140.0 0.0001	0.0 0.0	250.000 0.0	73.282 -1.841		Vel = 4.36		
	0.0 279.62				0.020		Qa = 100		
						71.461	Vel = 0.75		
							K Factor = 33.08		

Water Supply Curve (C)

Sprinkler Systems Inc.
111 COMMERCIAL STREET

Page 8
Date 4-22-2013

City Water Supply:
C1 - Static Pressure : 102
C2 - Residual Pressure: 96
C2 - Residual Flow : 1162

Demand:
D1 - Elevation : 17.793
D2 - System Flow : 179.617
D2 - System Pressure : 71.461
Hose (Adj City) : _____
Hose (Demand) : 100
D3 - System Demand : 279.617
Safety Margin : 30.109

