



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

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

Job Name : 106 HIGH STREET  
Building :  
Location : 106 HIGH STREET, PORTLAND, MAINE 04101  
System : 1 OF 1  
Contract : 13073  
Data File : 13073106HIGHSTREETPTLDA14.WXF

Hydraulic Design Information Sheet

Name - 106 HIGH STREET Date - 11-1-2013  
 Location - 106 HIGH STREET, PORTLAND, MAINE 04101  
 Building - System No. - 1 OF 1  
 Contractor - EAST BROWN COW Contract No. - 13073  
 Calculated By - SCOTT E. GARLAND Drawing No. - 1,2 OF 2  
 Construction: (X) Combustible ( ) Non-Combustible Ceiling Height - VARIES  
 Occupancy - STUDIO AREA - 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

Area of Sprinkler Operation	ENTIRE	System Type	Sprinkler/Nozzle
Density	- .10	(X) Wet	Make RELIABLE
Area Per Sprinkler	- 130	( ) Dry	Model F1FR56
Elevation at Highest Outlet	- 143.042	( ) Deluge	Size 1/2 X 1/2
S Hose Allowance - Inside	-	( ) Preaction	K-Factor 5.6
I Rack Sprinkler Allowance	-	( ) Other	Temp.Rat.200 DEG
G Hose Allowance - Outside	- 100		

N Note DESIGN AREA #1 - 3RD FLOOR LOFT

Calculation Flow Required - 201.018 Press Required - 46.452 AT BASE OF RISER  
 Summary C-Factor Used: 120 Overhead 140 Underground

Water Flow Test:	Pump Data:	Tank or Reservoir:
A Date of Test - 3-26-2008		Cap. -
T Time of Test -	Rated Cap.-	Elev.-
E Static Press - 91	@ Press -	
R Residual Press - 88	Elev. -	Well
Flow - 1644		Proof Flow
S Elevation - 13.0		

U Location - AT MAPLE STREET AND DANFORTH STREET, 1270' AWAY

P Source of Information - PORTLAND WATER DISTRICT

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

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

G Horizontal Barriers Provided:

# Fittings Used Summary

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## 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

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
1	135.0	5.6	10.33	na	18.0	0.1	148.162	7.0
2	135.0	5.6	10.67	na	18.29	0.1	148.162	7.0
3	139.0	5.6	8.6	na	16.42	0.1	148.162	7.0
4	139.0	5.6	8.89	na	16.7	0.1	148.162	7.0
5	143.042	5.6	7.0	na	14.82	0.1	148.162	7.0
6	143.042	5.6	7.24	na	15.07	0.1	148.162	7.0
7	143.042	5.6	7.11	na	14.93	0.1	148.162	7.0
8	143.042	5.6	7.35	na	15.18	0.1	148.162	7.0
9	135.0	5.6	10.94	na	18.52	0.1	148.162	7.0
10	135.0	5.6	11.3	na	18.83	0.1	148.162	7.0
11	139.0	5.6	9.2	na	16.99	0.1	148.162	7.0
12	139.0	5.6	9.51	na	17.27	0.1	148.162	7.0
A	134.583		12.18	na				
B	134.583		12.21	na				
C	134.583		12.3	na				
D	134.583		12.43	na				
F	134.583		12.89	na				
G	134.583		12.91	na				
E	134.583		13.25	na				
H	124.0		19.65	na				
U	124.0		19.93	na				
J	124.0		20.52	na				
V	114.0		26.08	na				
W	110.75		29.16	na				
X	110.75		31.68	na				
Y	110.75		32.24	na				
Z	98.417		38.24	na				
RT	98.417		38.45	na				
TV	97.0		42.07	na				
RB	93.0		46.45	na				
X1	100.0		43.98	na	100.0			
X2	100.0		44.0	na				
X3	55.0		63.57	na				
TEST	13.0		82.42	na				

The maximum velocity is 7.73 and it occurs in the pipe between nodes E and H

# 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	*****
1 to 2	18.00 18.0	1.442 120.0 0.0227		0.0 0.0 0.0	15.000 0.0 15.000	10.330 0.0 0.341			K Factor = 5.60 Vel = 3.54	
2 to A	18.29 36.29	1.442 120.0 0.0832	1E 1T	3.716 7.432 0.0	4.833 11.148 15.981	10.671 0.181 1.329			K Factor = 5.60 Vel = 7.13	
	0.0 36.29					12.181			K Factor = 10.40	
3 to 4	16.42 16.42	1.442 120.0 0.0192		0.0 0.0 0.0	15.000 0.0 15.000	8.603 0.0 0.288			K Factor = 5.60 Vel = 3.23	
4 to B	16.70 33.12	1.442 120.0 0.0703	1E 1T	3.716 7.432 0.0	8.833 11.148 19.981	8.891 1.913 1.404			K Factor = 5.60 Vel = 6.51	
	0.0 33.12					12.208			K Factor = 9.48	
5 to 6	14.82 14.82	1.442 120.0 0.0159		0.0 0.0 0.0	15.000 0.0 15.000	7.000 0.0 0.238			K Factor = 5.60 Vel = 2.91	
6 to C	15.06 29.88	1.442 120.0 0.0581	1E 1T	3.716 7.432 0.0	12.875 11.148 24.023	7.238 3.664 1.395			K Factor = 5.60 Vel = 5.87	
	0.0 29.88					12.297			K Factor = 8.52	
7 to 8	14.93 14.93	1.442 120.0 0.0161		0.0 0.0 0.0	15.000 0.0 15.000	7.111 0.0 0.242			K Factor = 5.60 Vel = 2.93	
8 to D	15.19 30.12	1.442 120.0 0.0589	1E 1T	3.716 7.432 0.0	12.875 11.148 24.023	7.353 3.664 1.415			K Factor = 5.60 Vel = 5.92	
	0.0 30.12					12.432			K Factor = 8.54	
9 to 10	18.52 18.52	1.442 120.0 0.0239		0.0 0.0 0.0	15.000 0.0 15.000	10.943 0.0 0.359			K Factor = 5.60 Vel = 3.64	
10 to F	18.83 37.35	1.442 120.0 0.0877	1E 1T	3.716 7.432 0.0	4.833 11.148 15.981	11.302 0.181 1.402			K Factor = 5.60 Vel = 7.34	
	0.0 37.35					12.885			K Factor = 10.41	
11 to 12	16.99 16.99	1.442 120.0 0.0204		0.0 0.0 0.0	15.000 0.0 15.000	9.200 0.0 0.306			K Factor = 5.60 Vel = 3.34	
12 to G	17.26 34.25	1.442 120.0 0.0748	1E 1T	3.716 7.432 0.0	8.833 11.148 19.981	9.506 1.913 1.494			K Factor = 5.60 Vel = 6.73	
	0.0 34.25					12.913			K Factor = 9.53	

# Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftg's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
A	36.29	2.635		0.0	5.958	12.181				
to B		120.0		0.0	0.0	0.0				
B	36.29	0.0045		0.0	5.958	0.027		Vel =	2.14	
B	33.12	2.635		0.0	6.083	12.208				
to C		120.0		0.0	0.0	0.0				
C	69.41	0.0146		0.0	6.083	0.089		Vel =	4.08	
C	29.89	2.635		0.0	4.750	12.297				
to D		120.0		0.0	0.0	0.0				
D	99.3	0.0284		0.0	4.750	0.135		Vel =	5.84	
D	30.11	2.635	1T	16.474	1.083	12.432				
to E		120.0		0.0	16.474	0.0				
E	129.41	0.0464		0.0	17.557	0.815		Vel =	7.61	
	0.0									
	129.41					13.247		K Factor =	35.56	
F	37.35	2.635		0.0	5.958	12.885				
to G		120.0		0.0	0.0	0.0				
G	37.35	0.0047		0.0	5.958	0.028		Vel =	2.20	
G	34.25	2.635	1T	16.474	5.000	12.913				
to E		120.0		0.0	16.474	0.0				
E	71.6	0.0156		0.0	21.474	0.334		Vel =	4.21	
	0.0									
	71.60					13.247		K Factor =	19.67	
E	201.02	3.26	1E	9.408	19.292	13.247				
to H		120.0	1T	20.159	29.567	4.584				
H	201.02	0.0371		0.0	48.859	1.815		Vel =	7.73	
H	0.0	3.26		0.0	7.667	19.646				
to U		120.0		0.0	0.0	0.0				
U	201.02	0.0373		0.0	7.667	0.286		Vel =	7.73	
U	0.0	3.26	1E	9.408	6.333	19.932				
to J		120.0		0.0	9.408	0.0				
J	201.02	0.0372		0.0	15.741	0.585		Vel =	7.73	
J	0.0	3.26	2E	18.815	14.375	20.517				
to V		120.0		0.0	18.815	4.331				
V	201.02	0.0372		0.0	33.190	1.234		Vel =	7.73	
V	0.0	3.26	1E	9.408	15.458	26.082				
to W		120.0	1T	20.159	29.567	1.408				
W	201.02	0.0372		0.0	45.025	1.673		Vel =	7.73	
W	0.0	3.26	2E	18.815	28.792	29.163				
to X		120.0	1T	20.159	38.974	0.0				
X	201.02	0.0372		0.0	67.766	2.519		Vel =	7.73	
X	0.0	3.26	1E	9.408	5.583	31.682				
to Y		120.0		0.0	9.408	0.0				
Y	201.02	0.0372		0.0	14.991	0.558		Vel =	7.73	
Y	0.0	4.26	1E	13.167	25.875	32.240				
to Z		120.0	1T	26.334	39.501	5.341				
Z	201.02	0.0101		0.0	65.376	0.661		Vel =	4.52	
Z	0.0	4.26	1E	13.167	7.000	38.242				
to RT		120.0		0.0	13.167	0.0				
RT	201.02	0.0101		0.0	20.167	0.203		Vel =	4.52	

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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	*****
RT to TV	0.0 201.02	4.26 120.0 0.0099	1Fsp 0.0 0.0	1.417 0.0 1.417	38.445 3.614 0.014		* Fixed loss = 3 Vel = 4.52		
TV to RB	0.0 201.02	4.26 120.0 0.0102	1Zac 0.0 0.0	4.000 0.0 4.000	42.073 4.338 0.041		* Fixed loss = 2.606 Vel = 4.52		
RB to X1	0.0 201.02	4.1 140.0 0.0092	1E 1G 1T	14.534 2.907 29.067	15.000 46.508 61.508	46.452 -3.032 0.563	Vel = 4.88		
X1 to X2	100.00 301.02	12.34 140.0 0.0001	1T 0.0 0.0	93.767 0.0 133.767	40.000 93.767 0.012	43.983 0.0	Qa = 100 Vel = 0.81		
X2 to X3	0.0 301.02	12.34 140.0 0.0001	2E 1T 0.0	84.39 93.767 0.0	720.000 178.157 898.157	43.995 19.490 0.081	Vel = 0.81		
X3 to TEST	0.0 301.02	8.23 100.0 0.0012	0.0 0.0 0.0	550.000 0.0 550.000	63.566 18.190 0.665		Vel = 1.82		
	0.0 301.02				82.421		K Factor = 33.16		

# Water Supply Curve (C)

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City Water Supply:  
C1 - Static Pressure : 91  
C2 - Residual Pressure: 88  
C2 - Residual Flow : 1644

Demand:  
D1 - Elevation : 56.321  
D2 - System Flow : 201.018  
D2 - System Pressure : 82.421  
Hose ( Adj City ) : \_\_\_\_\_  
Hose ( Demand ) : 100  
D3 - System Demand : 301.018  
Safety Margin : 8.449

