



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

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

Job Name : 135 CONGRESS STREET  
Building :  
Location : 135 CONGRESS STREET, PORTLAND, MAINE 04104  
System : 1 OF 1  
Contract : 13087  
Data File : 13087135CONGRESSSTA1.WXF

HYDRAULIC DESIGN INFORMATION SHEET

Name - 135 CONGRESS STREET Date - 10-11-2013  
Location - 135 CONGRESS STREET, PORTLAND, MAINE 04104  
Building - System No. - 1 OF 1  
Contractor - OWNER Contract No. - 13087  
Calculated By - SCOTT E. GARLAND Drawing No. - 1-3 OF 3  
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height 8-5  
OCCUPANCY - CONDOMINIUMS - RESIDENTIAL

S Type of Calculation: ( )NFPA 13 Residential (X)NFPA 13R ( )NFPA 13D  
Y Number of Sprinklers Flowing: ( )1 ( )2 (X)4 ( )  
S ( )Other  
T ( )Specific Ruling Made by Date  
E  
M Listed Flow at Start Point - 13.0 Gpm System Type  
Listed Pres. at Start Point - 7.0 Psi (X) Wet ( ) Dry  
D MAXIMUM LISTED SPACING 16 x 16 ( ) Deluge ( ) PreAction  
E Domestic Flow Added - Gpm Sprinkler or Nozzle  
S Additional Flow Added - Gpm Make RELIABLE Model F1RES49  
I Elevation at Highest Outlet - 131.5Feet Size 1/2 X 1/2 K-Factor 4.9  
G Note: Temperature Rating 155 DEG  
N DESIGN AREA #1 - 3RD FLOOR BEDROOM

Calculation Gpm Required 53.814 Psi Required 37.228 AT BASE OF RISER  
Summary C-Factor Used: Overhead 150 Underground 140

W Water Flow Test: Pump Data: Tank or Reservoir:  
A Date of Test - 11-2-1999 Rated Cap. Cap.  
T Time of Test - @ Psi Elev.  
E Static (Psi) - 50 Elev.  
R Residual (Psi) - 44 Other Well  
Flow (Gpm) - 1047 Proof Flow Gpm  
S Elevation - 100.0

P Location: ON NORTH STREET, NEXT TO THE BUILDING

P  
L Source of Information: PORTLAND WATER DISTRICT  
Y

# Fittings Used Summary

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## Fitting Legend

Abbrev.	Name	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
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.
TYP	0.0	4.9	7.04	na	13.0	0.05	260	7.0
1	131.5	K = K @ DROP	7.36	na	13.0			
2	131.5	K = K @ DROP	7.35	na	13.0			
A	131.5		7.84	na				
3	131.5	K = K @ DROP	8.39	na	13.88			
B	131.5		8.89	na				
4	131.5	K = K @ DROP	8.44	na	13.93			
C	131.5		8.99	na				
D	131.5		9.17	na				
E	131.5		9.43	na				
F	131.5		10.11	na				
H	121.083		15.59	na				
J	121.083		16.24	na				
EE	121.083		17.11	na				
FF	109.583		22.67	na				
DD	109.583		22.75	na				
GG	98.75		27.61	na				
RT	98.75		27.64	na				
TV	96.833		31.47	na				
RB	92.417		37.23	na				
X1	92.417		37.24	na				
TEST	100.0		33.95	na				

The maximum velocity is 8.76 and it occurs in the pipe between nodes A and B

# 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	*****
TYP to DROP	13.00 13.0	1.109 150.0 0.0296	1T	9.906 0.0 0.0	0.750 9.905 10.655	7.039 0.0 0.315			K Factor = 4.90 Vel = 4.32	
	0.0 13.00						7.354		K Factor = 4.79	
1 to A	13.00 13.0	1.101 150.0 0.0307	1T	9.563 0.0 0.0	6.042 9.562 15.604	7.359 0.0 0.479			K Factor @ node DROP Vel = 4.38	
	0.0 13.00						7.838		K Factor = 4.64	
2 to A	13.00 13.0	1.101 150.0 0.0307	1T	9.563 0.0 0.0	6.209 9.562 15.771	7.354 0.0 0.484			K Factor @ node DROP Vel = 4.38	
	0.0 13.00						7.838		K Factor = 4.64	
A to B	26.00 26.0	1.101 150.0 0.1105		0.0 0.0 0.0	9.500 0.0 9.500	7.838 0.0 1.050			Vel = 8.76	
	0.0 26.00						8.888		K Factor = 8.72	
3 to B	13.88 13.88	1.101 150.0 0.0346	1T	9.563 0.0 0.0	4.917 9.562 14.479	8.387 0.0 0.501			K Factor @ node DROP Vel = 4.68	
	0.0 13.88						8.888		K Factor = 4.66	
B to C	39.89 39.89	1.394 150.0 0.0774		0.0 0.0 0.0	1.292 0.0 1.292	8.888 0.0 0.100			Vel = 8.39	
	0.0 39.89						8.988		K Factor = 13.31	
4 to C	13.93 13.93	1.101 150.0 0.0348	1T	9.563 0.0 0.0	6.167 9.562 15.729	8.440 0.0 0.548			K Factor @ node DROP Vel = 4.69	
	0.0 13.93						8.988		K Factor = 4.65	
C to D	53.81 53.81	1.598 150.0 0.0693		0.0 0.0 0.0	2.583 0.0 2.583	8.988 0.0 0.179			Vel = 8.61	
D to E	0.0 53.81	2.003 150.0 0.0230		0.0 0.0 0.0	11.333 0.0 11.333	9.167 0.0 0.261			Vel = 5.48	
E to F	0.0 53.81	2.003 150.0 0.0230	2E	12.965 0.0 0.0	16.667 12.965 29.632	9.428 0.0 0.682			Vel = 5.48	
F to H	0.0 53.81	2.067 120.0 0.0299	2E 1T	10.0 10.0 0.0	12.333 20.000 32.333	10.110 4.512 0.966			Vel = 5.14	
H to J	0.0 53.81	2.067 120.0 0.0299	1T	10.0 0.0 0.0	11.833 10.000 21.833	15.588 0.0 0.652			Vel = 5.14	

# 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	*****
J to EE	0.0 53.81	2.067 120.0 0.0299	1E 1T	5.0 10.0 0.0	14.000 15.000 29.000	16.240 0.0 0.866		Vel = 5.14		
EE to FF	0.0 53.81	2.157 120.0 0.0242	1T	12.307 0.0 0.0	11.583 12.307 23.890	17.106 4.981 0.579		Vel = 4.72		
FF to DD	0.0 53.81	3.26 120.0 0.0032	1T	20.159 0.0 0.0	4.333 20.159 24.492	22.666 0.0 0.079		Vel = 2.07		
DD to GG	0.0 53.81	3.26 120.0 0.0032	1E 1T	9.408 20.159 0.0	22.542 29.567 52.109	22.745 4.692 0.169		Vel = 2.07		
GG to RT	0.0 53.81	4.26 120.0 0.0009	1E	13.167 0.0 0.0	24.125 13.167 37.292	27.606 0.0 0.033		Vel = 1.21		
RT to TV	0.0 53.81	4.26 120.0 0.0010	1Fsp	0.0 0.0 0.0	1.917 0.0 1.917	27.639 3.830 0.002		* Fixed loss = 3 Vel = 1.21		
TV to RB	0.0 53.81	4.26 120.0 0.0009	1Zac	0.0 0.0 0.0	4.417 0.0 4.417	31.471 5.753 0.004		* Fixed loss = 3.84 Vel = 1.21		
RB to X1	0.0 53.81	6.16 140.0 0.0001	1G 1T	4.304 43.037 0.0	35.000 47.341 82.341	37.228 0.0 0.009		Vel = 0.58		
X1 to TEST	0.0 53.81	12.34 140.0 0.0		0.0 0.0 0.0	20.000 0.0 20.000	37.237 -3.284 0.0		Vel = 0.14		
	0.0 53.81					33.953		K Factor = 9.23		

# Water Supply Curve (C)

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City Water Supply:  
C1 - Static Pressure : 50  
C2 - Residual Pressure: 44  
C2 - Residual Flow : 1047

Demand:  
D1 - Elevation : 13.643  
D2 - System Flow : 53.8141  
D2 - System Pressure : 33.953  
Hose ( Adj City ) : \_\_\_\_\_  
Hose ( Demand ) : \_\_\_\_\_  
D3 - System Demand : 53.8141  
Safety Margin : 16.023

