



. . . Fire Protection by Computer Design

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

Job Name : TWO CANAL PLAZA
Building :
Location : 2 CANAL PLAZA, PORTLAND, MAINE 04101
System : 1 OF 1
Contract : 13025
Data File : 13025TWOCANALPLAZAA1.WXF

Hydraulic Design Information Sheet

Name - TWO CANAL PLAZA Date - 7-18-2013
 Location - 2 CANAL PLAZA, PORTLAND, MAINE 04101
 Building - System No. - 1 OF 1
 Contractor - MONAGHAN WOODWORKS Contract No. - 13025
 Calculated By - SCOTT E. GARLAND Drawing No. - 1, 2 OF 2
 Construction: () Combustible (X) Non-Combustible Ceiling Height - 15-4
 Occupancy - MECHANICAL PENTHOUSE - ORDINARY HAZARD GP 2

S (X) NFPA 13 () Lt. Haz. Ord.Haz.Gp. () 1 (X) 2 () 3 () Ex.Haz.
 Y () NFPA 231 () NFPA 231C () Figure Curve
 S Other
 T Specific Ruling Made By Date

M	Area of Sprinkler Operation - 1020	System Type	Sprinkler/Nozzle
	Density - .20	(X) Wet	Make RELIABLE
D	Area Per Sprinkler - 225	() Dry	Model F1FR LO
E	Elevation at Highest Outlet - 176.333	() Deluge	Size 17/32 X 3/4
S	Hose Allowance - Inside -	() Preaction	K-Factor 8.0
I	Rack Sprinkler Allowance -	() Other	Temp.Rat.200 DEG
G	Hose Allowance - Outside - 250		

N Note DESIGN AREA #1 - MECHANICAL PENTHOUSE

Calculation Flow Required - 315.520 Press Required - 84.005 AT BASE OF RISER
 Summary C-Factor Used: 120 Overhead 140 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 6-24-2008		Cap. -
T	Time of Test -	Rated Cap.-	Elev.-
E	Static Press - 90	@ Press -	
R	Residual Press - 88	Elev. -	Well
S	Flow - 1758		Proof Flow
U	Elevation - 117.0		

P Location - ON EXCHANGE STREET, 1500-0 FROM THE BUILDING

L Source of Information - PORTLAND WATER DISTRICT

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

G Horizontal Barriers Provided:
 E

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
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
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	8	9.15	na	24.2	0.2	121	9.151
11	176.333	K = K @ SPRG	10.26	na	24.2			
12	176.333	K = K @ SPRG	10.3	na	24.24			
13	176.333	K = K @ SPRG	10.51	na	24.49			
AA	176.333		11.47	na				
14	176.333	K = K @ SPRG	11.34	na	25.43			
15	176.333	K = K @ SPRG	11.56	na	25.69			
BB	176.333		12.61	na				
16	176.333	K = K @ SPRG	14.24	na	28.51			
17	176.333	K = K @ SPRG	17.9	na	31.97			
18	176.333	K = K @ SPRG	21.26	na	34.84			
CT	176.333		23.29	na				
19	176.333	K = K @ SPRG	14.31	na	28.58			
20	176.333	K = K @ SPRG	16.59	na	30.77			
DT	176.333		18.2	na				
21	176.333	K = K @ SPRG	23.74	na	36.81			
FT	176.333		27.33	na				
CC	173.167		27.08	na				
DD	173.167		27.52	na				
FF	173.167		29.61	na				
EE	173.167		29.64	na				
GX	173.167		33.49	na				
GG	170.833		36.28	na				
HH	170.833		37.0	na				
JJ	109.167		69.22	na				
T	109.167		71.43	na				
U	109.167		73.23	na				
RT	108.0		74.86	na				
TV	105.083		79.19	na				
RB	101.75		84.0	na				
X1	101.75		86.04	na	250.0			
TEST	87.583		92.32	na				

The maximum velocity is 22.03 and it occurs in the pipe between nodes DT and DD

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	*****
TYP to SPRG	24.20 24.2	1.049 120.0 0.1852	1T	5.0 0.0 0.0	1.000 5.000 6.000	9.151 0.0 1.111			K Factor = 8.00	
	0.0 24.20						10.262		K Factor = 7.55	
11 to AA	24.20 24.2	1.049 120.0 0.1852		0.0 0.0 0.0	6.500 0.0 6.500	10.262 0.0 1.204			K Factor @ node SPRG	
	0.0 24.20						11.466		K Factor = 7.15	
12 to 13	24.24 24.24	1.682 120.0 0.0187		0.0 0.0 0.0	11.083 0.0 11.083	10.299 0.0 0.207			K Factor @ node SPRG	
13 to AA	24.49 48.73	1.682 120.0 0.0678	1T	9.9 0.0 0.0	4.250 9.900 14.150	10.506 0.0 0.960			K Factor @ node SPRG	
	0.0 48.73						11.466		K Factor = 14.39	
AA to BB	72.93 72.93	1.682 120.0 0.1429		0.0 0.0 0.0	8.000 0.0 8.000	11.466 0.0 1.143				Vel = 10.53
	0.0 72.93						12.609		K Factor = 20.54	
14 to 15	25.43 25.43	1.682 120.0 0.0204		0.0 0.0 0.0	11.083 0.0 11.083	11.335 0.0 0.226			K Factor @ node SPRG	
15 to BB	25.69 51.12	1.682 120.0 0.0741	1T	9.9 0.0 0.0	4.250 9.900 14.150	11.561 0.0 1.048			K Factor @ node SPRG	
	0.0 51.12						12.609		K Factor = 14.40	
BB to 16	124.05 124.05	2.157 120.0 0.1138	1E	6.153 0.0 0.0	8.167 6.153 14.320	12.609 0.0 1.629				Vel = 10.89
16 to 17	28.51 152.56	2.157 120.0 0.1668	2E	12.307 0.0 0.0	9.667 12.307 21.974	14.238 0.0 3.665			K Factor @ node SPRG	
17 to CT	31.96 184.52	2.157 120.0 0.2372	1T	12.307 0.0 0.0	10.417 12.307 22.724	17.903 0.0 5.389			K Factor @ node SPRG	
	0.0 184.52						23.292		K Factor = 38.23	
18 to CT	34.84 34.84	1.049 120.0 0.3632	1T	5.0 0.0 0.0	0.583 5.000 5.583	21.264 0.0 2.028			K Factor @ node SPRG	
	0.0 34.84						23.292		K Factor = 7.22	
CT to CC	219.36 219.36	2.635 120.0 0.1232	1T	16.474 0.0 0.0	3.167 16.474 19.641	23.292 1.371 2.420				Vel = 12.91

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftn'g's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 219.36									
						27.083			K Factor = 42.15	
19 to DT	28.58	1.049 120.0	1T	5.0 0.0	10.417 5.000	14.315 0.0			K Factor @ node SPRG	
	28.58	0.2519		0.0	15.417	3.884			Vel = 10.61	
	0.0 28.58								K Factor = 6.70	
20 to DT	30.77	1.049 120.0	1T	5.0 0.0	0.583 5.000	16.587 0.0			K Factor @ node SPRG	
	30.77	0.2887		0.0	5.583	1.612			Vel = 11.42	
	0.0 30.77								K Factor = 7.21	
DT to DD	59.35	1.049 120.0	1T	5.0 0.0	3.167 5.000	18.199 1.371				
	59.35	0.9734		0.0	8.167	7.950			Vel = 22.03	
	0.0 59.35								K Factor = 11.31	
21 to FT	36.81	1.049 120.0	1E 1T	2.0 5.0	1.917 7.000	23.742 0.0			K Factor @ node SPRG	
	36.81	0.4023		0.0	8.917	3.587			Vel = 13.66	
FT to FF	0.0	1.442 120.0	1T	7.432 0.0	3.167 7.432	27.329 1.371				
	36.81	0.0855		0.0	10.599	0.906			Vel = 7.23	
	0.0 36.81								K Factor = 6.77	
CC to DD	219.36	3.26 120.0		0.0 0.0	10.000 0.0	27.083 0.0				
	219.36	0.0437		0.0	10.000	0.437			Vel = 8.43	
DD to EE	59.35	3.26 120.0	1T	20.159 0.0	11.000 20.159	27.520 0.0				
	278.71	0.0680		0.0	31.159	2.120			Vel = 10.71	
	0.0 278.71								K Factor = 51.19	
FF to EE	36.81	3.26 120.0	1T	20.159 0.0	1.333 20.159	29.606 0.0				
	36.81	0.0016		0.0	21.492	0.034			Vel = 1.41	
	0.0 36.81								K Factor = 6.76	
EE to GX	315.52	4.26 120.0	8E 1T	105.337 26.334	33.750 131.671	29.640 0.0				
	315.52	0.0233		0.0	165.421	3.848			Vel = 7.10	
GX to GG	0.0	3.26 120.0	1T	20.159 0.0	0.625 20.159	33.488 1.011				
	315.52	0.0856		0.0	20.784	1.779			Vel = 12.13	
GG to HH	0.0	4.26 120.0	1E	13.167 0.0	18.000 13.167	36.278 0.0				
	315.52	0.0233		0.0	31.167	0.725			Vel = 7.10	
HH to JJ	0.0	4.26 120.0	2E 1Fsp	26.334 0.0	65.542 42.134	37.003 29.708			* Fixed loss = 3	
	315.52	0.0233	1B	15.8	107.676	2.504			Vel = 7.10	

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftn'g's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
JJ to T	0.0 315.52	4.26 120.0 0.0233	3E 39.501 0.0	55.548 39.501 95.049	69.215 0.0 2.211		Vel = 7.10		
T to U	0.0 315.52	4.26 120.0 0.0233	1E 13.167 1T 26.334 0.0	38.000 39.501 77.501	71.426 0.0 1.803		Vel = 7.10		
U to RT	0.0 315.52	4.26 120.0 0.0233	3E 39.501 0.0	8.750 39.501 48.251	73.229 0.505 1.123		Vel = 7.10		
RT to TV	0.0 315.52	4.26 120.0 0.0233	1Fsp 0.0 0.0	2.917 0.0 2.917	74.857 4.263 0.068		* Fixed loss = 3 Vel = 7.10		
TV to RB	0.0 315.52	4.26 120.0 0.0231	1Zac 0.0 0.0	3.333 0.0 3.333	79.188 4.740 0.077		* Fixed loss = 3.296 Vel = 7.10		
RB to X1	0.0 315.52	4.1 140.0 0.0211	1E 14.534 1G 2.907 1T 29.067	50.000 46.508 96.508	84.005 0.0 2.034		Vel = 7.67		
X1 to TEST	250.00 565.52	12.34 140.0 0.0003	0.0 0.0 0.0	500.000 0.0 500.000	86.039 6.136 0.144		Qa = 250 Vel = 1.52		
	0.0 565.52				92.319		K Factor = 58.86		

Water Supply Curve (C)

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City Water Supply:
C1 - Static Pressure : 101
C2 - Residual Pressure: 99
C2 - Residual Flow : 1342

Demand:
D1 - Elevation : 38.438
D2 - System Flow : 315.52
D2 - System Pressure : 92.319
Hose (Adj City) : _____
Hose (Demand) : 250
D3 - System Demand : 565.52
Safety Margin : 8.276

