



. . . Fire Protection by Computer Design

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

Job Name : PERKINS THOMPSON, 9TH FLOOR ONE CANAL PLAZA
Building :
Location : 1 CANAL PLAZA, PORTLAND, MAINE 04101
System : 1 OF 1
Contract : 14060
Data File : 14060PERKINSTHOMPSON9THFLONECANALA1.WXF

Hydraulic Design Information Sheet

Name - PERKINS THOMPSON, 9TH FLOOR Date - 7-14-2014
 Location - 1 CANAL PLAZA, PORTLAND, MAINE 04101
 Building - System No. - 1 OF 1
 Contractor - MONAGHAN WOODWORKS Contract No. - 14060
 Calculated By - SCOTT E. GARLAND Drawing No. - 1 OF 1
 Construction: () Combustible (X) Non-Combustible Ceiling Height - VARIES
 Occupancy - OFFICES - LIGHT HAZARD

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

E

M	Area of Sprinkler Operation - 900	System Type	Sprinkler/Nozzle
	Density - .10	(X) Wet	Make RELIABLE
D	Area Per Sprinkler - 330	() Dry	Model F1FREC
E	Elevation at Highest Outlet - 209.083	() Deluge	Size 17/32 X 3/4
S	Hose Allowance - Inside -	() Preaction	K-Factor 8.0
I	Rack Sprinkler Allowance -	() Other	Temp.Rat.155 DEG
G	Hose Allowance - Outside - 100		

N

Note DESIGN AREA #1 - OFFICES, 9TH FLOOR

Calculation Flow Required - 186.12 Press Required - 94.779 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 - 5-11-2013		Cap. -
T	Time of Test -	Rated Cap.- 750 GPM	Elev.-
E	Static Press - 101	@ Press - 71 PSI	
R	Residual Press - 99	Elev. - 101.167	Well
	Flow - 1342		Proof Flow
S	Elevation - 87.583		

U

P Location - AT CORNER OF UNION & FORE STREETS, 360-0 FROM THE BUILDING

P

L Source of Information - PORTLAND WATER DISTRICT

Y

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

R

K Flue Spacing Clearance:Storage to Ceiling
 A Longitudinal Transverse

G

E Horizontal Barriers Provided:

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	
A	Alarm Rel E1 & E3							7.7	21.5		17		27	29								
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	
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	
S	NFPA 13 Swing Check Valve	4	5	5	7	9	11	14	16	19	22	27	32	45	55	65	76	87	98	109	130	
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	

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	17.02	na	33.0	0.1	330	17.0
TYP1	0.0	8	17.02	na	33.0	0.1	330	17.0
1	209.083	K = K @ DROP	19.97	na	33.0			
2	209.083	K = K @ DROP	21.08	na	33.91			
3	209.083	K = K @ DROP	24.7	na	36.69			
A	209.083		40.77	na				
4	209.083	K = K @ DRP1	30.83	na	40.72			
5	209.083	K = K @ DRP1	32.48	na	41.8			
D	209.083		44.65	na				
B	209.083		54.22	na				
C	209.083		55.41	na				
E	209.083		57.57	na				
F	209.083		68.6	na				
FF	209.083		70.24	na				
K	109.0		113.77	na				
L	109.0		113.96	na				
PO	101.167		117.54	na				
PI	101.167		94.56	na				
BASE	101.167		94.78	na				
HOSE	110.0		91.15	na	100.0			
TEST	87.583		100.89	na				

The maximum velocity is 20.35 and it occurs in the pipe between nodes 3 and A

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 DROP	33.00 33.0	1.049 120.0 0.3286	1E 1T	2.0 5.0 0.0	2.000 7.000 9.000	17.016 0.0 2.957			K Factor = 8.00	
	0.0 33.00									
						19.973			K Factor = 7.38	
TYP1 to DRP1	33.00 33.0	1.049 120.0 0.3286	1E 1T	2.0 5.0 0.0	2.833 7.000 9.833	17.016 0.0 3.231			K Factor = 8.00	
	0.0 33.00									
						20.247			K Factor = 7.33	
1 to 2	33.00 33.0	1.442 120.0 0.0698		0.0 0.0 0.0	15.917 0.0 15.917	19.973 0.0 1.111			K Factor @ node DROP	
2 to 3	33.90 66.9	1.442 120.0 0.2580		0.0 0.0 0.0	14.000 0.0 14.000	21.084 0.0 3.612			K Factor @ node DROP	
3 to A	36.70 103.6	1.442 120.0 0.5793		0.0 0.0 0.0	27.750 0.0 27.750	24.696 0.0 16.076			K Factor @ node DROP	
A to B	0.0 103.6	1.442 120.0 0.5793	1T	7.432 0.0 0.0	15.792 7.432 23.224	40.772 0.0 13.453				Vel = 20.35
	0.0 103.60									
						54.225			K Factor = 14.07	
4 to 5	40.72 40.72	1.442 120.0 0.1030		0.0 0.0 0.0	16.000 0.0 16.000	30.834 0.0 1.648			K Factor @ node DRP1	
5 to D	41.80 82.52	1.442 120.0 0.3803		0.0 0.0 0.0	32.000 0.0 32.000	32.482 0.0 12.170			K Factor @ node DRP1	
D to C	0.0 82.52	1.442 120.0 0.3803	2E 1T	7.432 7.432 0.0	13.417 14.864 28.281	44.652 0.0 10.755				Vel = 16.21
	0.0 82.52									
						55.407			K Factor = 11.09	
B to C	103.60 103.6	2.157 120.0 0.0815		0.0 0.0 0.0	14.500 0.0 14.500	54.225 0.0 1.182				Vel = 9.10
C to E	82.52 186.12	2.157 120.0 0.2410		0.0 0.0 0.0	8.958 0.0 8.958	55.407 0.0 2.159				Vel = 16.34
E to F	0.0 186.12	2.157 120.0 0.2409	1T	12.307 0.0 0.0	33.500 12.307 45.807	57.566 0.0 11.037				Vel = 16.34
F to FF	0.0 186.12	3.26 120.0 0.0322	2E 1T	18.815 20.159 0.0	11.833 38.974 50.807	68.603 0.0 1.638				Vel = 7.15
FF to K	0.0 186.12	6.065 120.0 0.0016	1E	14.0 0.0 0.0	100.083 14.000 114.083	70.241 43.346 0.179				Vel = 2.07

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	*****
K to L	0.0 186.12	6.065 120.0 0.0016	3E 1T	42.0 30.0 0.0	50.000 72.000 122.000	113.766 0.0 0.191			Vel = 2.07	
L to PO	0.0 186.12	6.065 120.0 0.0016	3E 1A 1G 1S	42.0 27.0 3.0 32.0	20.000 104.000 124.000	113.957 3.392 0.195			Vel = 2.07	
	0.0 186.12					117.544			K Factor = 17.17	
System Demand Pressure						117.544				
Safety Margin						55.119				
Continuation Pressure						172.663				
Pressure @ Pump Outlet						172.663				
Pressure From Pump Curve						-78.098				
Pressure @ Pump Inlet						94.565				
PI to BASE	0.0 186.12	6.065 120.0 0.0016	5E 2G 1T	70.0 6.0 30.0	30.000 106.000 136.000	94.565 0.0 0.214			Vel = 2.07	
BASE to HOSE	0.0 186.12	6.16 140.0 0.0011	1E 1G 1T	20.084 4.304 43.037	110.000 67.425 177.425	94.779 -3.826 0.194			Vel = 2.00	
HOSE to TEST	100.00 286.12	12.34 140.0 0.0001		0.0 0.0 0.0	360.000 0.0 360.000	91.147 9.709 0.030			Qa = 100 Vel = 0.77	
	0.0 286.12					100.886			K Factor = 28.49	

Water Supply Curve (C)

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City Water Supply: C1 - Static Pressure : 101 C2 - Residual Pressure: 99 C2 - Residual Flow : 1342 City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow A1 - Adjusted Static: 95.096 A2 - Adj Resid : 88.671 @ 750 A3 - Adj Resid : 81.632 @ 1125	Pump Data: P1 - Pump Churn Pressure : 78.1 P2 - Pump Rated Pressure : 71 P2 - Pump Rated Flow : 750 P3 - Pump Pressure @ Max Flow : 46.15 P3 - Pump Max Flow : 1125 City Residual Flow @ 0 = 11180.23 City Residual Flow @ 20 = 9923.09 City Water @ 150% of Pump = 99.56	Demand: D1 - Elevation : 52.622 D2 - System Flow : 186.121 D2 - System Pressure : 117.544 Hose (Adj City) : 100 Hose (Demand) : _____ D3 - System Demand : 186.121 Safety Margin : 55.119
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