



... Fire Protection by Computer Design

DEAN & ALLYN, INC.
32 LEWISTON ROAD BUILDING 1C
P.O. BOX 709
GRAY, ME 04039
207-657-5646

Job Name : 15 EXCHANGE ST. FIRSTFLOOR
Building :
Location : 15 EXCHANGE STREET PORTLAND MAINE
System : ONE
Contract : C09914
Data File : 15 EXCHANGE ST FIRST FLOOR.WXF

Hydraulic Design Information Sheet

Name - 15 EXCHANGE STREET FIRST FLOOR Date - 10-25-09
 Location - 15 EXCHANGE STREET PORTLAND MAINE
 Building - System No. - ONE
 Contractor - DEAN AND ALLYN, INC. Contract No. - C09914
 Calculated By - H. KING Drawing No. - 1 OF 1
 Construction: (X) Combustible () Non-Combustible Ceiling Height - 13'
 Occupancy - RESTAURANT

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

E
 M Area of Sprinkler Operation - ENTIRE FL System Type Sprinkler/Nozzle
 Density - .10/.15 (X) Wet Make VIKING
 D Area Per Sprinkler - 288/120 () Dry Model MICROFAST
 E Elevation at Highest Outlet - 13 () Deluge Size 1/2"
 S Hose Allowance - Inside - () Preaction K-Factor 5.6
 I Rack Sprinkler Allowance - () Other Temp.Rat.155
 G Hose Allowance - Outside - 250

N Note CUSHION 8.95PSI

Calculation Flow Required - 485.23 Press Required - 99.74 CITY
 Summary C-Factor Used: 120 Overhead 140 Underground

W Water Flow Test: Pump Data: Tank or Reservoir:
 A Date of Test - 4-27-05 Cap. -
 T Time of Test - Rated Cap.- Elev.-
 E Static Press - 109 @ Press -
 R Residual Press - 106 Elev. - Well
 Flow - 1635 Proof Flow
 S Elevation - 0

U Location - COMMERCIAL AT UNION

P
 L Source of Information - P. W. D.
 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 () Encap.
 S R () Double Row () Slave Pallet () Solid Shelf () Non
 T A () Mult. Row () Open Shelf
 O C

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	
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.
30A	58.0	4.9	27.3	na	25.6	0.1	256	7.0
10	13.0	5.6	26.8	na	28.99	0.1	288	26.8
11	13.0	5.6	27.19	na	29.2	0.1	288	26.8
12	13.0	5.6	28.63	na	29.96	0.1	288	26.8
13	9.0	5.6	18.02	na	23.77	0.1	120	7.0
14	13.0	5.6	18.7	na	24.22	0.1	120	7.0
15	13.0	5.6	13.67	na	20.7	0.15	130	7.0
15.5	13.0	5.6	13.44	na	20.53	0.15	130	7.0
16	13.0	5.6	18.7	na	24.22	0.15	130	7.0
17	8.0	5.6	36.07	na	33.63	0.1	130	7.0
72	8.0		38.56	na				
70	13.0		14.91	na				
71	13.0		20.37	na				
57	13.0		30.55	na				
58	13.0		32.04	na				
73	13.0		39.01	na				
59	9.0		44.31	na				
60	0.0		54.61	na				
61	0.0		63.64	na				
TR	0.0		97.79	na				
FF	0.0		99.59	na				
CTY	0.0		99.74	na	250.0			

The maximum velocity is 24.3 and it occurs in the pipe between nodes 71 and 58

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	*****
30A to 30	25.60 25.6	1.049 120.0 0.2055	1T	5.0 0.0 0.0	1.000 5.000 6.000	27.295 25.120 1.233			K Factor = 4.90 Vel = 9.50	
	0.0 25.60						53.648		K Factor = 3.50	
10 to 11	28.99 28.99	1.61 120.0 0.0321		0.0 0.0 0.0	12.300 0.0 12.300	26.800 0.0 0.395			K Factor = 5.60 Vel = 4.57	
11 to 12	29.20 58.19	1.61 120.0 0.1165		0.0 0.0 0.0	12.300 0.0 12.300	27.195 0.0 1.433			K Factor = 5.60 Vel = 9.17	
12 to 57	29.97 88.16	2.067 120.0 0.0744	1E 1T	5.0 10.0 0.0	10.800 15.000 25.800	28.628 0.0 1.920			K Factor = 5.60 Vel = 8.43	
	0.0 88.16						30.548		K Factor = 15.95	
13 to 14	23.77 23.77	1.049 120.0 0.1790	2E	4.0 0.0 0.0	9.500 4.000 13.500	18.015 -1.732 2.417			K Factor = 5.60 Vel = 8.82	
14 to 58	24.22 47.99	1.049 120.0 0.6569	1E 1T	2.0 5.0 0.0	13.300 7.000 20.300	18.700 0.0 13.336			K Factor = 5.60 Vel = 17.82	
	0.0 47.99						32.036		K Factor = 8.48	
15 to 70	20.70 20.7	1.049 120.0 0.1388	1T	5.0 0.0 0.0	4.000 5.000 9.000	13.665 0.0 1.249			K Factor = 5.60 Vel = 7.68	
	0.0 20.70						14.914		K Factor = 5.36	
15.5 to 70	20.53 20.53	1.049 120.0 0.1366	1T	5.0 0.0 0.0	5.800 5.000 10.800	13.439 0.0 1.475			K Factor = 5.60 Vel = 7.62	
	0.0 20.53						14.914		K Factor = 5.32	
16 to 71	24.22 24.22	1.049 120.0 0.1853	1T	5.0 0.0 0.0	4.000 5.000 9.000	18.703 0.0 1.668			K Factor = 5.60 Vel = 8.99	
	0.0 24.22						20.371		K Factor = 5.37	
17 to 72	33.63 33.63	1.049 120.0 0.3404	1T	5.0 0.0 0.0	2.300 5.000 7.300	36.073 0.0 2.485			K Factor = 5.60 Vel = 12.48	
72 to 73	0.0 33.63	1.049 120.0 0.3405	1T	5.0 0.0 0.0	2.700 5.000 7.700	38.558 -2.166 2.622			Vel = 12.48	
	0.0 33.63						39.014		K Factor = 5.38	

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	*****
70	41.23	1.049		0.0	11.000	14.914				
to		120.0		0.0	0.0	0.0				
71	41.23	0.4961		0.0	11.000	5.457		Vel = 15.31		
71	24.22	1.049	1T	5.0	5.000	20.371				
to		120.0		0.0	5.000	0.0				
58	65.45	1.1665		0.0	10.000	11.665		Vel = 24.30		
	0.0									
	65.45					32.036		K Factor = 11.56		
57	88.16	2.067	1E	5.0	5.000	30.548				
to		120.0	1T	10.0	15.000	0.0				
58	88.16	0.0744		0.0	20.000	1.488		Vel = 8.43		
58	113.43	2.067	2E	10.0	10.300	32.036				
to		120.0		0.0	10.000	0.0				
73	201.59	0.3437		0.0	20.300	6.978		Vel = 19.27		
73	33.63	2.067	1E	5.0	2.800	39.014				
to		120.0		0.0	5.000	1.732				
59	235.22	0.4573		0.0	7.800	3.567		Vel = 22.49		
59	0.0	2.067	1E	5.0	9.000	44.313				
to		120.0		0.0	5.000	3.898				
60	235.22	0.4573		0.0	14.000	6.402		Vel = 22.49		
60	0.0	2.635	2E	16.474	15.000	54.613				
to		120.0	2T	32.948	49.422	0.0				
61	235.22	0.1402		0.0	64.422	9.031		Vel = 13.84		
61	0.0	2.635	15E	123.557	120.000	63.644				
to		120.0		0.0	123.557	0.0				
TR	235.22	0.1402		0.0	243.557	34.143		Vel = 13.84		
TR	0.0	3.26	1A	28.895	6.000	97.787				
to		120.0	1G	1.344	30.239	0.0				
FF	235.22	0.0497		0.0	36.239	1.801		Vel = 9.04		
FF	0.0	6.16	1E	20.084	20.000	99.588				
to		140.0	1G	4.304	67.425	0.0				
CTY	235.22	0.0017	1T	43.037	87.425	0.148		Vel = 2.53		
	250.00							Qa = 250.00		
	485.22					99.736		K Factor = 48.59		

Water Supply Curve (C)

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City Water Supply:
C1 - Static Pressure : 109
C2 - Residual Pressure: 106
C2 - Residual Flow : 1635

Demand:
D1 - Elevation : 5.630
D2 - System Flow : 235.225
D2 - System Pressure : 99.736
Hose (Adj City) : _____
Hose (Demand) : 250
D3 - System Demand : 485.225
Safety Margin : 8.947

