



... Fire Protection by Computer Design

DEAN & ALLYN, INC.
PO BOX 709
116 LEWISTON ROAD
GRAY, MAINE 04039
207-657-5646

Job Name : C1003 INDIA STREET 2ND FLOOR
Building : 2 OF 3
Location : PORTLAND, MAINE
System : WX1
Contract : C111003
Data File : C1003 INDIA STREET 2ND FLOOR.wx1

HYDRAULIC CALCULATIONS
for

Project name: 61 INDIA STREET
Location: PORTLAND, MAINE
Drawing no: 2 OF 3
Date: 05/10/2011

Design

Remote area number: WX1
Remote area location: 2ND FLOOR
Occupancy classification: LIGHT/ORDINARY HAZARD 1
Density: .15 - Gpm/SqFt
Area of application: LARGEST ROOM - SqFt
Coverage per sprinkler: 130 - SqFt
Type of sprinklers calculated: K=5.6
No. of sprinklers calculated: 7
In-rack demand: 0 - GPM
Hose streams: 250 - GPM
Total water required (including hose streams): 402.075 - GPM @ 65.14 - Psi
Type of system: WET
Volume of dry or preaction system: N/A - Gal

Water supply information

Date: 04/20/2007
Location: HYDRANT #298
Source: PORTLAND WATER DISTRICT

Name of contractor: DEAN & ALLYN, INC.
Address: PO BOX 709 / 116 LEWISTON ROAD / GRAY, MAINE 04039
Phone number: 207-657-5646
Name of designer: T CLARKE
Authority having jurisdiction: MAINE STATE FIRE MARSHAL'S OFFICE
Notes: (Include peaking information or gridded systems here.) SAFETY MARGIN: 31.8 PSI

Fittings Used Summary

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Fitting Legend		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
Abbrev.	Name																				
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
I	90' Grvd-Vic Elbow #10	0	0	2	3	4	3.5	6	5	8	7	8.5	10	13	17	20	23	25	33	36	40
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
Zca	Colt C200 Horz Butt	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

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with *. The fittings marked with a * show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a * will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
201	29.208	5.6	12.13	na	19.5	0.15	130	7.0
202	29.208	5.6	12.32	na	19.65	0.15	130	7.0
203	29.208		13.32	na				
204	29.208	5.6	15.13	na	21.79	0.15	130	7.0
205	29.208	5.6	12.76	na	20.0	0.15	130	7.0
206	29.208	5.6	13.8	na	20.8	0.15	130	7.0
207	29.208		18.79	na				
208	27.375	5.6	19.44	na	24.69	0.15	130	7.0
209	27.375	5.6	20.97	na	25.65	0.15	130	7.0
210	27.375		26.59	na				
211	29.542		31.4	na				
212	28.708		37.68	na				
213	28.708		39.04	na				
214	28.708		39.86	na				
215	28.708		40.91	na				
216	28.708		42.05	na				
217	28.708		43.96	na				
218	28.708		46.43	na				
219	28.708		51.07	na				
TR	19.125		59.14	na				
BR	8.0		68.52	na				
CITY	0.0		73.14	na	250.0			
TEST	20.0		65.14	na				

The maximum velocity is 18.68 and it occurs in the pipe between nodes 209 and 210

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	*****
201	19.50	1.049	1T	5.0	4.583	12.125			K Factor = 5.60	
to		120.0		0.0	5.000	0.0				
203	19.5	0.1242		0.0	9.583	1.190			Vel = 7.24	
	0.0									
	19.50					13.315			K Factor = 5.34	
202	19.65	1.049	1T	5.0	2.917	12.318			K Factor = 5.60	
to		120.0		0.0	5.000	0.0				
203	19.65	0.1259		0.0	7.917	0.997			Vel = 7.29	
203	19.50	1.38	1E	3.0	12.333	13.315				
to		120.0		0.0	3.000	0.0				
204	39.15	0.1186		0.0	15.333	1.819			Vel = 8.40	
204	21.79	1.38	1E	3.0	10.583	15.134			K Factor = 5.60	
to		120.0		0.0	3.000	0.0				
207	60.94	0.2689		0.0	13.583	3.652			Vel = 13.07	
	0.0									
	60.94					18.786			K Factor = 14.06	
205	20.00	1.049		0.0	8.000	12.756			K Factor = 5.60	
to		120.0		0.0	0.0	0.0				
206	20.0	0.1301		0.0	8.000	1.041			Vel = 7.42	
206	20.80	1.049	1E	2.0	3.250	13.797			K Factor = 5.60	
to		120.0	1T	5.0	7.000	0.0				
207	40.8	0.4867		0.0	10.250	4.989			Vel = 15.15	
207	60.94	1.61	2E	8.0	13.417	18.786				
to		120.0		0.0	8.000	0.794				
210	101.74	0.3275		0.0	21.417	7.014			Vel = 16.03	
	0.0									
	101.74					26.594			K Factor = 19.73	
208	24.69	1.049		0.0	8.000	19.436			K Factor = 5.60	
to		120.0		0.0	0.0	0.0				
209	24.69	0.1921		0.0	8.000	1.537			Vel = 9.17	
209	25.64	1.049	1T	5.0	2.833	20.973			K Factor = 5.60	
to		120.0		0.0	5.000	0.0				
210	50.33	0.7176		0.0	7.833	5.621			Vel = 18.68	
210	101.74	2.067	1E	5.0	13.125	26.594				
to		120.0	1T	10.0	15.000	-0.939				
211	152.07	0.2041		0.0	28.125	5.740			Vel = 14.54	
211	0.0	2.067	2T	20.0	9.042	31.395				
to		120.0		0.0	20.000	0.361				
212	152.07	0.2041		0.0	29.042	5.927			Vel = 14.54	
212	0.0	2.067		0.0	6.667	37.683				
to		120.0		0.0	0.0	0.0				
213	152.07	0.2040		0.0	6.667	1.360			Vel = 14.54	

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	*****
213	0.0	2.067		4.000		39.043			
to		120.0		0.0		0.0			
214	152.07	0.2040		4.000		0.816		Vel = 14.54	
214	0.0	2.067		5.167		39.859			
to		120.0		0.0		0.0			
215	152.07	0.2042		5.167		1.055		Vel = 14.54	
215	0.0	2.067		5.583		40.914			
to		120.0		0.0		0.0			
216	152.07	0.2040		5.583		1.139		Vel = 14.54	
216	0.0	2.067		9.333		42.053			
to		120.0		0.0		0.0			
217	152.07	0.2040		9.333		1.904		Vel = 14.54	
217	0.0	2.067	1T 10.0	2.125		43.957			
to		120.0		10.000		0.0			
218	152.07	0.2041		12.125		2.475		Vel = 14.54	
218	0.0	2.067	1T 10.0	12.708		46.432			
to		120.0		10.000		0.0			
219	152.07	0.2040		22.708		4.633		Vel = 14.54	
219	0.0	2.067	2E 10.0	9.208		51.065			
to		120.0		10.000		4.150			
TR	152.07	0.2041		19.208		3.920		Vel = 14.54	
TR	0.0	3.26	1Zca 0.0	16.792		59.135			
to		120.0	1E 9.408	16.128		8.658		* Fixed loss = 3.84	
BR	152.07	0.0222	1I 6.72	32.920		0.731		Vel = 5.85	
BR	0.0	4.1	2E 29.067	150.000		68.524			
to		140.0	1T 29.067	61.041		3.465			
CITY	152.07	0.0055	1G 2.907	211.041		1.152		Vel = 3.70	
CITY	250.01	8.27	1E 28.468	520.000		73.141		Qa = 250	
to		140.0	1T 55.354	90.148		-8.662			
TEST	402.08	0.0011	1G 6.326	610.148		0.661		Vel = 2.40	
	0.0								
	402.08					65.140		K Factor = 49.82	

Water Supply Curve (C)

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City Water Supply:
C1 - Static Pressure : 98
C2 - Residual Pressure: 92
C2 - Residual Flow : 1034

Demand:
D1 - Elevation : 3.988
D2 - System Flow : 152.075
D2 - System Pressure : 65.140
Hose (Demand) : 250
D3 - System Demand : 402.075
Safety Margin : 31.815

