



... 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 4TH FLOOR
Building : 3 OF 3
Location : PORTLAND, MAINE
System : WX1
Contract : C111003
Data File : C1003 INDIA STREET 4TH FLOOR.wx1

HYDRAULIC CALCULATIONS
for

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

Design

Remote area number: WX1
Remote area location: 4TH FLOOR
Occupancy classification: RESIDENTIAL
Density: 0.05 - Gpm/SqFt
Area of application: 4 HEADS - SqFt
Coverage per sprinkler: 256 - SqFt
Type of sprinklers calculated: K=4.0
No. of sprinklers calculated: 4
In-rack demand: 0 - GPM
Hose streams: 0 - GPM
Total water required (including hose streams): 64.86 - GPM @ 46.73 - 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: 51.2 PSI

Fittings Used Summary

DEAN & ALLYN, INC.
C1003 INDIA STREET 4TH FLOOR

Page 2
Date 05/10/2011

Fitting Legend		½	¾	1	1¼	1½	2	2½	3	3½	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

DEAN & ALLYN, INC.
C1003 INDIA STREET 4TH FLOOR

Page 3
Date 05/10/2011

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
401	48.063		16.72	na				
402A	47.563		16.94	na				
402	48.063		16.72	na				
403	47.146		17.12	na				
404	46.75	4	16.0	na	16.0	0.05	256	16.0
408	46.75	4	16.18	na	16.09	0.05	256	16.0
413	46.75	4	16.47	na	16.23	0.05	256	16.0
417	46.75	4	17.09	na	16.54	0.05	256	16.0
405	47.146		17.12	na				
407	47.146		17.16	na				
409	47.146		17.23	na				
412	47.146		17.45	na				
414	47.146		17.54	na				
416	47.146		18.03	na				
418	47.146		18.2	na				
419	47.854		22.27	na				
319	38.0		27.94	na				
219	28.708		34.88	na				
TR	19.125		39.84	na				
BR	8.0		51.66	na				
CITY	0.0		55.37	na				
TEST	20.0		46.73	na				

The maximum velocity is 10.22 and it occurs in the pipe between nodes 418 and 419

Final Calculations - Hazen-Williams

DEAN & ALLYN, INC.
C1003 INDIA STREET 4TH FLOOR

Page 4
Date 05/10/2011

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftnng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
401	0.0	1.049	3E	6.0	15.000	16.723				
to		120.0		0.0	6.000	0.0				
402	0.0	0.0		0.0	21.000	0.0		Vel = 0		
	0.0									
	0.0					16.723		K Factor = 0		
402A	0.0	1.049	1T	5.0	0.500	16.940				
to		120.0		0.0	5.000	-0.217				
402	0.0	0.0		0.0	5.500	0.0		Vel = 0		
402	0.0	1.049	1E	2.0	10.250	16.723				
to		120.0	1T	5.0	7.000	0.397				
403	0.0	0.0		0.0	17.250	0.0		Vel = 0		
403	0.0	1.38		0.0	3.917	17.120				
to		120.0		0.0	0.0	0.0				
405	0.0	0.0		0.0	3.917	0.0		Vel = 0		
	0.0									
	0.0					17.120		K Factor = 0		
404	16.00	1.049	3E	6.0	4.000	16.000		K Factor = 4.00		
to		120.0	1T	5.0	11.000	-0.172				
405	16.0	0.0861		0.0	15.000	1.292		Vel = 5.94		
	0.0									
	16.00					17.120		K Factor = 3.87		
408	16.09	1.049	3E	6.0	3.000	16.181		K Factor = 4.00		
to		120.0	1T	5.0	11.000	-0.172				
409	16.09	0.0871		0.0	14.000	1.219		Vel = 5.97		
	0.0									
	16.09					17.228		K Factor = 3.88		
413	16.23	1.049	3E	6.0	3.000	16.471		K Factor = 4.00		
to		120.0	1T	5.0	11.000	-0.172				
414	16.23	0.0885		0.0	14.000	1.239		Vel = 6.03		
	0.0									
	16.23					17.538		K Factor = 3.88		
417	16.54	1.049	3E	6.0	3.000	17.089		K Factor = 4.00		
to		120.0	1T	5.0	11.000	-0.172				
418	16.54	0.0916		0.0	14.000	1.282		Vel = 6.14		
	0.0									
	16.54					18.199		K Factor = 3.88		
405	16.00	1.38		0.0	1.833	17.120				
to		120.0		0.0	0.0	0.0				
407	16.0	0.0229		0.0	1.833	0.042		Vel = 3.43		
407	0.0	1.61		0.0	6.167	17.162				
to		120.0		0.0	0.0	0.0				
409	16.0	0.0107		0.0	6.167	0.066		Vel = 2.52		

Final Calculations - Hazen-Williams

DEAN & ALLYN, INC.
C1003 INDIA STREET 4TH FLOOR

Page 5
Date 05/10/2011

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
409	16.09	1.61		5.792	17.228				
to		120.0		0.0	0.0				
412	32.09	0.0387		5.792	0.224		Vel =	5.06	
412	0.0	1.61		2.208	17.452				
to		120.0		0.0	0.0				
414	32.09	0.0389		2.208	0.086		Vel =	5.06	
414	16.23	1.61		6.000	17.538				
to		120.0		0.0	0.0				
416	48.32	0.0825		6.000	0.495		Vel =	7.61	
416	0.0	1.61		2.000	18.033				
to		120.0		0.0	0.0				
418	48.32	0.0830		2.000	0.166		Vel =	7.61	
418	16.54	1.61	3E 12.0	18.750	18.199				
to		120.0		12.000	-0.307				
419	64.86	0.1424		30.750	4.379		Vel =	10.22	
419	0.0	1.61		9.854	22.271				
to		120.0		0.0	4.268				
319	64.86	0.1424		9.854	1.403		Vel =	10.22	
319	0.0	1.61	1E 4.0	8.458	27.942				
to		120.0	1T 8.0	12.000	4.024				
219	64.86	0.1424		20.458	2.914		Vel =	10.22	
219	0.0	2.067	2E 10.0	9.208	34.880				
to		120.0		10.000	4.150				
TR	64.86	0.0422		19.208	0.811		Vel =	6.20	
TR	0.0	3.26	1Zca 0.0	16.792	39.841				
to		120.0	1E 9.408	16.128	11.670		* Fixed loss =	6.852	
BR	64.86	0.0046	1I 6.72	32.920	0.151		Vel =	2.49	
BR	0.0	4.1	2E 29.067	150.000	51.662				
to		140.0	1T 29.067	61.041	3.465				
CITY	64.86	0.0011	1G 2.907	211.041	0.238		Vel =	1.58	
CITY	0.0	8.27	1E 28.468	520.000	55.365				
to		140.0	1T 55.354	90.148	-8.662				
TEST	64.86	0.0	1G 6.326	610.148	0.023		Vel =	0.39	
	0.0								
	64.86				46.726		K Factor =	9.49	

Water Supply Curve (C)

DEAN & ALLYN, INC.
C1003 INDIA STREET 4TH FLOOR

Page 6
Date 05/10/2011

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

Demand:
D1 - Elevation : 11.585
D2 - System Flow : 64.859
D2 - System Pressure : 46.726
Hose (Demand) :
D3 - System Demand : 64.859
Safety Margin : 51.238

