

... Fire Protection by Computer Design

HIGH TECH FIRE PROTECTION
84 HACKETT MILLS ROAD
P.O. BOX 156
POLAND, ME 04274
207-998-2551

Job Name : 420 FORE STREET LOFT/ATTIC CALC
Drawing : FP-01
Location : 420 Fore Street Portland Maine
Remote Area : 1
Contract :
Data File : ATTIC CALCS.WXF

HYDRAULIC CALCULATIONS
for

Project name: 420 Fore Street Loft/Attic Calc
Location: 420 Fore Street Portland Maine
Drawing no: FP-01
Date: 5/12/2015

Design

Remote area number: 1
Remote area location: North Loft
Occupancy classification: Light
Density: .1 - Gpm/SqFt
Area of application: 515 - SqFt
Coverage per sprinkler: 240 - SqFt
Type of sprinklers calculated: Tyco Attic Heads
No. of sprinklers calculated: 4
In-rack demand: - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 214 - GPM @ 90 - Psi
Type of system: Wet System
Volume of dry or preaction system: 0 - Gal

Water supply information

Date: 05-11-2013
Location: Corner of Union and Fore
Source: Portland Water District

Name of contractor: HIGH TECH FIRE PROTECTION
Address: P.O. BOX 156 / / MINOT, ME 04258
Phone number: 207-998-2551
Name of designer: Ed Pennell
Authority having jurisdiction: State of Maine / Portland Fire Department
Notes: (Include peaking information or gridded systems here.)

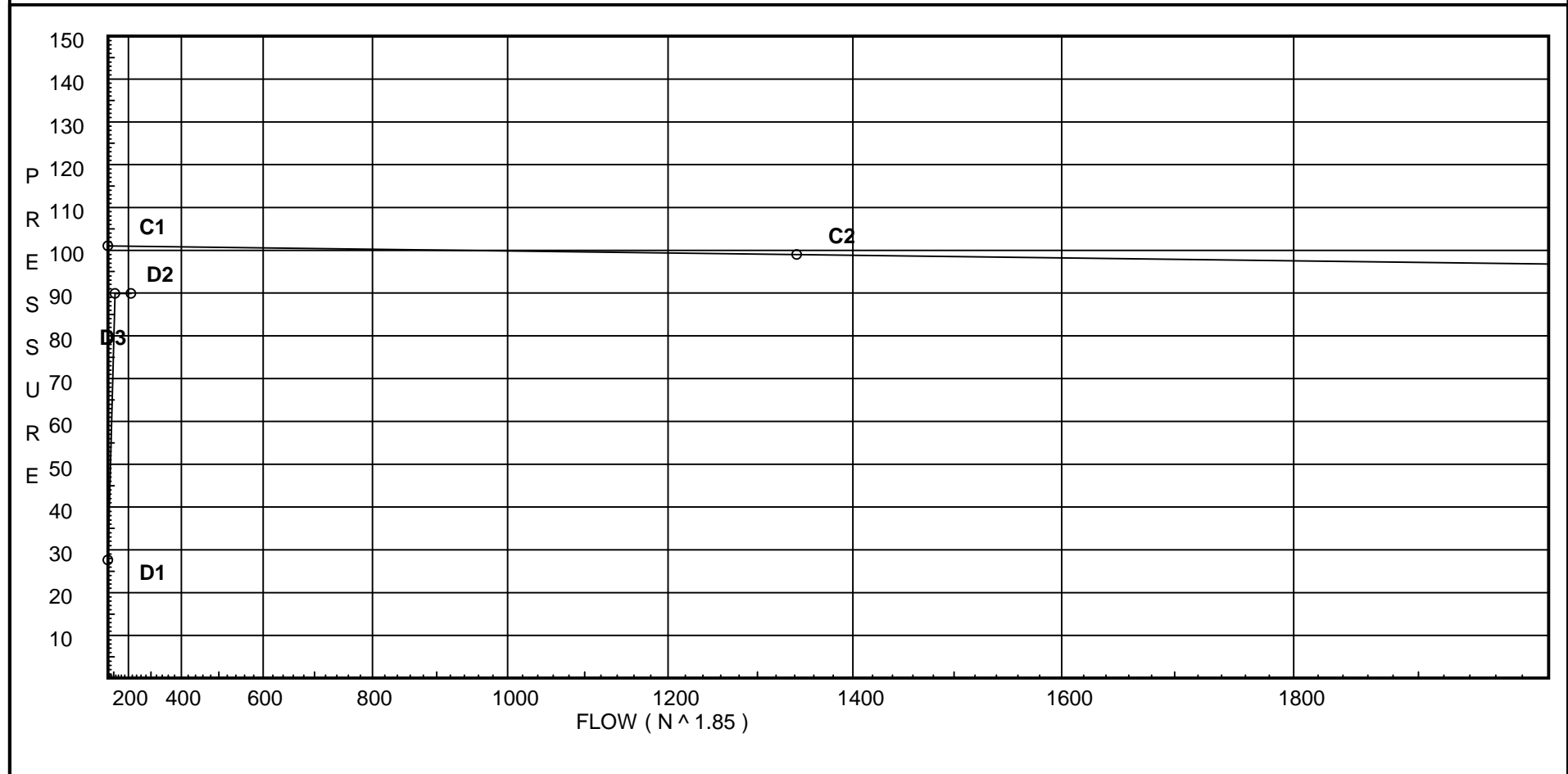
Water Supply Curve (C)

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

Demand:
D1 - Elevation : 27.610
D2 - System Flow : 113.466
D2 - System Pressure : 89.913
Hose (Demand) : 100
D3 - System Demand : 213.466
Safety Margin : 11.020



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																				
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	1	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
V	90' Ell Firelock #001	0	0	0	0	0	3.5	4.3	5	0	6.8	8.5	10	13	0	0	0	0	0	0	0
X	90'Tee-BranchFirelock002	0	0	0	0	0	8.5	10.8	13	0	16	21	25	33	0	0	0	0	0	0	0
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

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.
A1	63.75	5.6	20.0	na	25.04	0.1	240	20.0
A2	63.75	5.6	21.38	na	25.89	0.1	240	20.0
A3	63.75	5.6	28.72	na	30.01	0.1	240	20.0
A4	63.75	5.6	33.72	na	32.52	0.1	240	20.0
A5	43.5		47.46	na				
A6	37.0		56.23	na				
A7	37.0		58.01	na				
C1	23.11		66.63	na				
C2	14.5		70.82	na				
C3	6.4		74.81	na				
C4	6.4		75.35	na				
C5	5.75		77.12	na				
C6	5.75		77.36	na				
TOR	2.0		84.17	na				
BOR	2.0		87.51	na				
H1	10.0		84.42	na				
H2	10.0		85.01	na				
H3	10.0		85.04	na				
H4	10.0		85.37	na	100.0			
TEST	0.0		89.91	na				

The maximum velocity is 18.91 and it occurs in the pipe between nodes A2 and A3

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	*****
A1	25.04	1.049	1E	2.0	5.000	20.000				
to		120.0		0.0	2.000	0.0				K Factor = 5.60
A2	25.04	0.1973		0.0	7.000	1.381				Vel = 9.30
A2	25.90	1.049	1T	5.0	5.000	21.381				K Factor = 5.60
to		120.0		0.0	5.000	0.0				
A3	50.94	0.7337		0.0	10.000	7.337				Vel = 18.91
A3	30.01	1.38	1T	6.0	5.000	28.718				K Factor = 5.60
to		120.0		0.0	6.000	0.0				
A4	80.95	0.4545		0.0	11.000	5.000				Vel = 17.36
A4	32.52	1.61	2E	8.0	4.400	33.718				K Factor = 5.60
to		120.0		0.0	8.000	8.770				
A5	113.47	0.4008		0.0	12.400	4.970				Vel = 17.88
A5	0.0	1.682		0.0	18.400	47.458				
to		120.0		0.0	0.0	2.815				
A6	113.47	0.3239		0.0	18.400	5.960				Vel = 16.38
A6	0.0	2.157	1X	10.461	7.920	56.233				
to		120.0		0.0	10.461	0.0				
A7	113.47	0.0965		0.0	18.381	1.773				Vel = 9.96
A7	0.0	2.635	3V	17.71	39.200	58.006				
to		120.0	1X	14.827	32.537	6.016				
C1	113.47	0.0364		0.0	71.737	2.610				Vel = 6.68
C1	0.0	2.635		0.0	12.750	66.632				
to		120.0		0.0	0.0	3.729				
C2	113.47	0.0364		0.0	12.750	0.464				Vel = 6.68
C2	0.0	2.635		0.0	13.000	70.825				
to		120.0		0.0	0.0	3.508				
C3	113.47	0.0364		0.0	13.000	0.473				Vel = 6.68
C3	0.0	2.635	1V	5.903	9.000	74.806				
to		120.0		0.0	5.903	0.0				
C4	113.47	0.0364		0.0	14.903	0.542				Vel = 6.68
C4	0.0	2.635	2V	11.807	29.100	75.348				
to		120.0		0.0	11.807	0.282				
C5	113.47	0.0364		0.0	40.907	1.488				Vel = 6.68
C5	0.0	2.635	1V	5.903	0.670	77.118				
to		120.0		0.0	5.903	0.0				
C6	113.47	0.0364		0.0	6.573	0.239				Vel = 6.68
C6	0.0	2.635	1V	5.903	28.100	77.357				
to		120.0	1T	16.474	31.987	4.624				* Fixed loss = 3
TOR	113.47	0.0364	1B	9.61	60.087	2.187				Vel = 6.68
			1Fsp	0.0						
TOR	0.0	2.635	1E	8.237	3.000	84.168				
to		120.0	1Zac	0.0	8.237	2.935				* Fixed loss = 2.935
BOR	113.47	0.0364		0.0	11.237	0.409				Vel = 6.68
BOR	0.0	2.635	1E	8.237	2.000	87.512				
to		120.0		0.0	8.237	-3.465				
H1	113.47	0.0363		0.0	10.237	0.372				Vel = 6.68
H1	0.0	2.635	1E	8.237	8.000	84.419				
to		120.0		0.0	8.237	0.0				
H2	113.47	0.0364		0.0	16.237	0.591				Vel = 6.68

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	*****
H2 to H3	0.0 113.47	6.14 120.0 0.0006	1T	31.85 0.0 46.850	15.000 31.850 0.028	85.010 0.0		Vel = 1.23	
H3 to H4	0.0 113.47	6.14 100.0 0.0008	1T	22.732 0.0 397.732	375.000 22.732 0.329	85.038 0.0		Vel = 1.23	
H4 to TEST	100.00 213.47	6.14 100.0 0.0027	1E 1G 1T	10.608 2.273 22.732	45.000 35.613 80.613	85.367 4.331 0.215		Qa = 100 Vel = 2.31	
	0.0 213.47					89.913		K Factor = 22.51	