Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 06/17/15

. . . 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

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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)

HIGH TECH FIRE PROTECTION
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City Water Supply:
C1 - Static Pressure : 101
C2 - Residual Pressure: 99
C2 - Residual Flow : 1342

Demand:
D1 - Ele
D2 - Sy
D2 - Sy
Hose (
D3 - Sy
Safety Margin : 11.020

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Fittings Used Summary

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Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	1					4
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	2					
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	2					1
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					3
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
A1	63.75	5.6	20.0	na	25.04	0.1
A2	63.75	5.6	21.38	na	25.89	0.1
A3	63.75	5.6	28.72	na	30.01	0.1
A4	63.75	5.6	33.72	na	32.52	0.1
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 Ftng's Total	Pt Pe Pf	Pt Pv Pn	**
A1	25.04	1.049	1E	2.0	5.000	20.000		K Factor = 5.60
to		120.0		0.0	2.000	0.0		
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

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