



... **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 : Press Hotel 5th floor room 501 #5A
Drawing : FP-04
Location : 119 Exchange Street Portland
Remote Area : 5A
Contract : 110713-1
Data File : Calc #5A 5th floor Unit 501 (new h2o).WXF

HYDRAULIC CALCULATIONS
for

Project name: Press Hotel 5th floor room 501 #5A
Location: 119 Exchange Street Portland
Drawing no: FP-04
Date: 3/20/14

Design

Remote area number: 5A
Remote area location: 5th floor Unit 501
Occupancy classification: Residential / light hazard
Density: .1 - Gpm/SqFt
Area of application: 326 - SqFt
Coverage per sprinkler: 224 - SqFt
Type of sprinklers calculated: Residential Pendants
No. of sprinklers calculated: 4
In-rack demand: n/a - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 195 - GPM @ 75 - Psi
Type of system: Wet NFPA 13
Volume of dry or preaction system: n/a - Gal

Water supply information

Date: 5-12-2014
Location: Corner of Exchange Street and Federal St.
Source: Portland Water District

Name of contractor: High Tech Fire Protection
Address: 84 Hackett Mills Road Poland / P.O. Box 154 Minot, ME / Pola
Phone number: 207-998-2551
Name of designer: Ed Poulin
Authority having jurisdiction: State of Maine / City of Portland
Notes: (Include peaking information or gridded systems here.)

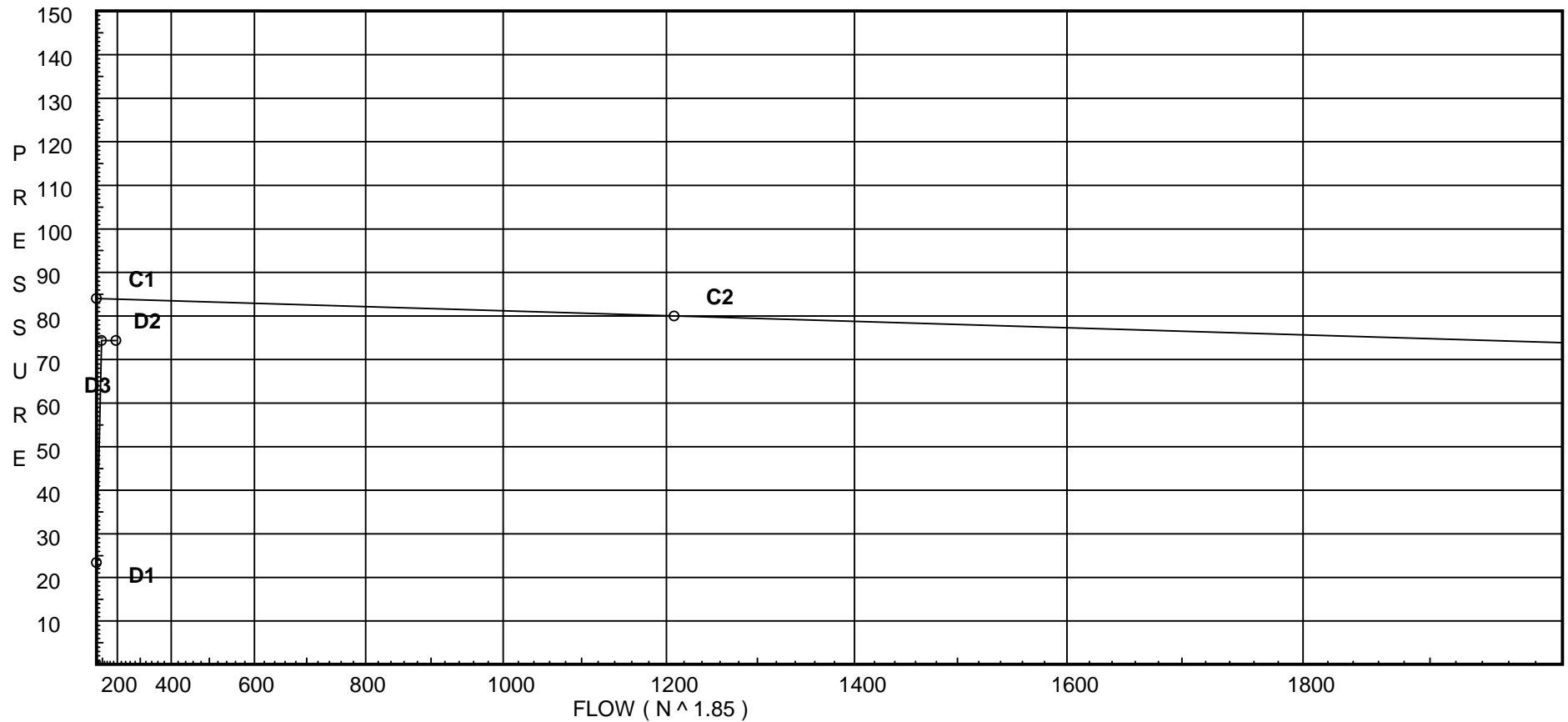
Water Supply Curve (C)

HIGH TECH FIRE PROTECTION
Press Hotel 5th floor room 501 #5A

Page 2
Date 3/20/14

City Water Supply:
C1 - Static Pressure : 84
C2 - Residual Pressure: 80
C2 - Residual Flow : 1209

Demand:
D1 - Elevation : 23.387
D2 - System Flow : 93.399
D2 - System Pressure : 74.360
Hose (Demand) : 100
D3 - System Demand : 193.399
Safety Margin : 9.505



Fittings Used Summary

HIGH TECH FIRE PROTECTION
Press Hotel 5th floor room 501 #5A

Page 3
Date 3/20/14

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
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
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
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
N *	CPVC 90'EI Harvel-Spears		7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O *	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
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' EI 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
Zia	Wilkins 350	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

HIGH TECH FIRE PROTECTION
 Press Hotel 5th floor room 501 #5A

Page 4
 Date 3/20/14

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
DP1	-1.0	5.8	14.92	na	22.4	0.1	224	7.5
DP2	-1.0	5.8	14.92	na	22.4	0.1	224	7.5
500	57.0	K = K @ EQ01	15.15	na	22.4			
501	57.0	5.8	15.72	na	23.0	0.1	224	13.2
502	57.0		16.46	na				
503	57.0	K = K @ EQ02	17.08	na	23.92			
504	57.0	5.8	17.24	na	24.09	0.1	224	13.2
505	57.0		18.05	na				
506	57.0		20.11	na				
507	57.0		21.36	na				
508	57.0		27.81	na				
509	57.0		29.89	na				
510	57.0		35.55	na				
SR5	14.0		59.91	na				
SR1	14.0		60.18	na				
SR11	14.0		60.33	na				
SR0	0.0		66.44	na				
SR01	0.0		66.8	na				
SR02	0.0		67.81	na				
SR03	0.0		67.86	na				
TOR	-4.0		69.89	na				
BOR	-6.0		73.76	na				
BASE	-6.0		78.07	na				
HS1	-4.0		77.24	na				
HS2	-4.0		77.26	na				
HS3	-4.0		77.34	na	100.0			
TEST	3.0		74.36	na				

The maximum velocity is 15.3 and it occurs in the pipe between nodes 502 and 503

Final Calculations - Hazen-Williams

HIGH TECH FIRE PROTECTION
 Press Hotel 5th floor room 501 #5A

Page 5
 Date 3/20/14

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
DP1 to EQ01	22.40 22.4	1.101 150.0 0.0839	1N	7.0 0.0 0.0	1.000 7.000 8.000	14.916 -0.433 0.671			K Factor = 5.80 Vel = 7.55	
	0.0 22.40						15.154		K Factor = 5.75	
DP2 to EQ02	22.40 22.4	1.101 150.0 0.0838	1O	5.0 0.0 0.0	1.000 5.000 6.000	14.916 -0.433 0.503			K Factor = 5.80 Vel = 7.55	
	0.0 22.40						14.986		K Factor = 5.79	
500 to 502	22.40 22.4	1.101 150.0 0.0839	1N	7.0 0.0 0.0	8.600 7.000 15.600	15.154 0.0 1.309			K Factor @ node EQ01 Vel = 7.55	
	0.0 22.40						16.463		K Factor = 5.52	
501 to 502	23.00 23.0	1.101 150.0 0.0881	1O	5.0 0.0 0.0	3.400 5.000 8.400	15.723 0.0 0.740			K Factor = 5.80 Vel = 7.75	
502 to 503	22.40 45.4	1.101 150.0 0.3100		0.0 0.0 0.0	2.000 0.0 2.000	16.463 0.0 0.620			Vel = 15.30	
503 to 505	23.91 69.31	1.394 150.0 0.2149		0.0 0.0 0.0	4.500 0.0 4.500	17.083 0.0 0.967			K Factor @ node EQ02 Vel = 14.57	
	0.0 69.31						18.050		K Factor = 16.31	
504 to 505	24.08 24.08	1.101 150.0 0.0960	1O	5.0 0.0 0.0	3.400 5.000 8.400	17.244 0.0 0.806			K Factor = 5.80 Vel = 8.11	
505 to 506	69.32 93.4	1.598 150.0 0.1919	1N	9.0 0.0 0.0	1.750 9.000 10.750	18.050 0.0 2.063			Vel = 14.94	
506 to 507	0.0 93.4	2.003 150.0 0.0639		0.0 0.0 0.0	19.500 0.0 19.500	20.113 0.0 1.246			Vel = 9.51	
507 to 508	0.0 93.4	2.003 150.0 0.0639	1N 1O	11.0 10.0 0.0	80.000 21.000 101.000	21.359 0.0 6.451			Vel = 9.51	
508 to 509	0.0 93.4	2.067 120.0 0.0820		0.0 0.0 0.0	1.000 0.0 1.000	27.810 2.000 0.082			* Fixed loss = 2 Vel = 8.93	
509 to 510	0.0 93.4	2.003 150.0 0.0639	2N	22.0 0.0 0.0	66.500 22.000 88.500	29.892 0.0 5.653			Vel = 9.51	
510 to SR5	0.0 93.4	2.157 120.0 0.0673	1B 1Fsp 1S 1X	7.384 0.0 13.537 10.461	5.000 35.689 40.689	35.545 21.623 2.738			* Fixed loss = 3 Vel = 8.20	

Final Calculations - Hazen-Williams

HIGH TECH FIRE PROTECTION
 Press Hotel 5th floor room 501 #5A

Page 6
 Date 3/20/14

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
			1V	4.307						
SR5 to SR1	0.0 93.4	4.26 120.0 0.0024	7V	62.675	50.000 62.675 112.675	59.906 0.0 0.276			Vel = 2.10	
SR1 to SR11	0.0 93.4	4.26 120.0 0.0024	3V	26.861	32.000 26.861 58.861	60.182 0.0 0.144			Vel = 2.10	
SR11 to SR0	0.0 93.4	4.26 120.0 0.0025	1V	8.954	10.000 8.954 18.954	60.326 6.063 0.047			Vel = 2.10	
SR0 to SR01	0.0 93.4	4.26 120.0 0.0024	3V 1B 1X 1F	26.861 15.8 21.067 5.267	81.500 68.995 150.495	66.436 0.0 0.368		Vel = 2.10		
SR01 to SR02	0.0 93.4	4.26 120.0 0.0030		0.0	1.000 0.0 1.000	66.804 1.000 0.003		* Fixed loss = 1 Vel = 2.10		
SR02 to SR03	0.0 93.4	4.26 120.0 0.0024	1X	21.067	2.000 21.067 23.067	67.807 0.0 0.056		Vel = 2.10		
SR03 to TOR	0.0 93.4	4.26 120.0 0.0025	2V 1X	17.907 21.067	81.000 38.974 119.974	67.863 1.732 0.294		Vel = 2.10		
TOR to BOR	0.0 93.4	4.26 120.0 0.0025	1Fsp	0.0	4.000 0.0 4.000	69.889 3.866 0.010		* Fixed loss = 3 Vel = 2.10		
BOR to BASE	0.0 93.4	4.26 120.0 0.0030	1Zia	0.0	1.000 0.0 1.000	73.765 4.305 0.003		* Fixed loss = 4.305 Vel = 2.10		
BASE to HS1	0.0 93.4	6.14 100.0 0.0006	1G 1E 1T	2.273 10.608 22.732	25.000 35.613 60.613	78.073 -0.866 0.035		Vel = 1.01		
HS1 to HS2	0.0 93.4	8.23 100.0 0.0001	1T	29.011	90.000 29.010 119.010	77.242 0.0 0.016		Vel = 0.56		
HS2 to HS3	0.0 93.4	6.14 100.0 0.0006	1T	22.732	120.000 22.732 142.732	77.258 0.0 0.083		Vel = 1.01		
HS3 to TEST	100.0 193.4	6.14 100.0 0.0022	1G 1E	2.273 10.608	10.000 12.881 22.881	77.341 -3.032 0.051		Qa = 100 Vel = 2.10		
	0.0 193.40					74.360		K Factor = 22.43		