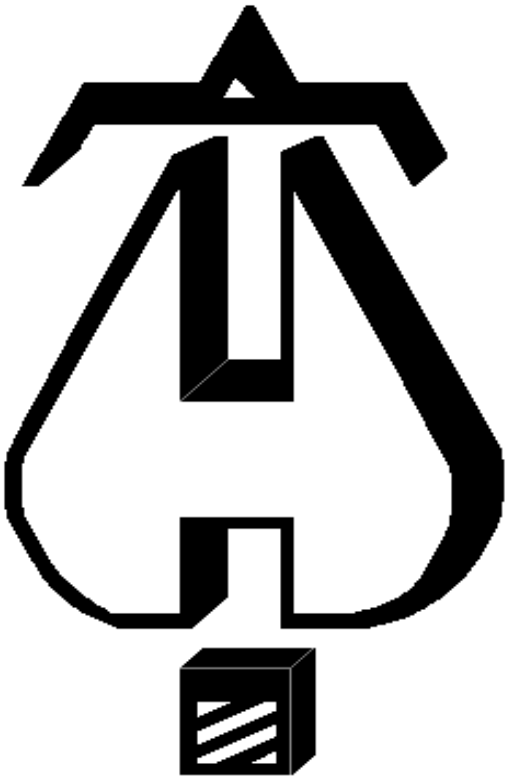


. . . Fire Protection by Computer Design

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

Job Name	:	Press Hotel 6th floor room 601 #6A
Drawing	:	FP-04
Location	:	119 Exchange Street Portland
Remote Area	:	6A
Contract	:	110713-1
Data File	:	Calc #6A 6th floor Unit 601 (new h2o).WXF

HYDRAULIC CALCULATIONS
for

Project name: Press Hotel 6th floor room 601 #6A
Location: 119 Exchange Street Portland
Drawing no: FP-04
Date: 3/20/14

Design

Remote area number: 6A
Remote area location: 6th floor Unit 601
Occupancy classification: Residential / light hazard
Density: .1 - Gpm/SqFt
Area of application: 483 - SqFt
Coverage per sprinkler: 224 - SqFt
Type of sprinklers calculated: Residential Pendents
No. of sprinklers calculated: 4
In-rack demand: n/a - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 192 - 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.)

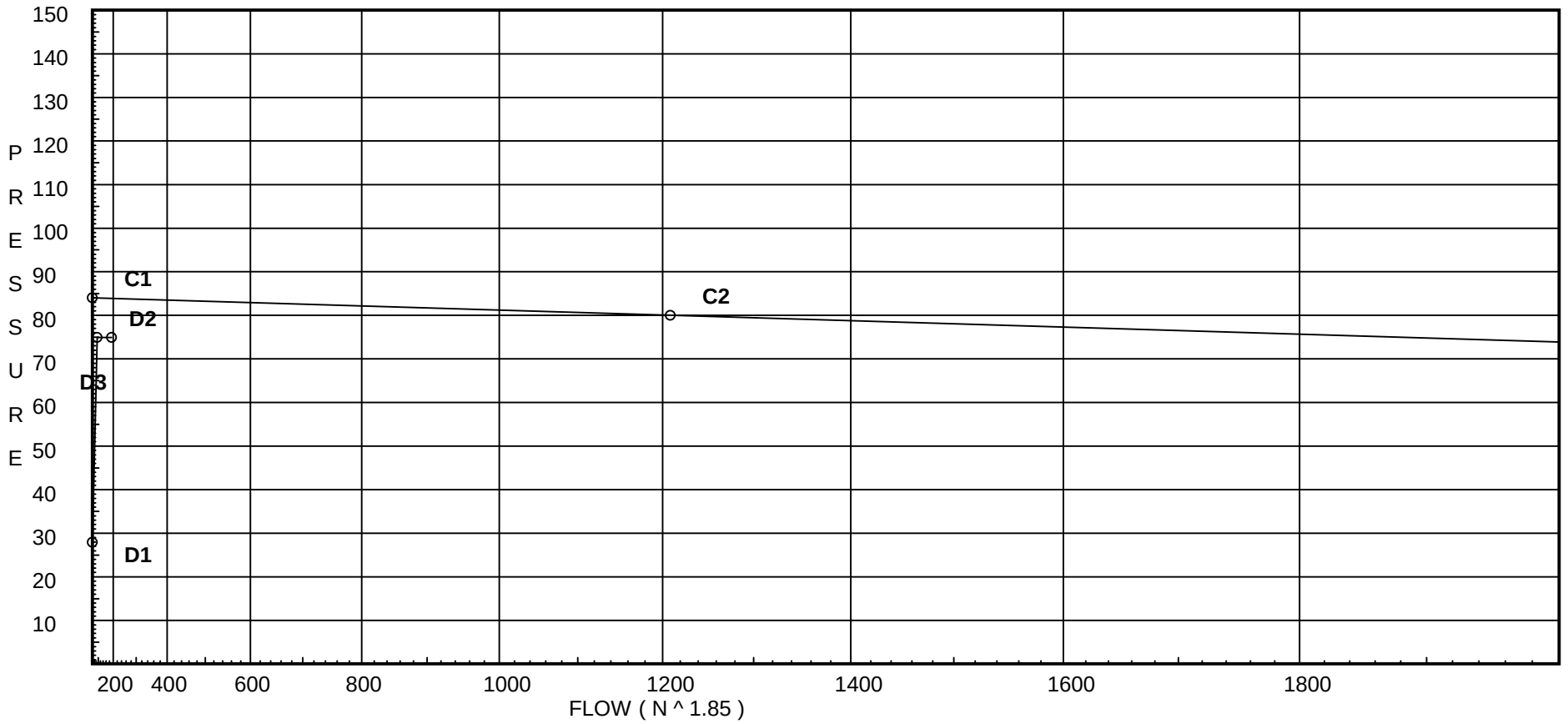
Water Supply Curve (C)

HIGH TECH FIRE PROTECTION
Press Hotel 6th floor room 601 #6A

Date 3/20/14

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

Demand:
- D1 - Elevation : 27.935
- D2 - System Flow : 91.677
- D2 - System Pressure : 74.947
- Hose (Demand) : 100
- D3 - System Demand : 191.677
- Safety Margin : 8.921



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	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'Ell 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' 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
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

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
600	67.5	5.8	14.92	na	22.4	0.1	224	13.2
601	67.5	K = K @ EQ01	15.17	na	22.54			
602	67.5		16.11	na				
603	67.5	5.8	16.1	na	23.27	0.1	224	13.2
604	67.5	K = K @ EQ01	16.45	na	23.47			
605	67.5		17.25	na				
606	67.5		21.66	na				
615	67.5		26.72	na				
616	67.5		28.8	na				
617	67.5		30.38	na				
SR6	57.0		41.65	na				
SR51	57.0		41.69	na				
SR5	14.0		60.5	na				
SR1	14.0		60.76	na				
SR11	14.0		60.9	na				
SR0	0.0		67.01	na				
SR01	0.0		67.37	na				
SR02	0.0		68.37	na				
SR03	0.0		68.42	na				
TOR	-4.0		70.44	na				
BOR	-6.0		74.32	na				
BASE	-6.0		78.67	na				
HS1	-4.0		77.83	na				
HS2	-4.0		77.85	na				
HS3	-4.0		77.93	na	100.0			
TEST	3.0		74.95	na				

The maximum velocity is 14.67 and it occurs in the pipe between nodes 605 and 606

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	22.40	1.101	1O	5.0	1.000	14.916		K Factor = 5.80
to		150.0		0.0	5.000	-0.433		
EQ01	22.4	0.0838		0.0	6.000	0.503		Vel = 7.55
	0.0							
	22.40					14.986		K Factor = 5.79
600	22.40	1.101		0.0	3.000	14.916		K Factor = 5.80
to		150.0		0.0	0.0	0.0		
601	22.4	0.0837		0.0	3.000	0.251		Vel = 7.55
601	22.54	1.394	1N	8.0	1.750	15.167		K Factor @ node EQ01
to		150.0		0.0	8.000	0.0		
602	44.94	0.0964		0.0	9.750	0.940		Vel = 9.45
602	0.0	1.394		0.0	11.900	16.107		
to		150.0		0.0	0.0	0.0		
605	44.94	0.0964		0.0	11.900	1.147		Vel = 9.45
	0.0							
	44.94					17.254		K Factor = 10.82
603	23.27	1.101		0.0	3.900	16.100		K Factor = 5.80
to		150.0		0.0	0.0	0.0		
604	23.27	0.0900		0.0	3.900	0.351		Vel = 7.84
604	23.47	1.394	1O	6.0	1.750	16.451		K Factor @ node EQ01
to		150.0		0.0	6.000	0.0		
605	46.74	0.1036		0.0	7.750	0.803		Vel = 9.83
605	44.94	1.598	1N	9.0	14.750	17.254		
to		150.0		0.0	9.000	0.0		
606	91.68	0.1854		0.0	23.750	4.404		Vel = 14.67
606	0.0	2.003		0.0	82.000	21.658		
to		150.0		0.0	0.0	0.0		
615	91.68	0.0617		0.0	82.000	5.060		Vel = 9.33
615	0.0	2.067		0.0	1.000	26.718		
to		120.0		0.0	0.0	2.000		* Fixed loss = 2
616	91.68	0.0800		0.0	1.000	0.080		Vel = 8.77
616	0.0	2.003		0.0	17.000	28.798		
to		120.0		0.0	0.0	0.0		
617	91.68	0.0932		0.0	17.000	1.585		Vel = 9.33
617	0.0	2.157	1B	7.384	11.000	30.383		
to		120.0	1Fsp	0.0	46.149	7.548		* Fixed loss = 3
SR6	91.68	0.0650	1S	13.537	57.149	3.715		Vel = 8.05
			2X	20.921				
			1V	4.307				
SR6	0.0	4.26	1V	8.954	10.500	41.646		
to		120.0		0.0	8.954	0.0		
SR51	91.68	0.0024		0.0	19.454	0.046		Vel = 2.06
SR51	0.0	4.26	4V	35.814	41.000	41.692		
to		120.0		0.0	35.814	18.623		
SR5	91.68	0.0024		0.0	76.814	0.182		Vel = 2.06
SR5	0.0	4.26	7V	62.675	50.000	60.497		
to		120.0		0.0	62.675	0.0		
SR1	91.68	0.0024		0.0	112.675	0.266		Vel = 2.06

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
SR1	0.0	4.26	3V	26.861	32.000	60.763		
to		120.0		0.0	26.861	0.0		
SR11	91.68	0.0024		0.0	58.861	0.139		Vel = 2.06
SR11	0.0	4.26	1V	8.954	10.000	60.902		
to		120.0		0.0	8.954	6.063		
SR0	91.68	0.0024		0.0	18.954	0.046		Vel = 2.06
SR0	0.0	4.26	3V	26.861	81.500	67.011		
to		120.0	1B	15.8	68.995	0.0		
SR01	91.68	0.0024	1X	21.067	150.495	0.355		Vel = 2.06
			1F	5.267				
SR01	0.0	4.26		0.0	1.000	67.366		
to		120.0		0.0	0.0	1.000		* Fixed loss = 1
SR02	91.68	0.0030		0.0	1.000	0.003		Vel = 2.06
SR02	0.0	4.26	1X	21.067	2.000	68.369		
to		120.0		0.0	21.067	0.0		
SR03	91.68	0.0023		0.0	23.067	0.054		Vel = 2.06
SR03	0.0	4.26	2V	17.907	81.000	68.423		
to		120.0	1X	21.067	38.974	1.732		
TOR	91.68	0.0024		0.0	119.974	0.284		Vel = 2.06
TOR	0.0	4.26	1Fsp	0.0	4.000	70.439		
to		120.0		0.0	0.0	3.866		* Fixed loss = 3
BOR	91.68	0.0025		0.0	4.000	0.010		Vel = 2.06
BOR	0.0	4.26	1Zia	0.0	1.000	74.315		
to		120.0		0.0	0.0	4.348		* Fixed loss = 4.348
BASE	91.68	0.0020		0.0	1.000	0.002		Vel = 2.06
BASE	0.0	6.14	1G	2.273	25.000	78.665		
to		100.0	1E	10.608	35.613	-0.866		
HS1	91.68	0.0006	1T	22.732	60.613	0.034		Vel = 0.99
HS1	0.0	8.23	1T	29.011	90.000	77.833		
to		100.0		0.0	29.010	0.0		
HS2	91.68	0.0001		0.0	119.010	0.016		Vel = 0.55
HS2	0.0	6.14	1T	22.732	120.000	77.849		
to		100.0		0.0	22.732	0.0		
HS3	91.68	0.0006		0.0	142.732	0.079		Vel = 0.99
HS3	100.00	6.14	1G	2.273	10.000	77.928		Qa = 100
to		100.0	1E	10.608	12.881	-3.032		
TEST	191.68	0.0022		0.0	22.881	0.051		Vel = 2.08
	0.0							
	191.68					74.947		K Factor = 22.14