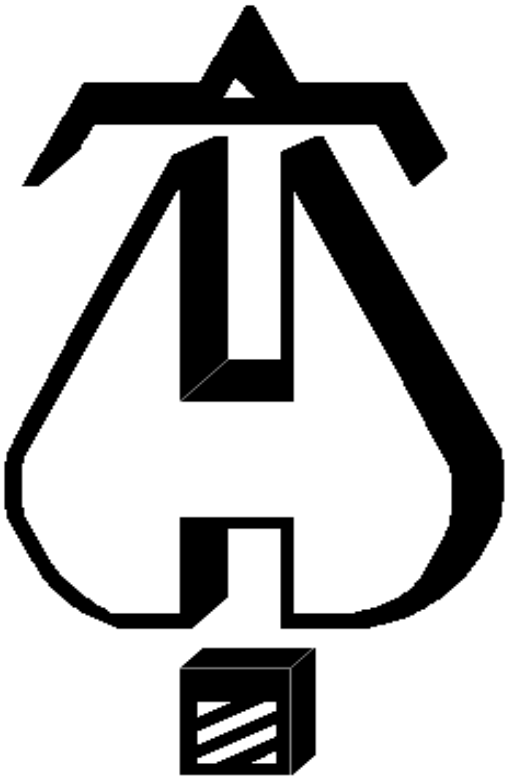


. . . Fire Protection by Computer Design

High Tech Fire Protection
84 Hackett Mills Road Poland
P.O. Box 154 Minot, ME
Poland, ME 04274
207-998-2551

Job Name	:	Hilton Garden Inn Addition Portland Jetport 2nd unit 201
Drawing	:	FP-02
Location	:	145 Jetport Boulevard Portland
Remote Area	:	2B
Contract	:	053013-1
Data File	:	second floor pend unit 201-203.WXF

HYDRAULIC CALCULATIONS
for

Project name: Hilton Garden Inn Addition 2nd floor unit 201-203
Location: 145 Jetport Boulevard Portland
Drawing no: FP-02
Date: 10/15/13

Design

Remote area number: 2B
Remote area location: SECOND FLOOR UNIT 201-203
Occupancy classification: RESIDENTIAL / LIGHT HAZARD
Density: .1 - Gpm/SqFt
Area of application: 4 HEAD - SqFt
Coverage per sprinkler: 256 - SqFt
Type of sprinklers calculated: RESIDENTIAL PENDENT
No. of sprinklers calculated: 4
In-rack demand: N/A - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 204 - GPM @ 49 - Psi
Type of system: WET
Volume of dry or preaction system: N/A - Gal

Water supply information

Date: 10/31/2013
Location: Test hydrant in front of addition entrance
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)

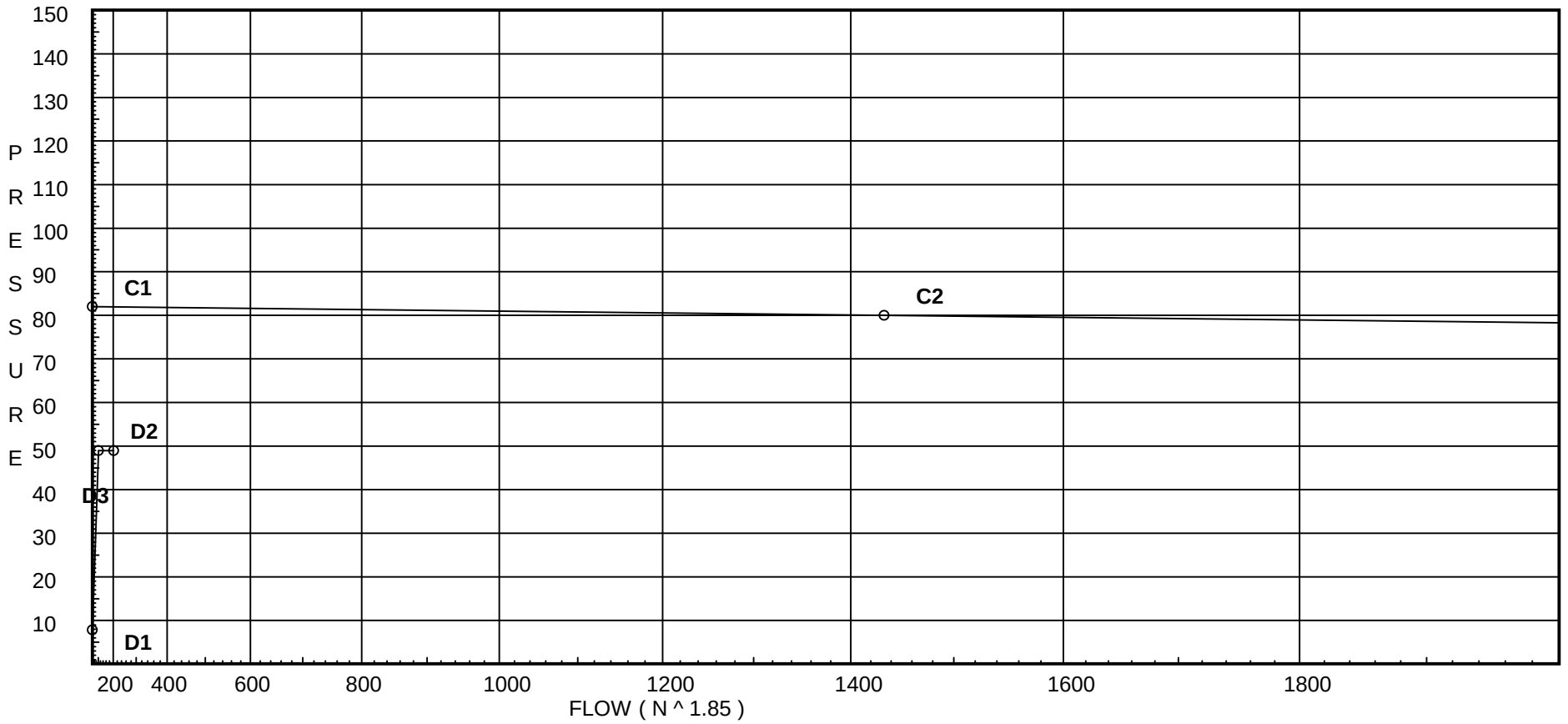
High Tech Fire Protection
Hilton Garden Inn Addition Portland Jetport 2nd unit 201

Date 10/15/13

City Water Supply:
- C1 - Static Pressure : 82
- C2 - Residual Pressure: 80
- C2 - Residual Flow : 1433

Demand:

D1 - Elevation	:	7.796
D2 - System Flow	:	103.103
D2 - System Pressure	:	48.952
Hose (Demand)	:	100
D3 - System Demand	:	203.103
Safety Margin	:	32.994



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
Bvcb	B Fly Vic 705W	0	0	0	0	0	0	5	5	0	12	12	8	11	12	14	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	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
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

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.

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
DP1	-1.0	5.8	19.48	na	25.6	0.1	256	7.6
201	20.0	K = K @ EQ01	20.28	na	25.6			
206	20.0	K = K @ EQ01	20.56	na	25.78			
221	20.0	K = K @ EQ01	20.56	na	25.77			
226	20.0	K = K @ EQ01	20.84	na	25.95			
BA	20.0		23.27	na				
BB	20.0		23.58	na				
BC	20.0		25.71	na				
BD	20.0		30.82	na				
AJ	20.0		36.11	na				
AK	10.0		40.5	na				
AL	10.0		40.93	na				
AM	10.0		40.96	na				
TOW	10.0		42.07	na				
BOW	3.0		48.33	na				
BASE	0.0		49.69	na				
HOSE	0.0		49.8	na	100.0			
TEST	2.0		48.95	na				

The maximum velocity is 9.5 and it occurs in the pipe between nodes DP1 and EQ01

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	25.60	1.049	1T	5.0	1.000	19.482		K Factor = 5.80
to		120.0		0.0	5.000	-0.433		
EQ01	25.6	0.2053		0.0	6.000	1.232		Vel = 9.50
	0.0							
	25.60					20.281		K Factor = 5.68
201	25.60	1.682		0.0	13.750	20.281		K Factor @ node EQ01
to		120.0		0.0	0.0	0.0		
206	25.6	0.0207		0.0	13.750	0.284		Vel = 3.70
206	25.78	1.682	1T	9.9	26.300	20.565		K Factor @ node EQ01
to		120.0		0.0	9.900	0.0		
BA	51.38	0.0748		0.0	36.200	2.707		Vel = 7.42
	0.0							
	51.38					23.272		K Factor = 10.65
221	25.77	1.682		0.0	13.750	20.556		K Factor @ node EQ01
to		120.0		0.0	0.0	0.0		
226	25.77	0.0209		0.0	13.750	0.287		Vel = 3.72
226	25.95	1.682	1T	9.9	26.300	20.843		K Factor @ node EQ01
to		120.0		0.0	9.900	0.0		
BB	51.72	0.0757		0.0	36.200	2.741		Vel = 7.47
	0.0							
	51.72					23.584		K Factor = 10.65
BA	51.38	2.157		0.0	14.000	23.272		
to		120.0		0.0	0.0	0.0		
BB	51.38	0.0223		0.0	14.000	0.312		Vel = 4.51
BB	51.72	2.157	1T	12.307	14.000	23.584		
to		120.0		0.0	12.307	0.0		
BC	103.1	0.0808		0.0	26.307	2.125		Vel = 9.05
BC	0.0	2.157	1T	12.307	51.000	25.709		
to		120.0		0.0	12.307	0.0		
BD	103.1	0.0808		0.0	63.307	5.115		Vel = 9.05
BD	0.0	2.157	1B	7.384	4.300	30.824		
to		120.0	1V	4.307	23.998	3.000		* Fixed loss = 3
AJ	103.1	0.0808	1T	12.307	28.298	2.286		Vel = 9.05
			1Fsp	0.0				
AJ	0.0	4.26	1V	8.954	10.000	36.110		
to		120.0		0.0	8.954	4.331		
AK	103.1	0.0029		0.0	18.954	0.055		Vel = 2.32
AK	0.0	4.26	5V	44.768	103.000	40.496		
to		120.0		0.0	44.768	0.0		
AL	103.1	0.0029		0.0	147.768	0.434		Vel = 2.32
AL	0.0	4.26	1V	8.954	0.500	40.930		
to		120.0		0.0	8.954	0.0		
AM	103.1	0.0030		0.0	9.454	0.028		Vel = 2.32
AM	0.0	4.26	11V	98.49	270.000	40.958		
to		120.0	2F	10.534	109.024	0.0		
TOW	103.1	0.0029		0.0	379.024	1.114		Vel = 2.32
TOW	0.0	4.26	1Bvcb	15.8	6.000	42.072		
to		120.0	1Fsp	0.0	71.102	6.032		* Fixed loss = 3
BOW	103.1	0.0029	1T	26.334	77.102	0.226		Vel = 2.32

Final Calculations - Hazen-Williams

High Tech Fire Protection
Hilton Garden Inn Addition Portland Jetport 2nd unit 201

Date 10/15/13

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
			1S	28.968				
BOW	0.0	4.26	1G	2.633	6.000	48.330		
to		120.0	1E	13.167	15.800	1.299		
BASE	103.1	0.0029		0.0	21.800	0.064		Vel = 2.32
BASE	0.0	6.16	1G	4.304	200.000	49.693		
to		140.0	2E	40.168	87.509	0.0		
HOSE	103.1	0.0004	1T	43.037	287.509	0.105		Vel = 1.11
HOSE	100.00	12.34	1G	9.377	300.000	49.798		Qa = 100
to		140.0	1E	42.195	145.339	-0.866		
TEST	203.1	0.0	1T	93.767	445.339	0.020		Vel = 0.54
	0.0							
	203.10					48.952		K Factor = 29.03