



**... 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 3rd hsw Corridor  
Drawing : FP-02  
Location : 145 Jetport Boulevard Portland  
Remote Area : 3B  
Contract : 053013-1  
Data File : third floor hsw hallway.WXF

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**HYDRAULIC CALCULATIONS**  
**for**

**Project name:** Hilton Garden Inn Addition 3rd hsw corridor  
**Location:** 145 Jetport Boulevard Portland  
**Drawing no:** FP-02  
**Date:** 10/15/13

**Design**

**Remote area number:** 3B  
**Remote area location:** THIRD FLOOR CORRIDOR  
**Occupancy classification:** RESIDENTIAL / LIGHT HAZARD  
**Density:** .1 - Gpm/SqFt  
**Area of application:** 5 HEAD - SqFt  
**Coverage per sprinkler:** 320 - SqFt  
**Type of sprinklers calculated:** RESIDENTIAL HORIZONTAL SIDEWALL  
**No. of sprinklers calculated:** 5  
**In-rack demand:** N/A - GPM  
**Hose streams:** 100 - GPM  
**Total water required (including hose streams):** 264 - GPM @ 77 - 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)

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Hilton Garden Inn Addition Portland Jetport 3rd hsw Corridor

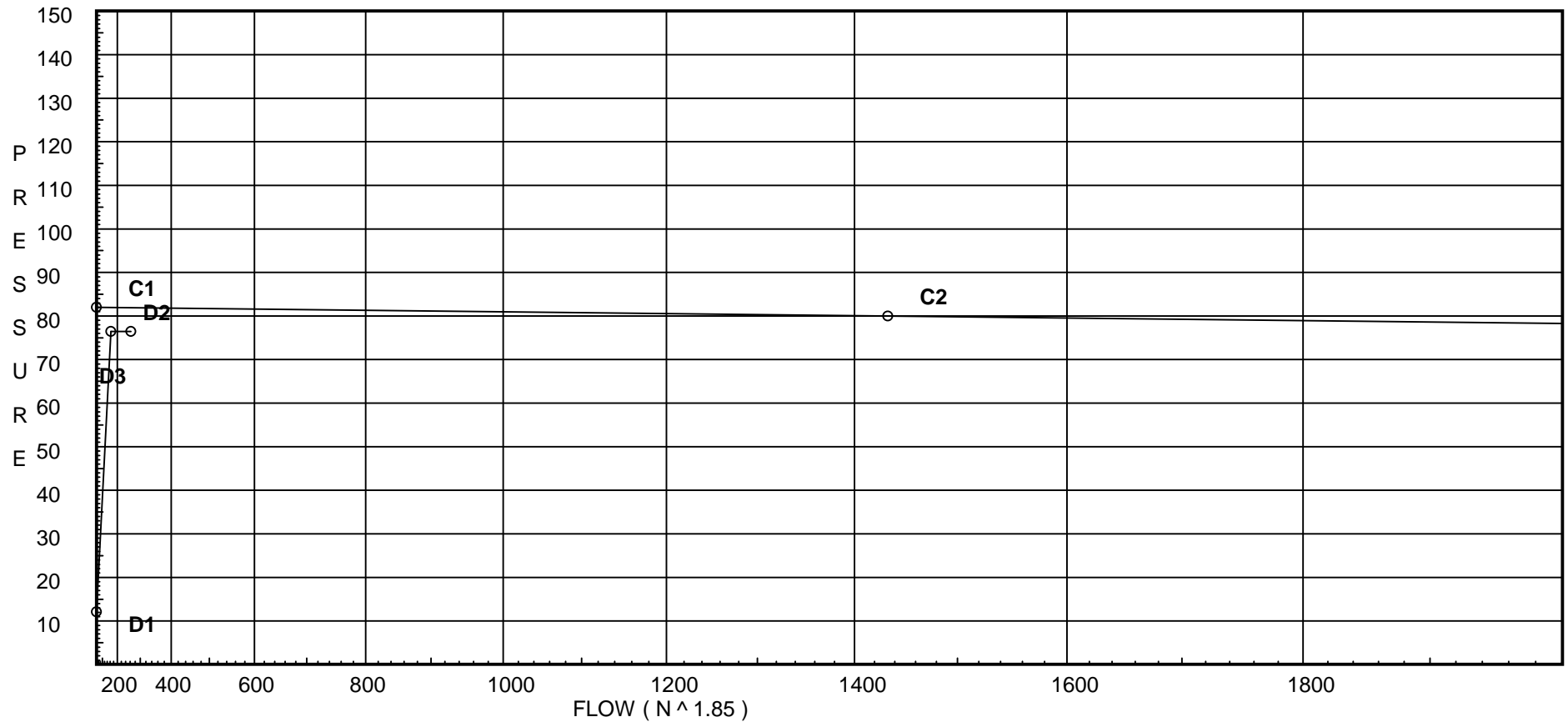
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## City Water Supply:

C1 - Static Pressure : 82  
C2 - Residual Pressure: 80  
C2 - Residual Flow : 1433

## Demand:

D1 - Elevation : 12.127  
D2 - System Flow : 163.562  
D2 - System Pressure : 76.457  
Hose ( Demand ) : 100  
D3 - System Demand : 263.562  
Safety Margin : 5.455



# Fittings Used Summary

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## 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
Bvca	B Fly Vic 705						6	6	7		8	12	14	16	18	19					
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.

# Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
350	30.0	5.8	32.32	na	32.97	0.1	320	20.1
355	30.0	5.8	30.44	na	32.0	0.1	320	20.1
360	30.0	5.8	31.19	na	32.39	0.1	320	20.1
365	30.0	5.8	31.44	na	32.52	0.1	320	20.1
370	30.0	5.8	33.71	na	33.68	0.1	320	20.1
AA	30.0		32.75	na				
AB	30.0		32.77	na				
AC	30.0		32.83	na				
AD	30.0		33.15	na				
AE	30.0		33.61	na				
AF	30.0		33.84	na				
AG	30.0		35.83	na				
AH	30.0		47.59	na				
AI	30.0		56.47	na				
AJ	20.0		60.87	na				
AK	10.0		65.33	na				
AL	10.0		66.35	na				
AM	10.0		66.42	na				
TOW	10.0		69.03	na				
BOW	3.0		75.59	na				
BASE	0.0		77.04	na				
HOSE	0.0		77.29	na	100.0			
TEST	2.0		76.46	na				

The maximum velocity is 14.36 and it occurs in the pipe between nodes AG and AH

# 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	*****
350 to AA	32.97 32.97	1.049 120.0 0.3285		0.0 0.0 0.0	1.300 0.0 1.300	32.321 0.0 0.427		K Factor = 5.80 Vel = 12.24		
	0.0 32.97					32.748		K Factor = 5.76		
355 to AB	32.00 32.0	1.049 120.0 0.3104	1T	5.0 0.0 0.0	2.500 5.000 7.500	30.440 0.0 2.328		K Factor = 5.80 Vel = 11.88		
	0.0 32.00					32.768		K Factor = 5.59		
360 to AD	32.39 32.39	1.049 120.0 0.3176	1T	5.0 0.0 0.0	1.200 5.000 6.200	31.185 0.0 1.969		K Factor = 5.80 Vel = 12.02		
	0.0 32.39					33.154		K Factor = 5.63		
365 to AF	32.52 32.52	1.049 120.0 0.3200	1T	5.0 0.0 0.0	2.500 5.000 7.500	31.444 0.0 2.400		K Factor = 5.80 Vel = 12.07		
	0.0 32.52					33.844		K Factor = 5.59		
370 to AG	33.67 33.67	1.049 120.0 0.3413	1T	5.0 0.0 0.0	1.200 5.000 6.200	33.710 0.0 2.116		K Factor = 5.80 Vel = 12.50		
	0.0 33.67					35.826		K Factor = 5.63		
AA to AB	32.97 32.97	2.157 120.0 0.0095		0.0 0.0 0.0	2.100 0.0 2.100	32.748 0.0 0.020		Vel = 2.89		
AB to AC	32.00 64.97	2.157 120.0 0.0347		0.0 0.0 0.0	1.700 0.0 1.700	32.768 0.0 0.059		Vel = 5.70		
AC to AD	0.0 64.97	2.157 120.0 0.0344		0.0 0.0 0.0	9.500 0.0 9.500	32.827 0.0 0.327		Vel = 5.70		
AD to AE	32.39 97.36	2.157 120.0 0.0725		0.0 0.0 0.0	6.300 0.0 6.300	33.154 0.0 0.457		Vel = 8.55		
AE to AF	0.0 97.36	2.157 120.0 0.0728		0.0 0.0 0.0	3.200 0.0 3.200	33.611 0.0 0.233		Vel = 8.55		
AF to AG	32.53 129.89	2.157 120.0 0.1239		0.0 0.0 0.0	16.000 0.0 16.000	33.844 0.0 1.982		Vel = 11.40		
AG to AH	33.67 163.56	2.157 120.0 0.1897	1T	12.307 0.0 0.0	49.700 12.307 62.007	35.826 0.0 11.764		Vel = 14.36		
AH to AI	0.0 163.56	2.157 120.0 0.1897	1V 1Bvca 1Fsp	4.307 7.384 0.0	7.000 23.998 30.998	47.590 3.000 5.880		* Fixed loss = 3 Vel = 14.36		

# 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	*****
			1T 12.307						
AI to AJ	0.0 163.56	4.26 120.0 0.0069		0.0 0.0 10.000	56.470 4.331 0.069		Vel = 3.68		
AJ to AK	0.0 163.56	4.26 120.0 0.0069	1V 8.954	10.000 8.954 18.954	60.870 4.331 0.131		Vel = 3.68		
AK to AL	0.0 163.56	4.26 120.0 0.0069	5V 44.768	103.000 44.768 147.768	65.332 0.0 1.020		Vel = 3.68		
AL to AM	0.0 163.56	4.26 120.0 0.0069	1V 8.954	0.500 8.954 9.454	66.352 0.0 0.065		Vel = 3.68		
AM to TOW	0.0 163.56	4.26 120.0 0.0069	11V 98.49 2F 10.534	270.000 109.024 379.024	66.417 0.0 2.614		Vel = 3.68		
TOW to BOW	0.0 163.56	4.26 120.0 0.0069	1Bvcb 15.8 1Fsp 0.0	6.000 71.102 77.102	69.031 6.032 0.532		* Fixed loss = 3 Vel = 3.68		
BOW to BASE	0.0 163.56	4.26 120.0 0.0069	1G 2.633 1E 13.167	6.000 15.800 21.800	75.595 1.299 0.151		Vel = 3.68		
BASE to HOSE	0.0 163.56	6.16 140.0 0.0009	1G 4.304 2E 40.168	200.000 87.509 287.509	77.045 0.0 0.247		Vel = 1.76		
HOSE to TEST	100.00 263.56	12.34 140.0 0.0001	1G 9.377 1E 42.195	300.000 145.339 445.339	77.292 -0.866 0.031		Qa = 100 Vel = 0.71		
	0.0 263.56				76.457		K Factor = 30.14		