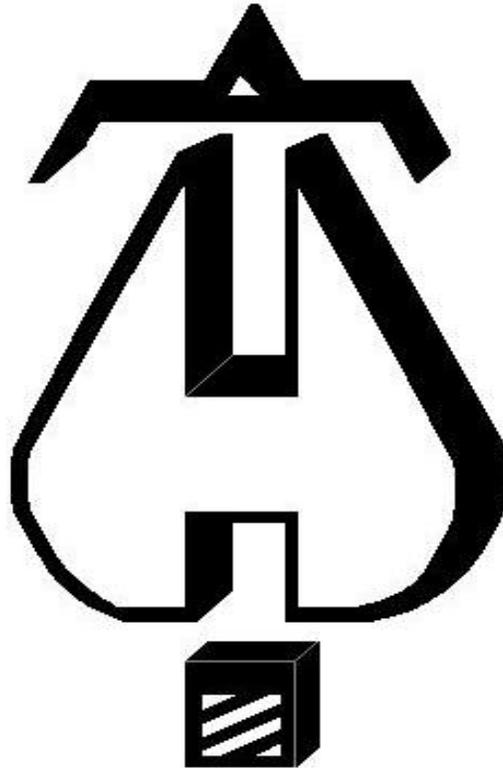




Reviewed for Code Compliance  
Inspections Division  
Approved with Conditions

Date: 10/15/13



**... 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 : Health Info Net basement office space  
Building : FP-01  
Location : Basement Office 141  
System : #2  
Contract :  
Data File : Basement.WXF



**HYDRAULIC CALCULATIONS**  
**for**

Date: 10/15/13

**Project name:** Health Info Net basement office space  
**Location:** Basement Office 141  
**Drawing no:** FP-01  
**Date:** 9-4-13

**Design**

**Remote area number:** #2  
**Remote area location:** Basement office 141  
**Occupancy classification:** Light Hazard  
**Density:** .1 - Gpm/SqFt  
**Area of application:** 1950 - SqFt  
**Coverage per sprinkler:** 196 - SqFt  
**Type of sprinklers calculated:** Quick Response Pendent Heads  
**No. of sprinklers calculated:** 17  
**In-rack demand:** n/a - GPM  
**Hose streams:** 100 - GPM  
**Total water required (including hose streams):** 486 - GPM @ 74 - Psi  
**Type of system:** Dry System  
**Volume of dry or preaction system:** 153 - Gal

**Water supply information**

**Date:** 5-17-13  
**Location:** 2" Main drain tag on riser  
**Source:** Main Tag on existing dry riser

**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  
Health Info Net basement office space

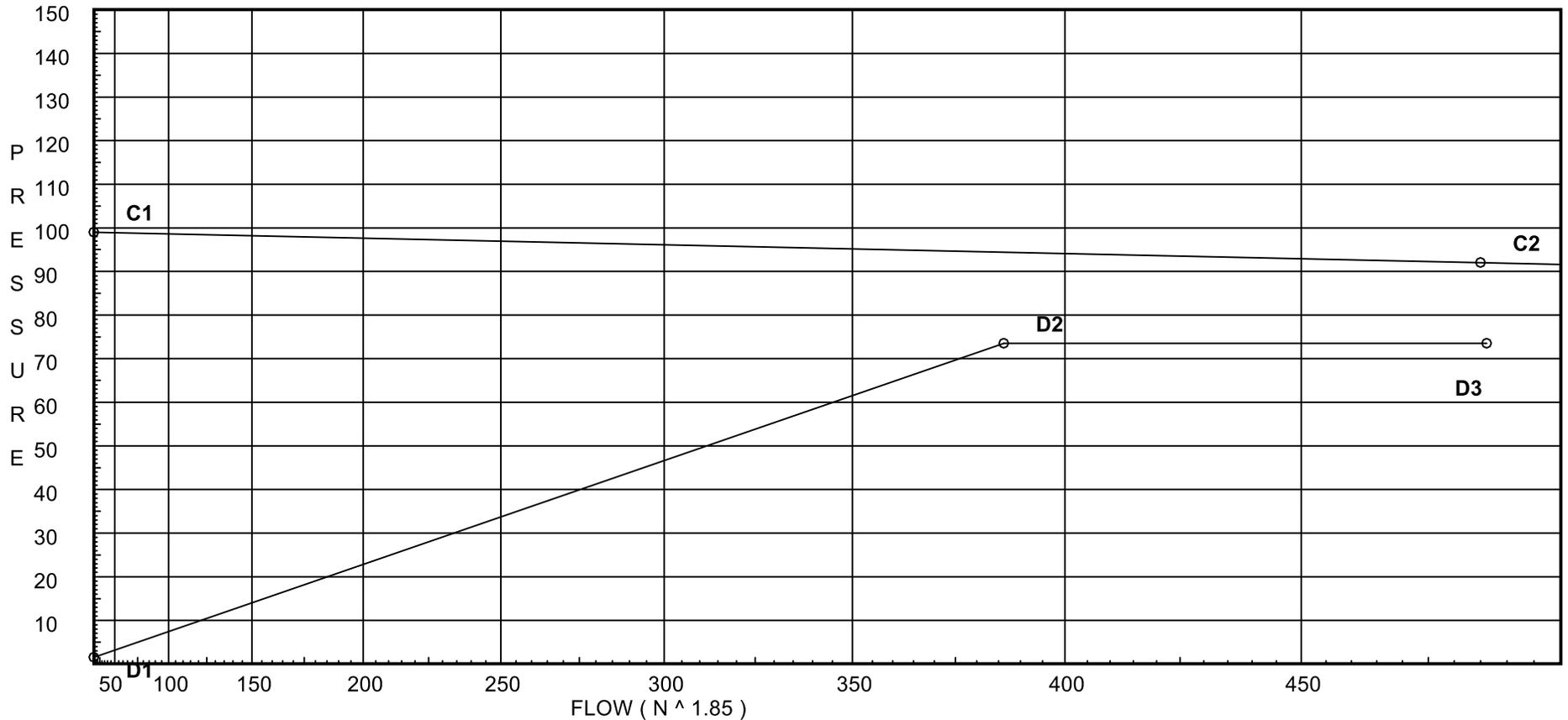


City Water Supply:  
C1 - Static Pressure : 99  
C2 - Residual Pressure: 92  
C2 - Residual Flow : 485

Demand:  
D1 - Elk  
D2 - Sy  
D2 - Sy  
D2 - Sy  
Hose ( l  
D3 - Sy  
Safety Margin : 18.459

Date: 10/15/13

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# Fittings Used Summary

High Tech Fire Protection  
Health Info Net basement office space



## 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	1	
D	Dry Rel D											28	47				4
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	2	1
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	1	8
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	6	21
V	90' EII Firelock #001	0	0	0	0	0	3.5	4.3	5	0	6.8	8.5	10	13	0	0	0

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Date: 10/15/13  
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

High Tech Fire Protection  
Health Info Net basement office space



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Date: 10/15/13

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density
DP1	-1.0	5.6	12.25	na	19.6	0.1
DP2	-1.0	5.6	12.25	na	19.6	0.1
DP3	-1.0	5.6	12.25	na	19.6	0.1
50	7.5	K = K @ EQ01	14.46	na	20.18	
51	7.5	K = K @ EQ01	14.52	na	20.22	
52	7.5	K = K @ EQ01	14.68	na	20.33	
53	7.5	K = K @ EQ01	15.19	na	20.68	
54	7.5	K = K @ EQ01	16.07	na	21.27	
55	7.5	K = K @ EQ02	16.84	na	21.62	
56	7.5	K = K @ EQ03	12.62	na	19.6	
57	7.5	K = K @ EQ03	13.55	na	20.31	
58	7.5		17.8	na		
59	7.5	K = K @ EQ03	14.56	na	21.06	
60	7.5	K = K @ EQ03	15.63	na	21.81	
61	7.5		20.48	na		
70	7.5	K = K @ EQ02	21.87	na	24.63	
71	7.5	K = K @ EQ02	21.96	na	24.68	
72	7.5	K = K @ EQ02	22.34	na	24.89	
73	7.5	K = K @ EQ02	23.02	na	25.27	
74	7.5	K = K @ EQ03	21.74	na	25.73	
75	7.5	K = K @ EQ03	22.93	na	26.42	
76	7.5		24.45	na		
77	7.5	K = K @ EQ02	27.27	na	27.5	
AA	7.5		38.73	na		
BB	7.5		41.23	na		
F	7.5		46.74	na		
G	7.5		47.18	na		
H	8.0		47.6	na		
I	8.0		52.4	na		
TOR	8.0		69.3	na	100.0	
BOR	4.0		73.51	na		

The maximum velocity is 22.72 and it occurs in the pipe between nodes BB and F

# Final Calculations - Hazen-Williams

High Tech Fire Protection  
Health Info Net basement office space



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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftg's Total	Pt Pe Pf	Pt Pv Pn	**
DP1 to EQ01	19.60 19.6	1.049 100.0 0.1757	2E 2.855 1T 3.568	4.000 6.423 10.423	12.250 -0.433 1.831		
	0.0 19.60					13.648	Vel = 7.28 K Factor = 5.31
DP2 to EQ02	19.60 19.6	1.049 100.0 0.1756	1E 1.427 2T 7.137	3.000 8.564 11.564	12.250 -0.433 2.031		
	0.0 19.60					13.848	Vel = 7.28 K Factor = 5.60 K Factor = 5.27
DP3 to EQ03	19.60 19.6	1.049 100.0 0.1756	1T 3.568	1.000 3.568 4.568	12.250 -0.433 0.802		
	0.0 19.60					12.619	Vel = 7.28 K Factor = 5.60 K Factor = 5.52
50 to 51	20.18 20.18	2.157 100.0 0.0055		10.000 0.0 10.000	14.463 0.0 0.055		K Factor @ node EQ01 Vel = 1.77
51 to 52	20.21 40.39	2.157 100.0 0.0200		8.100 0.0 8.100	14.518 0.0 0.162		K Factor @ node EQ01 Vel = 3.55
52 to 53	20.33 60.72	2.157 100.0 0.0425		12.000 0.0 12.000	14.680 0.0 0.510		K Factor @ node EQ01 Vel = 5.33
53 to 54	20.68 81.4	2.157 100.0 0.0731		12.000 0.0 12.000	15.190 0.0 0.877		K Factor @ node EQ01 Vel = 7.15
54 to 55	21.26 102.66	2.157 100.0 0.1123		6.900 0.0 6.900	16.067 0.0 0.775		K Factor @ node EQ01 Vel = 9.01
55 to 58	21.62 124.28	2.157 100.0 0.1600		6.000 0.0 6.000	16.842 0.0 0.960		K Factor @ node EQ02 Vel = 10.91
	0.0 124.28					17.802	K Factor = 29.46
56 to 57	19.60 19.6	1.049 100.0 0.1757		5.300 0.0 5.300	12.619 0.0 0.931		K Factor @ node EQ03 Vel = 7.28
57 to 58	20.31 39.91	1.049 100.0 0.6547	1E 1.427 1T 3.568	1.500 4.995 6.495	13.550 0.0 4.252		K Factor @ node EQ03 Vel = 14.82
58 to 61	124.28 164.19	2.157 100.0 0.2677		10.000 0.0 10.000	17.802 0.0 2.677		Vel = 14.42
	0.0 164.19					20.479	K Factor = 36.28
59 to 60	21.06 21.06	1.049 100.0 0.2004		5.300 0.0 5.300	14.564 0.0 1.062		K Factor @ node EQ03 Vel = 7.82

Date: 10/15/13

# Final Calculations - Hazen-Williams

High Tech Fire Protection  
Health Info Net basement office space



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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftnng's Total	Pt Pe Pf	Pt Pv Pn	**
								Date: 10/15/13
60 to 61	21.81 42.87	1.049 100.0 0.7472	1E 1T	1.427 3.568 0.0	1.500 4.995 6.495	15.626 0.0 4.853		K Factor @ node EQ03 Vel = 15.91
61 to AA	164.19 207.06	2.157 100.0 0.4112	1T	8.783 0.0 0.0	35.600 8.783 44.383	20.479 0.0 18.250		Vel = 18.18
						0.0 207.06	38.729	K Factor = 33.27
70 to 71	24.63 24.63	2.157 100.0 0.0080		0.0 0.0 0.0	12.000 0.0 12.000	21.868 0.0 0.096		K Factor @ node EQ02 Vel = 2.16
71 to 72	24.68 49.31	2.157 100.0 0.0289		0.0 0.0 0.0	13.000 0.0 13.000	21.964 0.0 0.376		K Factor @ node EQ02 Vel = 4.33
72 to 73	24.90 74.21	2.157 100.0 0.0616		0.0 0.0 0.0	11.000 0.0 11.000	22.340 0.0 0.678		K Factor @ node EQ02 Vel = 6.52
73 to 76	25.27 99.48	2.157 100.0 0.1059		0.0 0.0 0.0	13.500 0.0 13.500	23.018 0.0 1.430		K Factor @ node EQ02 Vel = 8.73
						0.0 99.48	24.448	K Factor = 20.12
74 to 76	25.73 25.73	1.049 100.0 0.2905	1T	3.568 0.0 0.0	5.750 3.568 9.318	21.741 0.0 2.707		K Factor @ node EQ03 Vel = 9.55
						0.0 25.73	24.448	K Factor = 5.20
75 to 76	26.42 26.42	1.049 100.0 0.3052	1T	3.568 0.0 0.0	1.400 3.568 4.968	22.932 0.0 1.516		K Factor @ node EQ03 Vel = 9.81
76 to 77	125.21 151.63	2.157 100.0 0.2311		0.0 0.0 0.0	12.200 0.0 12.200	24.448 0.0 2.819		Vel = 13.31
77 to BB	27.50 179.13	2.157 100.0 0.3145	1T	8.783 0.0 0.0	35.600 8.783 44.383	27.267 0.0 13.960		K Factor @ node EQ02 Vel = 15.73
						0.0 179.13	41.227	K Factor = 27.90
AA to BB	207.06 207.06	2.635 100.0 0.1552		0.0 0.0 0.0	16.100 0.0 16.100	38.729 0.0 2.498		Vel = 12.18
BB to F	179.13 386.19	2.635 100.0 0.4915	1V	4.213 0.0 0.0	7.000 4.213 11.213	41.227 0.0 5.511		Vel = 22.72
F to G	0.0 386.19	4.26 100.0 0.0473	1V	6.39 0.0 0.0	3.000 6.390 9.390	46.738 0.0 0.444		Vel = 8.69

# Final Calculations - Hazen-Williams

High Tech Fire Protection  
Health Info Net basement office space



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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	**
G	0.0	4.26	1E	9.397	4.000	47.182		
to		100.0		0.0	9.397	-0.217		
H	386.19	0.0474		0.0	13.397	0.635		Vel = 8.69
H	0.0	4.26	1F	3.759	72.000	47.600		
to		100.0	4V	25.561	29.320	0.0		
I	386.19	0.0474		0.0	101.320	4.800		Vel = 8.69
I	0.0	4.26	12V	76.682	280.000	52.400		
to		100.0		0.0	76.682	0.0		
TOR	386.19	0.0474		0.0	356.682	16.895		Vel = 8.69
TOR	100.00	4.026	1D	19.984	6.000	69.295		Qa = 100
to		100.0		0.0	19.984	1.732		
BOR	486.19	0.0955		0.0	25.984	2.482		Vel = 12.25
	0.0							
	486.19					73.509		K Factor = 56.71

Date: 10/15/13