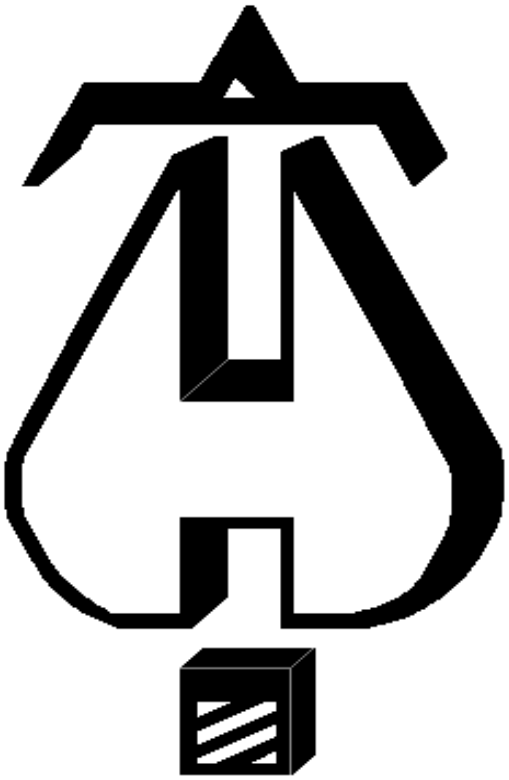


. . . Fire Protection by Computer Design

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

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

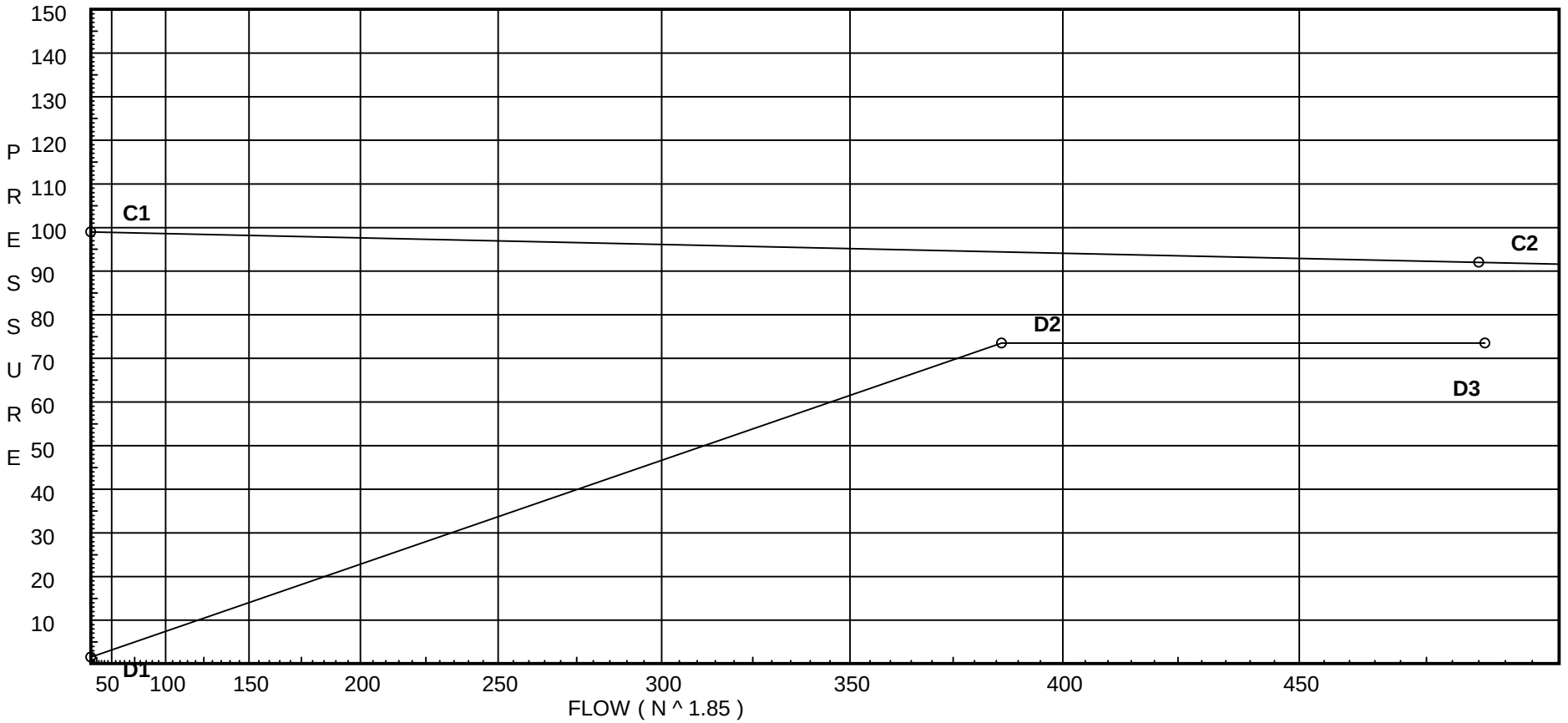
Water supply information

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.)

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

Demand:
- D1 - Elevation : 1.516
- D2 - System Flow : 386.186
- D2 - System Pressure : 73.509
- Hose (Demand) : 100
- D3 - System Demand : 486.186
- Safety Margin : 18.459



Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
D	Dry Rel D										28		47								
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
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	5.6	12.25	na	19.6	0.1	196	7.0
DP2	-1.0	5.6	12.25	na	19.6	0.1	196	7.0
DP3	-1.0	5.6	12.25	na	19.6	0.1	196	7.0
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

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	19.60	1.049	2E	2.855	4.000	12.250		K Factor = 5.60
to		100.0	1T	3.568	6.423	-0.433		
EQ01	19.6	0.1757		0.0	10.423	1.831		Vel = 7.28
	0.0							
	19.60					13.648		K Factor = 5.31
DP2	19.60	1.049	1E	1.427	3.000	12.250		K Factor = 5.60
to		100.0	2T	7.137	8.564	-0.433		
EQ02	19.6	0.1756		0.0	11.564	2.031		Vel = 7.28
	0.0							
	19.60					13.848		K Factor = 5.27
DP3	19.60	1.049	1T	3.568	1.000	12.250		K Factor = 5.60
to		100.0		0.0	3.568	-0.433		
EQ03	19.6	0.1756		0.0	4.568	0.802		Vel = 7.28
	0.0							
	19.60					12.619		K Factor = 5.52
50	20.18	2.157		0.0	10.000	14.463		K Factor @ node EQ01
to		100.0		0.0	0.0	0.0		
51	20.18	0.0055		0.0	10.000	0.055		Vel = 1.77
51	20.21	2.157		0.0	8.100	14.518		K Factor @ node EQ01
to		100.0		0.0	0.0	0.0		
52	40.39	0.0200		0.0	8.100	0.162		Vel = 3.55
52	20.33	2.157		0.0	12.000	14.680		K Factor @ node EQ01
to		100.0		0.0	0.0	0.0		
53	60.72	0.0425		0.0	12.000	0.510		Vel = 5.33
53	20.68	2.157		0.0	12.000	15.190		K Factor @ node EQ01
to		100.0		0.0	0.0	0.0		
54	81.4	0.0731		0.0	12.000	0.877		Vel = 7.15
54	21.26	2.157		0.0	6.900	16.067		K Factor @ node EQ01
to		100.0		0.0	0.0	0.0		
55	102.66	0.1123		0.0	6.900	0.775		Vel = 9.01
55	21.62	2.157		0.0	6.000	16.842		K Factor @ node EQ02
to		100.0		0.0	0.0	0.0		
58	124.28	0.1600		0.0	6.000	0.960		Vel = 10.91
	0.0							
	124.28					17.802		K Factor = 29.46
56	19.60	1.049		0.0	5.300	12.619		K Factor @ node EQ03
to		100.0		0.0	0.0	0.0		
57	19.6	0.1757		0.0	5.300	0.931		Vel = 7.28
57	20.31	1.049	1E	1.427	1.500	13.550		K Factor @ node EQ03
to		100.0	1T	3.568	4.995	0.0		
58	39.91	0.6547		0.0	6.495	4.252		Vel = 14.82
58	124.28	2.157		0.0	10.000	17.802		
to		100.0		0.0	0.0	0.0		
61	164.19	0.2677		0.0	10.000	2.677		Vel = 14.42
	0.0							
	164.19					20.479		K Factor = 36.28
59	21.06	1.049		0.0	5.300	14.564		K Factor @ node EQ03
to		100.0		0.0	0.0	0.0		
60	21.06	0.2004		0.0	5.300	1.062		Vel = 7.82

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

Final Calculations - Hazen-Williams

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*******	Notes	******
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		