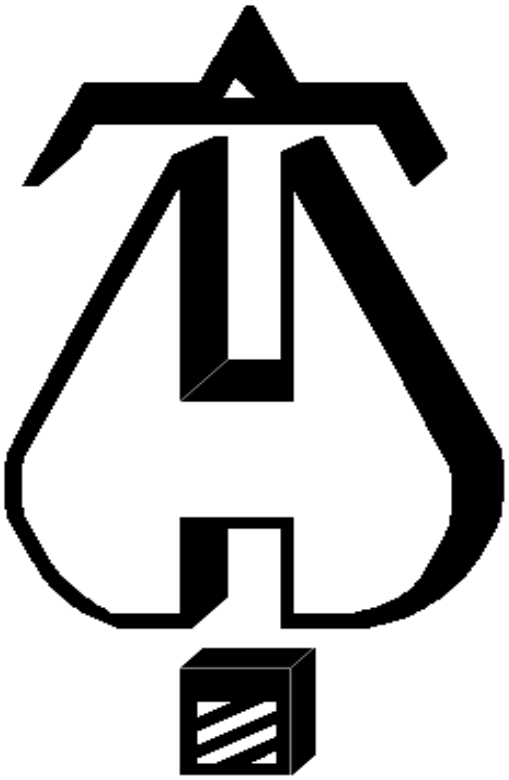


. . . Fire Protection by Computer Design

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 1st floor office space
Building	:	FP-01
Location	:	1st Floor Office Space
System	:	#1
Contract	:	
Data File	:	1st floor.WXF

HYDRAULIC CALCULATIONS
for

Project name: Health Info Net 1st floor office space
Location: 1st Floor Office Space
Drawing no: FP-01
Date: 9-03-13

Design

Remote area number: #1
Remote area location: 1st Floor Office Space 111
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: 21
In-rack demand: N/A - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 521 - GPM @ 71 - Psi
Type of system: Dry system
Volume of dry or preaction system: 153 - Gal

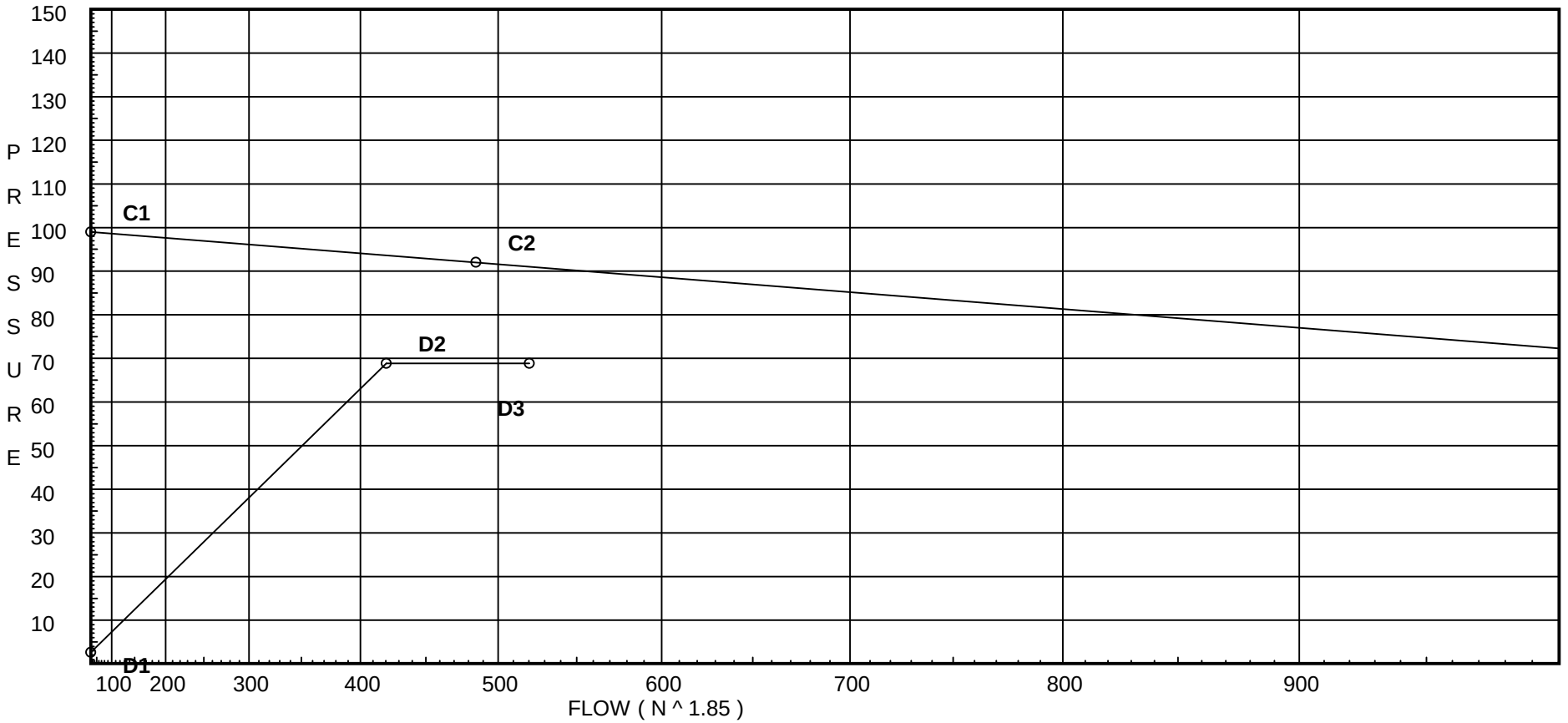
Water supply information

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 : 2.599
- D2 - System Flow : 420.395
- D2 - System Pressure : 68.851
- Hose (Demand) : 100
- D3 - System Demand : 520.395
- Safety Margin : 22.175



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
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

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
10	10.0	K = K @ EQ02	13.58	na	19.6			
11	10.0	K = K @ EQ02	13.66	na	19.65			
12	10.0	K = K @ EQ02	13.78	na	19.74			
13	10.0	K = K @ EQ02	14.02	na	19.91			
14	10.0	K = K @ EQ02	14.85	na	20.49			
15	10.0	K = K @ EQ02	15.67	na	21.05			
16	10.0	K = K @ EQ02	17.07	na	21.97			
20	10.0	K = K @ EQ01	15.21	na	21.03			
21	10.0	K = K @ EQ01	15.29	na	21.09			
22	10.0	K = K @ EQ01	15.59	na	21.3			
23	10.0	K = K @ EQ01	16.14	na	21.67			
24	10.0	K = K @ EQ01	16.52	na	21.92			
25	10.0	K = K @ EQ03	16.53	na	21.44			
26	10.0	K = K @ EQ01	16.76	na	22.08			
30	10.0	K = K @ EQ01	14.83	na	20.77			
31	10.0	K = K @ EQ01	14.9	na	20.82			
32	10.0	K = K @ EQ01	15.11	na	20.97			
33	10.0	K = K @ EQ01	15.57	na	21.28			
34	10.0	K = K @ EQ01	16.3	na	21.78			
35	10.0	K = K @ EQ01	16.43	na	21.86			
A	10.0		17.19	na				
B	10.0		17.4	na				
C	10.0		18.05	na				
D	10.0		20.22	na				
E	10.0		32.01	na				
F	7.5		37.87	na				
G	7.5		38.4	na				
H	7.5		39.14	na				
I	7.5		44.75	na				
TOR	7.5		64.52	na	100.0			
BOR	4.0		68.85	na				

The maximum velocity is 16.16 and it occurs in the pipe between nodes C and D

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	1.500	12.250		K Factor = 5.60
to		100.0	1T	3.568	6.423	-0.433		
EQ01	19.6	0.1756		0.0	7.923	1.391		Vel = 7.28
	0.0							
	19.60					13.208		K Factor = 5.39
DP2	19.60	1.049	1E	1.427	1.500	12.250		K Factor = 5.60
to		100.0	2T	7.137	8.564	-0.433		
EQ02	19.6	0.1757		0.0	10.064	1.768		Vel = 7.28
	0.0							
	19.60					13.585		K Factor = 5.32
DP3	19.60	1.049	2E	2.855	5.000	12.250		K Factor = 5.60
to		100.0	1T	3.568	6.423	-0.433		
EQ03	19.6	0.1756		0.0	11.423	2.006		Vel = 7.28
	0.0							
	19.60					13.823		K Factor = 5.27
10	19.60	2.157		0.0	13.750	13.585		K Factor @ node EQ02
to		100.0		0.0	0.0	0.0		
11	19.6	0.0052		0.0	13.750	0.072		Vel = 1.72
11	19.65	2.157		0.0	6.500	13.657		K Factor @ node EQ02
to		100.0		0.0	0.0	0.0		
12	39.25	0.0189		0.0	6.500	0.123		Vel = 3.45
12	19.74	2.157		0.0	6.000	13.780		K Factor @ node EQ02
to		100.0		0.0	0.0	0.0		
13	58.99	0.0403		0.0	6.000	0.242		Vel = 5.18
13	19.92	2.157		0.0	12.000	14.022		K Factor @ node EQ02
to		100.0		0.0	0.0	0.0		
14	78.91	0.0690		0.0	12.000	0.828		Vel = 6.93
14	20.49	2.157		0.0	7.750	14.850		K Factor @ node EQ02
to		100.0		0.0	0.0	0.0		
15	99.4	0.1058		0.0	7.750	0.820		Vel = 8.73
15	21.05	2.157	1T	8.783	1.300	15.670		K Factor @ node EQ02
to		100.0		0.0	8.783	0.0		
A	120.45	0.1509		0.0	10.083	1.522		Vel = 10.58
	0.0							
	120.45					17.192		K Factor = 29.05
16	21.97	2.157	1T	8.783	10.000	17.070		K Factor @ node EQ02
to		100.0		0.0	8.783	0.0		
A	21.97	0.0065		0.0	18.783	0.122		Vel = 1.93
	0.0							
	21.97					17.192		K Factor = 5.30
20	21.03	2.157		0.0	14.000	15.206		K Factor @ node EQ01
to		100.0		0.0	0.0	0.0		
21	21.03	0.0060		0.0	14.000	0.084		Vel = 1.85
21	21.09	2.157		0.0	14.000	15.290		K Factor @ node EQ01
to		100.0		0.0	0.0	0.0		
22	42.12	0.0216		0.0	14.000	0.302		Vel = 3.70
22	21.29	2.157		0.0	12.000	15.592		K Factor @ node EQ01
to		100.0		0.0	0.0	0.0		
23	63.41	0.0461		0.0	12.000	0.553		Vel = 5.57

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
23	21.67	2.157	1T	8.783	7.100	16.145		K Factor @ node EQ01
to		100.0		0.0	8.783	0.0		
B	85.08	0.0793		0.0	15.883	1.260		Vel = 7.47
	0.0							
	85.08					17.405		K Factor = 20.39
24	21.92	2.157		0.0	2.300	16.520		K Factor @ node EQ01
to		100.0		0.0	0.0	0.0		
25	21.92	0.0061		0.0	2.300	0.014		Vel = 1.92
25	21.44	2.157		0.0	9.750	16.534		K Factor @ node EQ03
to		100.0		0.0	0.0	0.0		
26	43.36	0.0229		0.0	9.750	0.223		Vel = 3.81
26	22.07	2.157	1T	8.783	4.500	16.757		K Factor @ node EQ01
to		100.0		0.0	8.783	0.0		
B	65.43	0.0488		0.0	13.283	0.648		Vel = 5.74
	0.0							
	65.43					17.405		K Factor = 15.68
30	20.77	2.157		0.0	11.600	14.830		K Factor @ node EQ01
to		100.0		0.0	0.0	0.0		
31	20.77	0.0058		0.0	11.600	0.067		Vel = 1.82
31	20.81	2.157		0.0	10.200	14.897		K Factor @ node EQ01
to		100.0		0.0	0.0	0.0		
32	41.58	0.0211		0.0	10.200	0.215		Vel = 3.65
32	20.97	2.157		0.0	10.200	15.112		K Factor @ node EQ01
to		100.0		0.0	0.0	0.0		
33	62.55	0.0450		0.0	10.200	0.459		Vel = 5.49
33	21.28	2.157		0.0	9.500	15.571		K Factor @ node EQ01
to		100.0		0.0	0.0	0.0		
34	83.83	0.0772		0.0	9.500	0.733		Vel = 7.36
34	21.77	2.157	1T	8.783	6.000	16.304		K Factor @ node EQ01
to		100.0		0.0	8.783	0.0		
C	105.6	0.1183		0.0	14.783	1.749		Vel = 9.27
	0.0							
	105.60					18.053		K Factor = 24.85
35	21.86	1.049	1T	3.568	4.000	16.427		K Factor @ node EQ01
to		100.0		0.0	3.568	0.0		
C	21.86	0.2149		0.0	7.568	1.626		Vel = 8.12
	0.0							
	21.86					18.053		K Factor = 5.14
A	142.42	3.26		0.0	7.750	17.192		
to		100.0		0.0	0.0	0.0		
B	142.42	0.0275		0.0	7.750	0.213		Vel = 5.47
B	150.51	3.26		0.0	6.200	17.405		
to		100.0		0.0	0.0	0.0		
C	292.93	0.1045		0.0	6.200	0.648		Vel = 11.26
C	127.47	3.26	1E	6.714	3.900	18.053		
to		100.0		0.0	6.714	0.0		
D	420.4	0.2040		0.0	10.614	2.165		Vel = 16.16

Final Calculations - Hazen-Williams

High Tech Fire Protection
Health Info Net 1st floor office space

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
D	0.0	3.26	1V	4.796	53.000	20.218		
to		100.0		0.0	4.795	0.0		
E	420.4	0.2040		0.0	57.795	11.788		Vel = 16.16
E	0.0	3.26	1X	12.469	11.000	32.006		
to		100.0		0.0	12.469	1.083		
F	420.4	0.2039		0.0	23.469	4.786		Vel = 16.16
F	0.0	4.26	1V	6.39	3.000	37.875		
to		100.0		0.0	6.390	0.0		
G	420.4	0.0554		0.0	9.390	0.520		Vel = 9.46
G	0.0	4.26	1E	9.397	4.000	38.395		
to		100.0		0.0	9.397	0.0		
H	420.4	0.0555		0.0	13.397	0.743		Vel = 9.46
H	0.0	4.26	1F	3.759	72.000	39.138		
to		100.0	4V	25.561	29.320	0.0		
I	420.4	0.0554		0.0	101.320	5.615		Vel = 9.46
I	0.0	4.26	12V	76.682	280.000	44.753		
to		100.0		0.0	76.682	0.0		
TOR	420.4	0.0554		0.0	356.682	19.768		Vel = 9.46
TOR	100.00	4.026	1D	19.984	6.000	64.521		Qa = 100
to		100.0		0.0	19.984	1.516		
BOR	520.4	0.1083		0.0	25.984	2.814		Vel = 13.12
	0.0							
	520.40					68.851		K Factor = 62.72