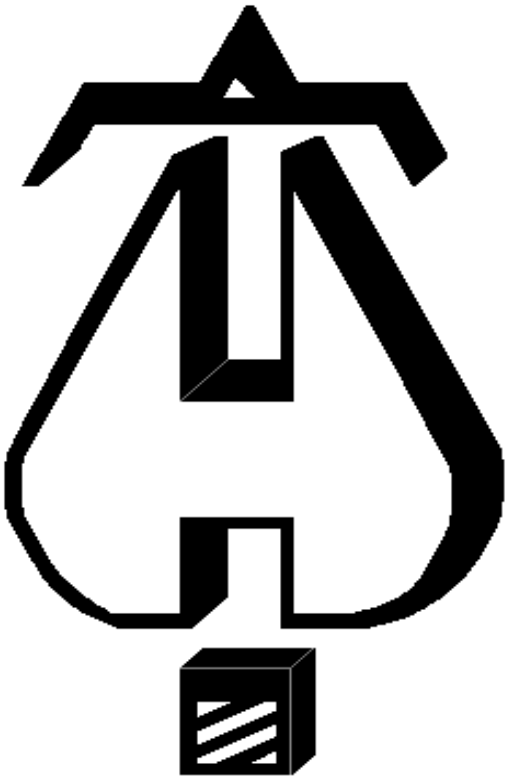


. . . Fire Protection by Computer Design

HIGH TECH FIRE PROTECTION
84 HACKETT MILLS ROAD
P.O. BOX 156
POLAND, ME 04274
207-998-2551

Job Name	:	Clark Insurance conditioned attic #2
Drawing	:	FP-01
Location	:	1945 Congress Street
Remote Area	:	#2
Contract	:	
Data File	:	Wet Attic.WXF

HYDRAULIC CALCULATIONS
for

Project name: Clark Insurance conditioned attic
Location: 1945 Congress Street
Drawing no: FP-01
Date: 8/18/17

Design

Remote area number: #2
Remote area location: Conditioned attic space
Occupancy classification: Light Hazard
Density: .1 - Gpm/SqFt
Area of application: 5-head spec - SqFt
Coverage per sprinkler: 240 - SqFt
Type of sprinklers calculated: back to back attic heads
No. of sprinklers calculated: 5
In-rack demand: n/a - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 223 - GPM @ 61 - Psi
Type of system: Wet System
Volume of dry or preaction system: n/a - Gal

Water supply information

Date: 8-11-17
Location: Corner of Congress St and International Parkway
Source: Portland Water District

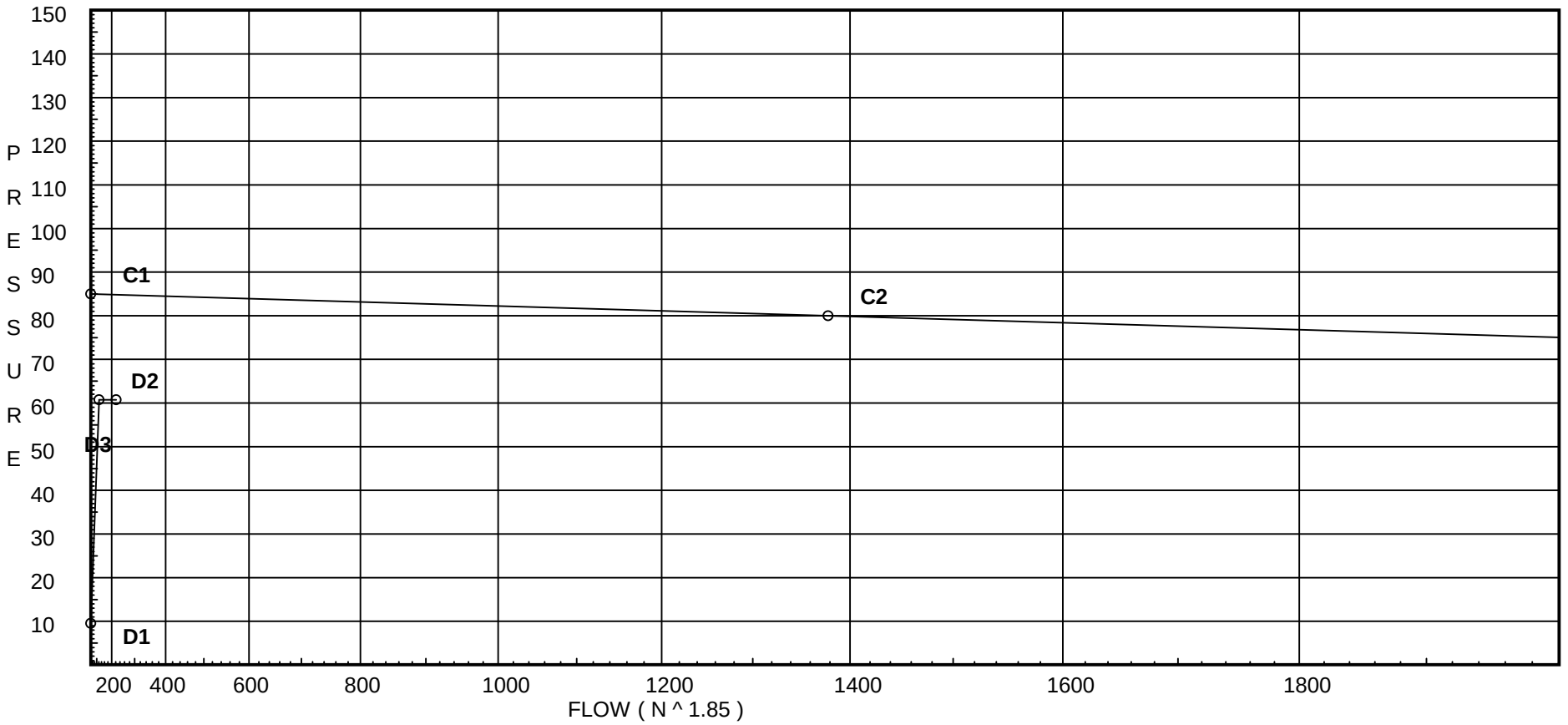
Name of contractor: HIGH TECH FIRE PROTECTION
Address: 84 HACKETT MILLS ROAD / P.O. BOX 156 / POLAND, ME 04274
Phone number: 207-998-2551
Name of designer: Ed Poulin
Authority having jurisdiction: State of Maine / City of Portland
Notes: (Include peaking information or gridded systems here.)

Water Supply Curve (C)

HIGH TECH FIRE PROTECTION
Clark Insurance conditioned attic #2

City Water Supply:
- C1 - Static Pressure : 85
- C2 - Residual Pressure: 80
- C2 - Residual Flow : 1378

Demand:
- D1 - Elevation : 9.528
- D2 - System Flow : 122.8
- D2 - System Pressure : 60.715
- Hose (Demand) : 100
- D3 - System Demand : 222.8
- Safety Margin : 24.114



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
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	1	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
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	3.5	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	8	8.5	10.8	13	0	16	21	25	33	0	0	0	0	0	0	0
Zia	Wilkins 350	Fitting generates a Fixed Loss Based on Flow																			

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

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
DP1	-1.0	8	10.3	na	25.67	0.1	256	10.3
200	35.0	5.6	18.4	na	24.02	0.1	240	18.4
201	35.0	5.6	18.5	na	24.08	0.1	240	18.4
202	35.0	5.6	18.85	na	24.31	0.1	240	18.4
203	35.0	5.6	19.6	na	24.79	0.1	240	18.4
204	35.0	5.6	20.89	na	25.59	0.1	240	18.4
205	35.0		27.57	na				
206	25.0		39.36	na				
207	25.0		40.1	na				
208	15.0		45.06	na				
209	15.0		46.74	na				
210	10.0		49.36	na				
AI	10.0		50.58	na				
TOR	10.0		52.25	na				
FLW	5.0		57.63	na				
BOR	0.0		66.07	na				
H1	0.0		66.2	na				
H2	0.0		66.22	na				
H3	0.0		66.23	na	100.0			
TEST	13.0		60.71	na				

The maximum velocity is 17.73 and it occurs in the pipe between nodes 204 and 205

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	25.67	1.049	1T	5.0	1.000	10.300		K Factor = 8.00
to		120.0		0.0	5.000	-0.433		
EQ01	25.67	0.2065		0.0	6.000	1.239		Vel = 9.53
	0.0							
	25.67					11.106		K Factor = 7.70
200	24.02	1.682		0.0	5.300	18.400		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
201	24.02	0.0183		0.0	5.300	0.097		Vel = 3.47
201	24.09	1.682		0.0	5.300	18.497		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
202	48.11	0.0662		0.0	5.300	0.351		Vel = 6.95
202	24.31	1.682		0.0	5.300	18.848		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
203	72.42	0.1411		0.0	5.300	0.748		Vel = 10.46
203	24.79	1.682		0.0	5.300	19.596		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
204	97.21	0.2432		0.0	5.300	1.289		Vel = 14.04
204	25.59	1.682	1V	4.331	13.500	20.885		K Factor = 5.60
to		120.0		0.0	4.331	0.0		
205	122.8	0.3749		0.0	17.831	6.685		Vel = 17.73
205	0.0	1.682	1X	9.9	10.000	27.570		
to		120.0		0.0	9.900	4.331		
206	122.8	0.3749		0.0	19.900	7.460		Vel = 17.73
206	0.0	2.635	1V	5.903	11.600	39.361		
to		120.0		0.0	5.903	0.0		
207	122.8	0.0421		0.0	17.503	0.737		Vel = 7.22
207	0.0	2.635	1V	5.903	9.000	40.098		
to		120.0		0.0	5.903	4.331		
208	122.8	0.0421		0.0	14.903	0.628		Vel = 7.22
208	0.0	2.635	1V	5.903	34.000	45.057		
to		120.0		0.0	5.903	0.0		
209	122.8	0.0421		0.0	39.903	1.681		Vel = 7.22
209	0.0	2.635	1V	5.903	5.000	46.738		
to		120.0		0.0	5.903	2.166		
210	122.8	0.0420		0.0	10.903	0.458		Vel = 7.22
210	0.0	2.635	1X	14.827	14.000	49.362		
to		120.0		0.0	14.827	0.0		
AI	122.8	0.0421		0.0	28.827	1.215		Vel = 7.22
	0.0							
	122.80					50.577		K Factor = 17.27
AI	122.80	2.635	2V	11.807	28.000	50.577		
to		120.0		0.0	11.807	0.0		
TOR	122.8	0.0421		0.0	39.807	1.676		Vel = 7.22
TOR	0.0	2.635	1Fsp	0.0	5.000	52.253		
to		120.0		0.0	0.0	5.166		* Fixed loss = 3
FLW	122.8	0.0420		0.0	5.000	0.210		Vel = 7.22
FLW	0.0	2.635	1Zia	0.0	1.000	57.629		
to		120.0		0.0	0.0	8.394		* Fixed loss = 6.229
BOR	122.8	0.0430		0.0	1.000	0.043		Vel = 7.22

Final Calculations - Hazen-Williams

HIGH TECH FIRE PROTECTION
Clark Insurance conditioned attic #2

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
BOR	0.0	6.16	1F	10.042	250.000	66.066		
to		140.0	1G	4.304	14.346	0.0		
H1	122.8	0.0005		0.0	264.346	0.133		Vel = 1.32
H1	0.0	8.27	1T	55.354	140.000	66.199		
to		140.0	1G	6.326	61.680	0.0		
H2	122.8	0.0001		0.0	201.680	0.025		Vel = 0.73
H2	0.0	12.34	1T	93.767	95.000	66.224		
to		140.0		0.0	93.767	0.0		
H3	122.8	0.0		0.0	188.767	0.003		Vel = 0.33
H3	100.00	6.16	1G	4.304	10.000	66.227		Qa = 100
to		140.0	1E	20.084	67.425	-5.630		
TEST	222.8	0.0015	1T	43.037	77.425	0.118		Vel = 2.40
	0.0							
	222.80					60.715		K Factor = 28.59