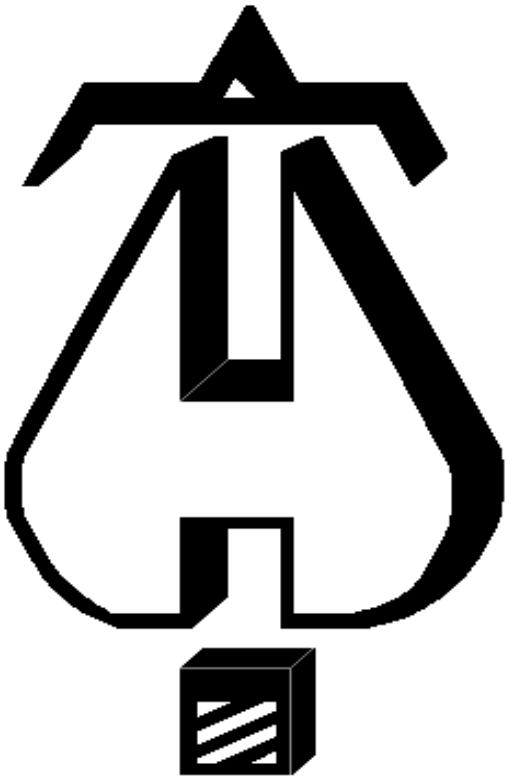


. . . Fire Protection by Computer Design

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

Job Name	:	Clark Insurance fitness room #1
Drawing	:	FP-01
Location	:	1945 Congress Street
Remote Area	:	#1
Contract	:	
Data File	:	Fitness Room 1.WXF

HYDRAULIC CALCULATIONS
for

Project name: Clark Insurance fitness room
Location: 1945 Congress Street
Drawing no: FP-01
Date: 8/14/17

Design

Remote area number: #1
Remote area location: Fitness Room
Occupancy classification: Light Hazard
Density: .1 - Gpm/SqFt
Area of application: 5-head spec - SqFt
Coverage per sprinkler: 324 - SqFt
Type of sprinklers calculated: extended coverage pendents
No. of sprinklers calculated: 5
In-rack demand: n/a - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 270 - GPM @ 74 - 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.)

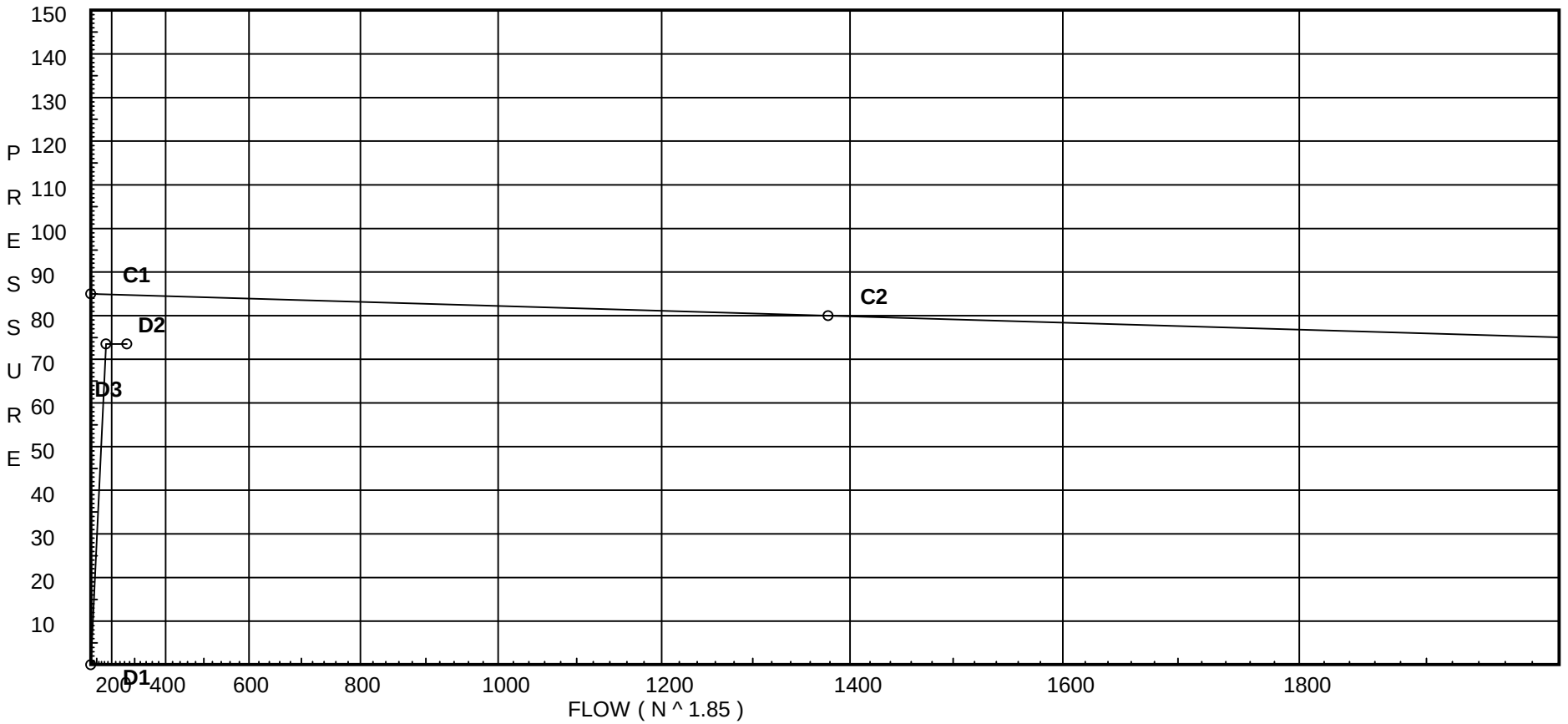
Water Supply Curve (C)

HIGH TECH FIRE PROTECTION
Clark Insurance fitness room #1

Date 8/18/17

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

Demand:
- D1 - Elevation : -1.299
- D2 - System Flow : 169.416
- D2 - System Pressure : 73.496
- Hose (Demand) : 100
- D3 - System Demand : 269.416
- Safety Margin : 11.259



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	16.6	na	32.59	0.1	324	16.6
100	10.0	K = K @ EQ01	31.26	na	32.59			
101	10.0	K = K @ EQ01	31.78	na	32.86			
102	10.0	K = K @ EQ01	33.65	na	33.82			
110	10.0	K = K @ EQ01	35.9	na	34.93			
111	10.0	K = K @ EQ01	36.49	na	35.21			
112	10.0		38.62	na				
AA	10.0		43.41	na				
AB	10.0		43.75	na				
AC	10.0		45.42	na				
AD	12.0		45.16	na				
AE	12.0		45.84	na				
AF	10.0		47.31	na				
AG	10.0		48.67	na				
AH	10.0		55.57	na				
AI	10.0		61.14	na				
TOR	10.0		64.18	na				
FLW	5.0		69.73	na				
BOR	0.0		78.67	na				
H1	0.0		78.91	na				
H2	0.0		78.95	na				
H3	0.0		78.96	na	100.0			
TEST	13.0		73.5	na				

The maximum velocity is 14.33 and it occurs in the pipe between nodes 102 and AA

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	32.59	1.049	2T	10.0	37.000	16.600		K Factor = 8.00
to		120.0		0.0	10.000	-0.433		
EQ01	32.59	0.3212		0.0	47.000	15.097		Vel = 12.10
	0.0							
	32.59					31.264		K Factor = 5.83
100	32.59	1.682		0.0	16.000	31.264		K Factor @ node EQ01
to		120.0		0.0	0.0	0.0		
101	32.59	0.0322		0.0	16.000	0.516		Vel = 4.71
101	32.87	1.682		0.0	16.000	31.780		K Factor @ node EQ01
to		120.0		0.0	0.0	0.0		
102	65.46	0.1170		0.0	16.000	1.872		Vel = 9.45
102	33.81	1.682	2V	8.662	20.000	33.652		K Factor @ node EQ01
to		120.0	1T	9.9	18.562	0.0		
AA	99.27	0.2529		0.0	38.562	9.754		Vel = 14.33
	0.0							
	99.27					43.406		K Factor = 15.07
110	34.93	1.682		0.0	16.000	35.903		K Factor @ node EQ01
to		120.0		0.0	0.0	0.0		
111	34.93	0.0366		0.0	16.000	0.586		Vel = 5.04
111	35.21	1.682		0.0	16.000	36.489		K Factor @ node EQ01
to		120.0		0.0	0.0	0.0		
112	70.14	0.1331		0.0	16.000	2.129		Vel = 10.13
112	0.0	1.682	2V	8.662	20.000	38.618		
to		120.0	1T	9.9	18.562	0.0		
AB	70.14	0.1330		0.0	38.562	5.129		Vel = 10.13
	0.0							
	70.14					43.747		K Factor = 10.60
AA	99.27	2.635		0.0	12.000	43.406		
to		120.0		0.0	0.0	0.0		
AB	99.27	0.0284		0.0	12.000	0.341		Vel = 5.84
AB	70.15	2.635	1V	5.903	16.000	43.747		
to		120.0		0.0	5.903	0.0		
AC	169.42	0.0764		0.0	21.903	1.673		Vel = 9.97
AC	0.0	2.635	1V	5.903	2.000	45.420		
to		120.0		0.0	5.903	-0.866		
AD	169.42	0.0764		0.0	7.903	0.604		Vel = 9.97
AD	0.0	2.635	1V	5.903	3.000	45.158		
to		120.0		0.0	5.903	0.0		
AE	169.42	0.0764		0.0	8.903	0.680		Vel = 9.97
AE	0.0	2.635	1V	5.903	2.000	45.838		
to		120.0		0.0	5.903	0.866		
AF	169.42	0.0764		0.0	7.903	0.604		Vel = 9.97
AF	0.0	2.635	1X	14.827	3.000	47.308		
to		120.0		0.0	14.827	0.0		
AG	169.42	0.0764		0.0	17.827	1.362		Vel = 9.97
AG	0.0	2.635	1X	14.827	75.500	48.670		
to		120.0		0.0	14.827	0.0		
AH	169.42	0.0764		0.0	90.327	6.899		Vel = 9.97

Final Calculations - Hazen-Williams

HIGH TECH FIRE PROTECTION
Clark Insurance fitness room #1

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
AH	0.0	2.635	1V	5.903	67.000	55.569		
to		120.0		0.0	5.903	0.0		
AI	169.42	0.0764		0.0	72.903	5.569		Vel = 9.97
AI	0.0	2.635	2V	11.807	28.000	61.138		
to		120.0		0.0	11.807	0.0		
TOR	169.42	0.0764		0.0	39.807	3.041		Vel = 9.97
TOR	0.0	2.635	1Fsp	0.0	5.000	64.179		
to		120.0		0.0	0.0	5.166		* Fixed loss = 3
FLW	169.42	0.0762		0.0	5.000	0.381		Vel = 9.97
FLW	0.0	2.635	1Zia	0.0	1.000	69.726		
to		120.0		0.0	0.0	8.863		* Fixed loss = 6.698
BOR	169.42	0.0770		0.0	1.000	0.077		Vel = 9.97
BOR	0.0	6.16	1F	10.042	250.000	78.666		
to		140.0	1G	4.304	14.346	0.0		
H1	169.42	0.0009		0.0	264.346	0.243		Vel = 1.82
H1	0.0	8.27	1T	55.354	140.000	78.909		
to		140.0	1G	6.326	61.680	0.0		
H2	169.42	0.0002		0.0	201.680	0.044		Vel = 1.01
H2	0.0	12.34	1T	93.767	95.000	78.953		
to		140.0		0.0	93.767	0.0		
H3	169.42	0.0		0.0	188.767	0.006		Vel = 0.45
H3	100.00	6.16	1G	4.304	10.000	78.959		Qa = 100
to		140.0	1E	20.084	67.425	-5.630		
TEST	269.42	0.0022	1T	43.037	77.425	0.167		Vel = 2.90
	0.0							
	269.42					73.496		K Factor = 31.43