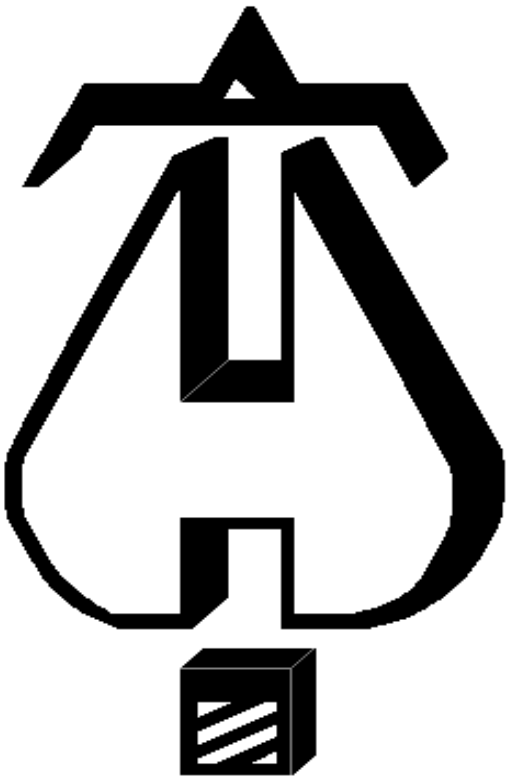


. . . Fire Protection by Computer Design

High Tech Fire Protection
84 Hackett Mills Rd
PO Box 156
Poland, ME, 04274
207-998-2551

Job Name	:	Schlotterbeck
Building	:	Fp-02
Location	:	Top Floor
System	:	1
Contract	:	
Data File	:	Top Floor Calc.WXF

HYDRAULIC CALCULATIONS
for

Project name: Schlotterbeck
Location: Top Floor
Drawing no: Fp-02
Date: 4-6-2016

Design

Remote area number: 1
Remote area location: Top Floor
Occupancy classification: Light
Density: .1 - Gpm/SqFt
Area of application: 250 - SqFt
Coverage per sprinkler: 256 - SqFt
Type of sprinklers calculated: 4
No. of sprinklers calculated: 4
In-rack demand: - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 206.791 - GPM @ 102.038 - Psi
Type of system: NFPA 13
Volume of dry or preaction system: - Gal

Water supply information

Date: 10-28-2016
Location: Riser
Source: Main Riser Tag

Name of contractor: High Tech Fire Protection
Address: 84 Hackett Mills Rd / PO Box 156 / Poland, ME, 04274
Phone number: 207-998-2551
Name of designer: Ed Pennell
Authority having jurisdiction: Portland Fire Department
Notes: (Include peaking information or gridded systems here.)

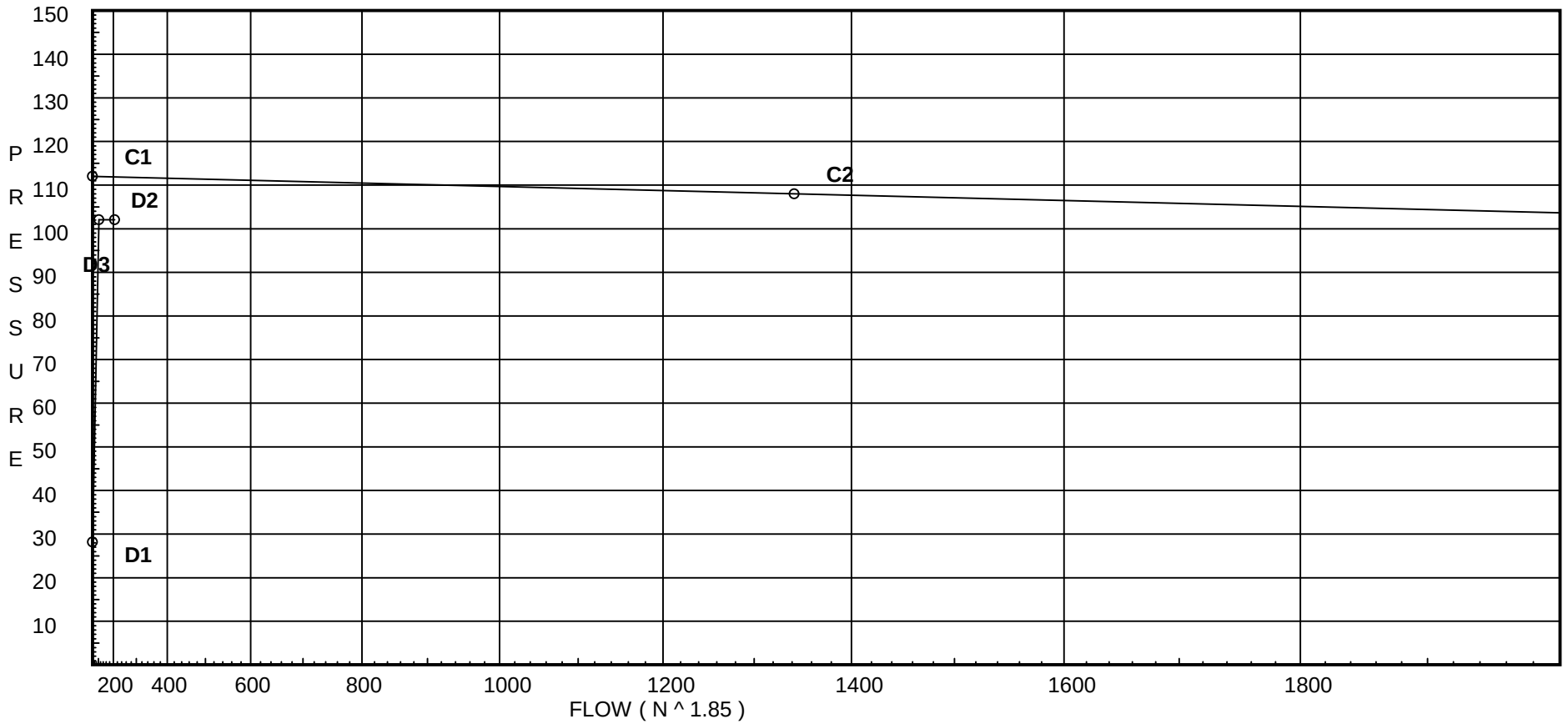
Water Supply Curve (C)

City Water Supply:

C1 - Static Pressure	:	112
C2 - Residual Pressure:		108
C2 - Residual Flow	:	1342

Demand:

D1 - Elevation	:	28.152
D2 - System Flow	:	106.791
D2 - System Pressure	:	102.038
Hose (Demand)	:	100
D3 - System Demand	:	206.791
Safety Margin	:	9.836



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
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
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
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
G	NFPA 13 Gate Valve	0	0	0	0	0	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	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
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.

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
1	65.0	4.9	27.3	na	25.6	0.1	256	13.5
2	65.0	4.9	29.25	na	26.5	0.1	256	13.5
P*	0.0		55.45	na				
3	65.0	4.9	30.09	na	26.88	0.1	256	13.5
4	65.0	4.9	32.22	na	27.81	0.1	256	13.5
5	65.0		37.66	na				
6	65.0		45.18	na				
7	66.0		47.78	na				
8	66.0		48.46	na				
9	66.0		55.0	na				
10	10.0		90.25	na				
11	10.0		90.45	na				
TOR	3.0		93.85	na				
BOR	3.0		96.9	na				
UG0	3.0		100.63	na				
UG1	3.0		100.66	na				
UG2	3.0		100.72	na				
TEST	0.0		102.04	na	100.0			

The maximum velocity is 22.91 and it occurs in the pipe between nodes 5 and 6

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
1	25.60	1.049		0.0	9.500	27.295		K Factor = 4.90
to		120.0		0.0	0.0	0.0		
2	25.6	0.2055		0.0	9.500	1.952		Vel = 9.50
2	26.50	1.049	1E	2.0	9.000	29.247		K Factor = 4.90
to		120.0		0.0	2.000	0.0		
5	52.1	0.7649		0.0	11.000	8.414		Vel = 19.34
	0.0							
	52.10					37.661		K Factor = 8.49
3	26.88	1.049		0.0	9.500	30.086		K Factor = 4.90
to		120.0		0.0	0.0	0.0		
4	26.88	0.2248		0.0	9.500	2.136		Vel = 9.98
4	27.81	1.049	1T	5.0	1.500	32.222		K Factor = 4.90
to		120.0		0.0	5.000	0.0		
5	54.69	0.8368		0.0	6.500	5.439		Vel = 20.30
5	52.10	1.38	1E	3.0	6.900	37.661		
to		120.0		0.0	3.000	0.0		
6	106.79	0.7590		0.0	9.900	7.514		Vel = 22.91
6	0.0	1.38	1E	3.0	1.000	45.175		
to		120.0		0.0	3.000	-0.433		
7	106.79	0.7590		0.0	4.000	3.036		Vel = 22.91
7	0.0	1.38		0.0	0.900	47.778		
to		120.0		0.0	0.0	0.0		
8	106.79	0.7589		0.0	0.900	0.683		Vel = 22.91
8	0.0	1.61	1T	8.0	10.250	48.461		
to		120.0		0.0	8.000	0.0		
9	106.79	0.3582		0.0	18.250	6.538		Vel = 16.83
9	0.0	2.157	1V	4.307	58.250	54.999		
to		120.0	1T	12.307	34.459	27.254		* Fixed loss = 3
10	106.79	0.0862	1X	10.461	92.709	7.993		Vel = 9.38
			1B	7.384				
			1Fsp	0.0				
10	0.0	4.26	1V	8.954	56.000	90.246		
to		120.0		0.0	8.954	0.0		
11	106.79	0.0031		0.0	64.954	0.204		Vel = 2.40
11	0.0	4.26	6V	53.722	63.000	90.450		
to		120.0		0.0	53.722	3.032		
TOR	106.79	0.0031		0.0	116.722	0.365		Vel = 2.40
TOR	0.0	4.26	1Fsp	0.0	8.000	93.847		
to		120.0	1V	8.954	8.954	3.000		* Fixed loss = 3
BOR	106.79	0.0031		0.0	16.954	0.053		Vel = 2.40
BOR	0.0	4.26	1Zia	0.0	5.000	96.900		
to		120.0		0.0	0.0	3.712		* Fixed loss = 3.712
UG0	106.79	0.0032		0.0	5.000	0.016		Vel = 2.40
UG0	0.0	6.16	1G	4.304	25.000	100.628		
to		140.0	1T	43.037	47.341	0.0		
UG1	106.79	0.0004		0.0	72.341	0.028		Vel = 1.15
UG1	0.0	8.27	3T	166.063	550.000	100.656		
to		140.0		0.0	166.063	0.0		
UG2	106.79	0.0001		0.0	716.063	0.067		Vel = 0.64

Final Calculations - Hazen-Williams

High Tech Fire Protection
Schlotterbeck

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*******	Notes	******
UG2	0.0	6.16	1G	4.304	15.000	100.723				
to		140.0	1E	20.084	24.388	1.299				
TEST	106.79	0.0004		0.0	39.388	0.016		Vel = 1.15		
	100.00							Qa = 100.00		
	206.79					102.038		K Factor = 20.47		