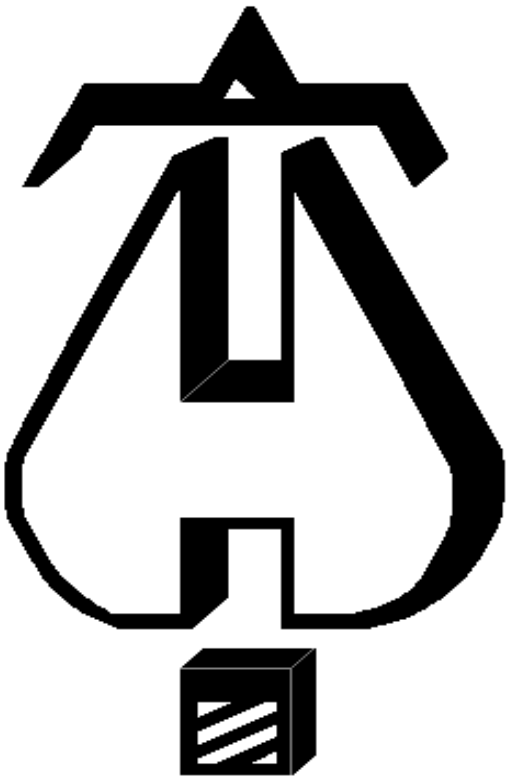


. . . Fire Protection by Computer Design

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

Job Name	:	Schlotterbeck Block
Building	:	FP-02
Location	:	117 Preble Street
System	:	2
Contract	:	
Data File	:	4th Floor Calc.WXF

HYDRAULIC CALCULATIONS
for

Project name: Schlotterbeck Block
Location: 117 Preble Street
Drawing no: FP-02
Date: 5-18-2016

Design

Remote area number: 2
Remote area location: 4th Floor
Occupancy classification: Light
Density: .1 - Gpm/SqFt
Area of application: 220 - SqFt
Coverage per sprinkler: 256 - SqFt
Type of sprinklers calculated: Residential Uprights
No. of sprinklers calculated: 4
In-rack demand: - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 212.619 - GPM @ 90.712 - Psi
Type of system: NFPA 13 Wet
Volume of dry or preaction system: - Gal

Water supply information

Date: 10-28-2014
Location: Riser
Source: Main Drain 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.)

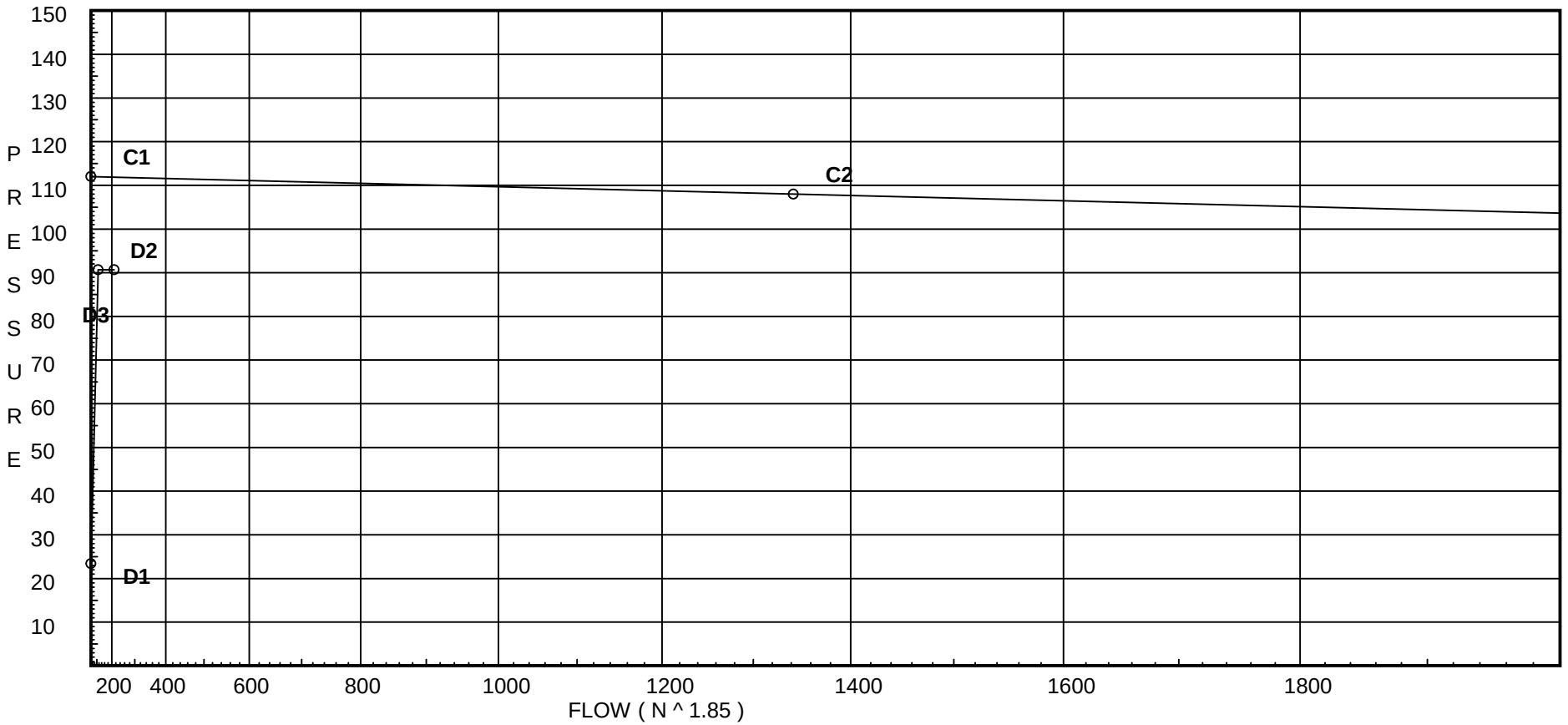
Water Supply Curve (C)

City Water Supply:

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

Demand:

D1 - Elevation	:	23.387
D2 - System Flow	:	112.619
D2 - System Pressure	:	90.712
Hose (Demand)	:	100
D3 - System Demand	:	212.619
Safety Margin	:	21.156



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
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
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.

Pressure / Flow Summary - STANDARD

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
DP1	0.0	4.9	27.3	na	25.6	0.1	256	13.5
DP2	0.0	4.9	27.3	na	25.6	0.1	256	13.5
1B	54.0	K = K @ EQ01	27.91	na	25.6			
2B	54.0	K = K @ EQ02	29.45	na	26.01			
3B	55.0		35.71	na				
4B	55.0		37.97	na				
5B	55.0	K = K @ EQ02	38.64	na	29.79			
P*	0.0		51.3	na				
7B	54.0	K = K @ EQ01	41.5	na	31.21			
8B	54.0		45.05	na				
9B	55.0		45.05	na				
10B	55.0		45.36	na				
6B	55.0		46.18	na				
12B	55.0		46.73	na				
13B	10.0		79.09	na				
11	10.0		79.28	na				
TOR	3.0		82.71	na				
BOR	3.0		85.77	na				
UG0	3.0		89.29	na				
UG1	3.0		89.32	na				
UG2	3.0		89.4	na				
TEST	0.0		90.71	na	100.0			

The maximum velocity is 19.16 and it occurs in the pipe between nodes 2B and 3B

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	25.60	1.049	1E	2.0	1.000	27.295		K Factor = 4.90
to		120.0		0.0	2.000	0.0		
EQ01	25.6	0.2057		0.0	3.000	0.617		Vel = 9.50
	0.0							
	25.60					27.912		K Factor = 4.85
DP2	25.60	1.049	1T	5.0	1.000	27.295		K Factor = 4.90
to		120.0		0.0	5.000	0.0		
EQ02	25.6	0.2055		0.0	6.000	1.233		Vel = 9.50
	0.0							
	25.60					28.528		K Factor = 4.79
1B	25.60	1.049		0.0	7.500	27.912		K Factor @ node EQ01
to		120.0		0.0	0.0	0.0		
2B	25.6	0.2055		0.0	7.500	1.541		Vel = 9.50
2B	26.01	1.049	1E	2.0	6.900	29.453		K Factor @ node EQ02
to		120.0		0.0	2.000	-0.433		
3B	51.61	0.7517		0.0	8.900	6.690		Vel = 19.16
3B	0.0	1.049	1E	2.0	1.000	35.710		
to		120.0		0.0	2.000	0.0		
4B	51.61	0.7517		0.0	3.000	2.255		Vel = 19.16
4B	0.0	1.049		0.0	0.900	37.965		
to		120.0		0.0	0.0	0.0		
5B	51.61	0.7522		0.0	0.900	0.677		Vel = 19.16
5B	29.80	1.38	1T	6.0	10.400	38.642		K Factor @ node EQ02
to		120.0		0.0	6.000	0.0		
6B	81.41	0.4593		0.0	16.400	7.533		Vel = 17.46
	0.0							
	81.41					46.175		K Factor = 11.98
7B	31.21	1.049		0.0	12.000	41.495		K Factor @ node EQ01
to		120.0		0.0	0.0	0.0		
8B	31.21	0.2965		0.0	12.000	3.558		Vel = 11.59
8B	0.0	1.38	1E	3.0	2.500	45.053		
to		120.0		0.0	3.000	-0.433		
9B	31.21	0.0780		0.0	5.500	0.429		Vel = 6.69
9B	0.0	1.38	1E	3.0	1.000	45.049		
to		120.0		0.0	3.000	0.0		
10B	31.21	0.0780		0.0	4.000	0.312		Vel = 6.69
10B	0.0	1.38	1T	6.0	11.600	45.361		
to		120.0		0.0	6.000	0.0		
12B	31.21	0.0780		0.0	17.600	1.372		Vel = 6.69
	0.0							
	31.21					46.733		K Factor = 4.57
6B	81.41	2.157		0.0	10.700	46.175		
to		120.0		0.0	0.0	0.0		
12B	81.41	0.0521		0.0	10.700	0.558		Vel = 7.15
12B	31.21	2.157	1S	13.537	55.750	46.733		
to		120.0	1T	12.307	47.996	22.490		* Fixed loss = 3
13B	112.62	0.0951	1V	4.307	103.746	9.869		Vel = 9.89
			1X	10.461				

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 ******
			1B	7.384				
			1Fsp	0.0				
13B	0.0	4.26	1V	8.954	45.000	79.092		
to		120.0		0.0	8.954	0.0		
11	112.62	0.0034		0.0	53.954	0.186		Vel = 2.54
11	0.0	4.26	6V	53.722	63.000	79.278		
to		120.0		0.0	53.722	3.032		
TOR	112.62	0.0035		0.0	116.722	0.404		Vel = 2.54
TOR	0.0	4.26	1Fsp	0.0	8.000	82.714		
to		120.0	1V	8.954	8.954	3.000		* Fixed loss = 3
BOR	112.62	0.0034		0.0	16.954	0.058		Vel = 2.54
BOR	0.0	4.26	1Zia	0.0	5.000	85.772		
to		120.0		0.0	0.0	3.501		* Fixed loss = 3.501
UG0	112.62	0.0036		0.0	5.000	0.018		Vel = 2.54
UG0	0.0	6.16	1G	4.304	25.000	89.291		
to		140.0	1T	43.037	47.341	0.0		
UG1	112.62	0.0004		0.0	72.341	0.031		Vel = 1.21
UG1	0.0	8.27	3T	166.063	550.000	89.322		
to		140.0		0.0	166.063	0.0		
UG2	112.62	0.0001		0.0	716.063	0.074		Vel = 0.67
UG2	0.0	6.16	1G	4.304	15.000	89.396		
to		140.0	1E	20.084	24.388	1.299		
TEST	112.62	0.0004		0.0	39.388	0.017		Vel = 1.21
	100.00							Qa = 100.00
	212.62					90.712		K Factor = 22.32