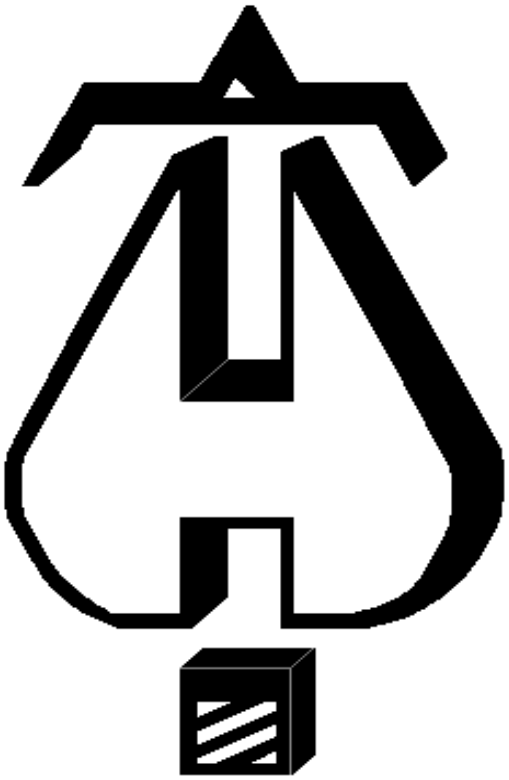


. . . Fire Protection by Computer Design

High Tech Fire Protection
84 Hackett Mills Road Poland
P.O. Box 154 Minot, ME
Poland, ME 04274
207-998-2551

Job Name	:	409 CUMBERLAND AVE APARTMENT COMPLEX ROOF LEVEL STANDPIPES
Drawing	:	FP-03
Location	:	Roof Standpipes remote 2 on Stair B and 1 on Stair A
Remote Area	:	5S
Contract	:	101513-1
Data File	:	Calc #5S Standpipe.WXF

HYDRAULIC CALCULATIONS
for

Project name: 409 CUMBERLAND AVE APARTMENT COMPLEX
Location: Roof Standpipes remote 2 on Stair B and 1 on Stair A
Drawing no: FP-03
Date: 2-20-14

Design

Remote area number: 5S
Remote area location: Roof Standpipes Stair B & A
Occupancy classification:
Density: - Gpm/SqFt
Area of application: - SqFt
Coverage per sprinkler: - SqFt
Type of sprinklers calculated:
No. of sprinklers calculated: 3
In-rack demand: n/a - GPM
Hose streams: 750 - GPM
Total water required (including hose streams): 750 - GPM @ 155 - Psi
Type of system: Manual Wet System
Volume of dry or preaction system: n/a - Gal

Water supply information

Date: n/a
Location:
Source: City of Portland Fire Department Pumper Truck

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.)

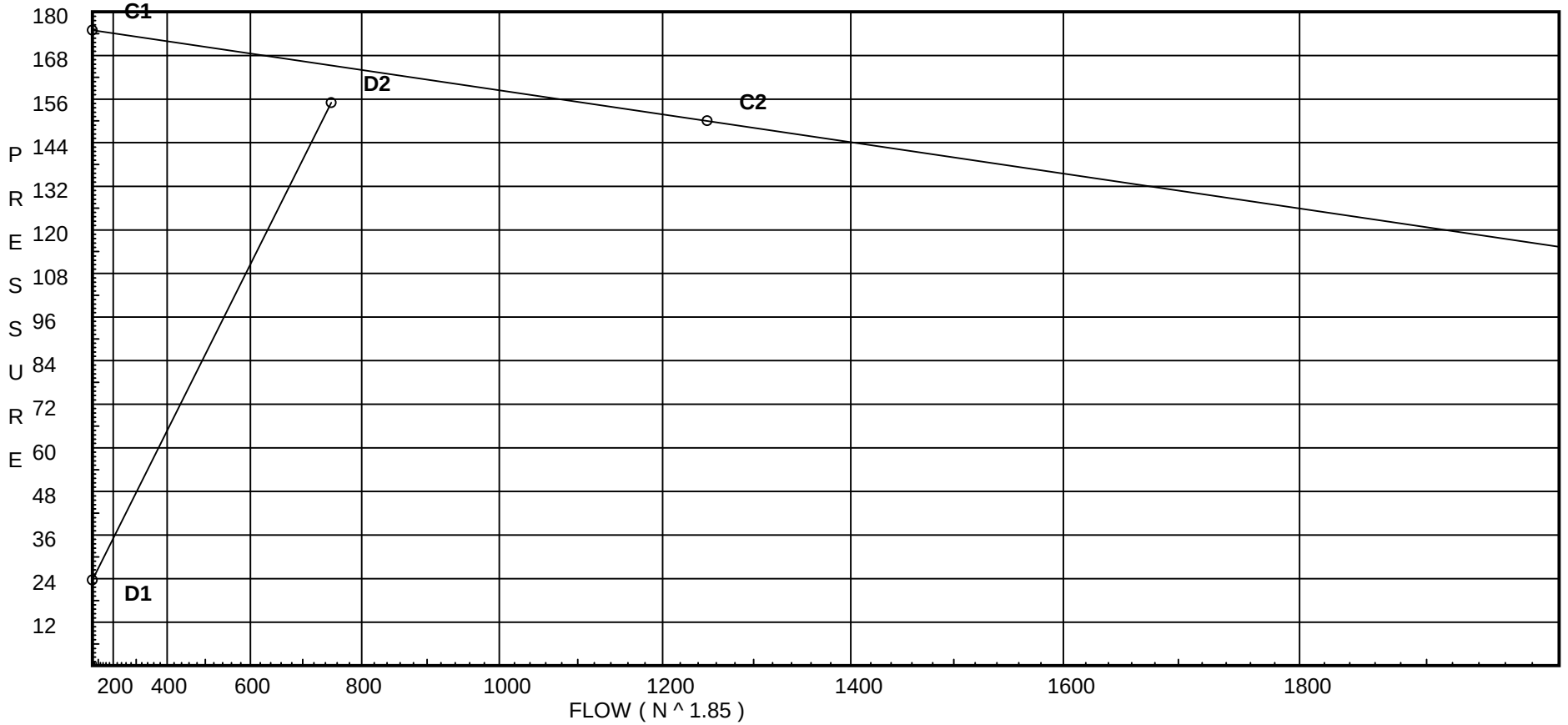
Water Supply Curve (C)

High Tech Fire Protection
409 CUMBERLAND AVE APARTMENT COMPLEX ROOF LEVEL STANDPIPES

Date 1-23-14

City Water Supply:
- C1 - Static Pressure : 175
- C2 - Residual Pressure: 150
- C2 - Residual Flow : 1250

Demand:
- D1 - Elevation : 23.604
- D2 - System Flow : 750
- D2 - System Pressure : 155.035
- Hose (Demand) : _____
- D3 - System Demand : 750
- Safety Margin : 10.249



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
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
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

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.
H1	63.5		65.0	na	250.0			
SB5	63.5		67.64	na				
H2	52.5		69.95	na	250.0			
SB4	52.5		72.58	na				
SB2	30.5		83.91	na				
H3	63.5		78.62	na	250.0			
SA5	63.5		81.26	na				
SA2	30.5		96.05	na				
SA0	8.5		108.4	na				
TOR	8.4		117.32	na				
BOR	3.0		125.18	na				
FD6	3.0		132.82	na				
FD5	15.0		129.63	na				
FD4	17.0		137.99	na				
FD3	17.0		140.97	na				
FD2	17.0		149.24	na				
FD1	9.0		155.04	na				

The maximum velocity is 16.88 and it occurs in the pipe between nodes SA2 and SA0

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
H1	250.00	2.469	1T	12.0	0.250	65.000		Qa = 250.00
to		120.0		0.0	12.000	0.0		
SB5	250.0	0.2154		0.0	12.250	2.639		Vel = 16.75
SB5	0.0	4.26		0.0	12.000	67.639		
to		120.0		0.0	0.0	4.764		
SB4	250.0	0.0151		0.0	12.000	0.181		Vel = 5.63
	0.0							
	250.00					72.584		K Factor = 29.34
H2	250.00	2.469	1T	12.0	0.250	69.946		Qa = 250.00
to		120.0		0.0	12.000	0.0		
SB4	250.0	0.2153		0.0	12.250	2.638		Vel = 16.75
SB4	250.00	4.26	1V	8.954	24.000	72.584		
to		120.0		0.0	8.954	9.528		
SB2	500.0	0.0545		0.0	32.954	1.797		Vel = 11.25
SB2	0.0	4.26	4V	35.814	150.000	83.909		
to		120.0	1B	15.8	72.681	0.0		
SA2	500.0	0.0545	1X	21.067	222.681	12.140		Vel = 11.25
	0.0							
	500.00					96.049		K Factor = 51.02
H3	250.00	2.469	1T	12.0	0.250	78.619		Qa = 250.00
to		120.0		0.0	12.000	0.0		
SA5	250.0	0.2153		0.0	12.250	2.638		Vel = 16.75
SA5	0.0	4.26		0.0	33.000	81.257		
to		120.0		0.0	0.0	14.292		
SA2	250.0	0.0152		0.0	33.000	0.500		Vel = 5.63
SA2	500.00	4.26	1V	8.954	15.500	96.049		
to		120.0		0.0	8.954	9.528		
SA0	750.0	0.1154		0.0	24.454	2.822		Vel = 16.88
SA0	0.0	4.26	3V	26.861	29.000	108.399		
to		120.0	1X	21.067	47.928	0.043		
TOR	750.0	0.1154		0.0	76.928	8.880		Vel = 16.88
TOR	0.0	4.26	1B	15.8	6.000	117.322		
to		120.0	1Fsp	0.0	15.800	5.339		* Fixed loss = 3
BOR	750.0	0.1154		0.0	21.800	2.516		Vel = 16.88
BOR	0.0	4.26	1T	26.334	2.000	125.177		
to		120.0	1S	28.968	64.256	0.0		
FD6	750.0	0.1154	1V	8.954	66.256	7.647		Vel = 16.88
FD6	0.0	4.26	1V	6.39	6.000	132.824		
to		100.0		0.0	6.390	-5.197		
FD5	750.0	0.1617		0.0	12.390	2.004		Vel = 16.88
FD5	0.0	4.26	4V	25.561	31.500	129.631		
to		100.0		0.0	25.561	-0.866		
FD4	750.0	0.1617		0.0	57.061	9.228		Vel = 16.88
FD4	0.0	4.26	1V	6.39	12.000	137.993		
to		100.0		0.0	6.390	0.0		
FD3	750.0	0.1617		0.0	18.390	2.974		Vel = 16.88
FD3	0.0	4.26	3V	19.171	32.000	140.967		
to		100.0		0.0	19.170	0.0		
FD2	750.0	0.1617		0.0	51.170	8.276		Vel = 16.88

Final Calculations - Hazen-Williams

High Tech Fire Protection
409 CUMBERLAND AVE APARTMENT COMPLEX ROOF LEVEL STANDPIPES

Date 1-23-14

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*******	Notes	******
FD2	0.0	4.26	1V	6.39	8.000	149.243				
to		100.0		0.0	6.390	3.465				
FD1	750.0	0.1617		0.0	14.390	2.327		Vel = 16.88		
	0.0									
	750.00					155.035		K Factor = 60.23		