



**... 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 : Standpipes Stair A & B  
Drawing : FP-02  
Location : Standpipes remote 2 on Stair B and 1 on Stair A  
Remote Area : 5  
Contract : 020714-1  
Data File : Calc #5 Standpipe.WXF

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**HYDRAULIC CALCULATIONS**  
*for*

**Project name:** STAIR B & STAIR A STANDPIPES  
**Location:** Standpipes remote 2 on Stair B and 1 on Stair A  
**Drawing no:** FP-02  
**Date:** 5-7-14

**Design**

**Remote area number:** 5  
**Remote area location:** 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 @ 118 - 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.)**

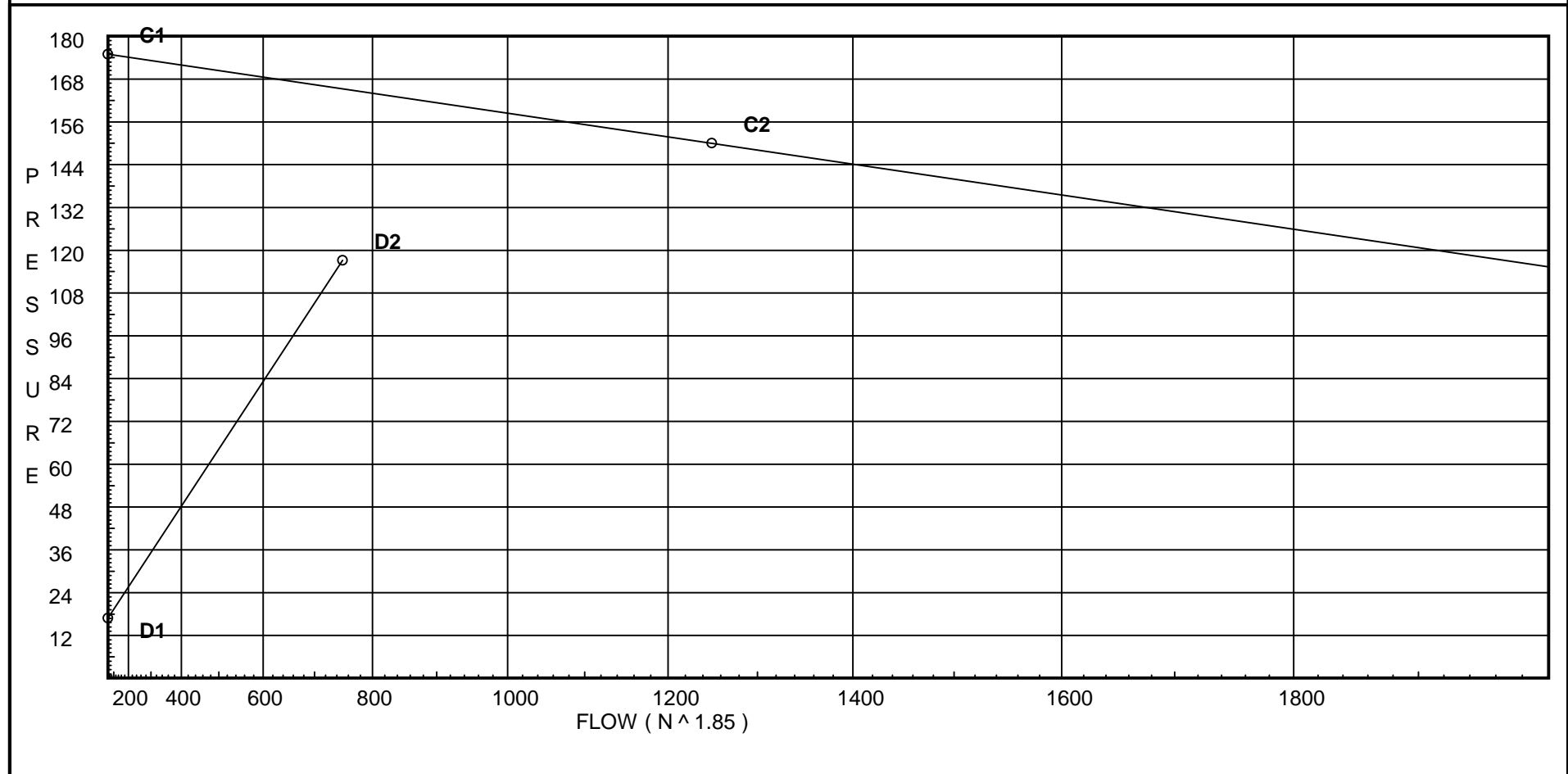
# Water Supply Curve (C)

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

Demand:  
D1 - Elevation : 16.891  
D2 - System Flow : 750  
D2 - System Pressure : 117.183  
Hose ( Demand ) : \_\_\_\_\_  
D3 - System Demand : 750  
Safety Margin : 48.100



# Fittings Used Summary

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## Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	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.

# Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
H1	34.0		65.0	na	250.0			
SB4	34.0		67.64	na				
SB35	30.0		69.58	na				
H2	25.0		69.38	na	250.0			
SB3	25.0		72.02	na				
SB1	-2.0		85.66	na				
SB11	-2.0		88.36	na				
SB12	-2.0		89.01	na				
H3	34.0		75.33	na	250.0			
SA4	34.0		77.97	na				
1B	-2.0		94.71	na				
TOW	-2.0		101.91	na				
BOW	-6.0		112.2	na				
FD1	-6.0		112.66	na				
FD2	-5.0		117.18	na				

The maximum velocity is 16.88 and it occurs in the pipe between nodes 1B and TOW

# Final Calculations - Hazen-Williams

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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				
SB4	250.0	0.2154		0.0	12.250	2.639			Vel = 16.75	
SB4	0.0	4.26	1V	8.954	5.000	67.639				
to		120.0		0.0	8.954	1.732				
SB35	250.0	0.0151		0.0	13.954	0.211			Vel = 5.63	
SB35	0.0	4.26	1V	8.954	9.000	69.582				
to		120.0		0.0	8.954	2.166				
SB3	250.0	0.0151		0.0	17.954	0.271			Vel = 5.63	
	0.0									
	250.00					72.019			K Factor = 29.46	
H2	250.00	2.469	1T	12.0	0.250	69.380			Qa = 250.00	
to		120.0		0.0	12.000	0.0				
SB3	250.0	0.2154		0.0	12.250	2.639			Vel = 16.75	
SB3	250.00	4.26	1V	8.954	26.700	72.019				
to		120.0		0.0	8.954	11.694				
SB1	500.0	0.0545		0.0	35.654	1.944			Vel = 11.25	
SB1	0.0	4.26	1X	21.067	3.800	85.657				
to		120.0	1V	8.954	45.821	0.0				
SB11	500.0	0.0545	1B	15.8	49.621	2.705			Vel = 11.25	
SB11	0.0	4.26	1V	8.954	3.000	88.362				
to		120.0		0.0	8.954	0.0				
SB12	500.0	0.0545		0.0	11.954	0.651			Vel = 11.25	
SB12	0.0	4.26	2V	17.907	65.500	89.013				
to		120.0	1X	21.067	38.974	0.0				
1B	500.0	0.0545		0.0	104.474	5.696			Vel = 11.25	
	0.0									
	500.00					94.709			K Factor = 51.38	
H3	250.00	2.469	1T	12.0	0.250	75.331			Qa = 250.00	
to		120.0		0.0	12.000	0.0				
SA4	250.0	0.2154		0.0	12.250	2.639			Vel = 16.75	
SA4	0.0	4.26	1B	15.8	39.000	77.970				
to		120.0	1X	21.067	36.867	15.592				
1B	250.0	0.0151		0.0	75.867	1.147			Vel = 5.63	
1B	500.00	4.26	2V	17.907	44.500	94.709				
to		120.0		0.0	17.907	0.0				
TOW	750.0	0.1154		0.0	62.407	7.203			Vel = 16.88	
TOW	0.0	4.26	1B	15.8	6.000	101.912				
to		120.0	1T	26.334	42.134	4.732			* Fixed loss = 3	
BOW	750.0	0.1154	1Fsp	0.0	48.134	5.556			Vel = 16.88	
BOW	0.0	4.26		0.0	4.000	112.200				
to		120.0		0.0	0.0	0.0				
FD1	750.0	0.1155		0.0	4.000	0.462			Vel = 16.88	
FD1	0.0	4.26	1V	8.954	5.000	112.662				
to		120.0	1S	28.968	37.922	-0.433				
FD2	750.0	0.1154		0.0	42.922	4.954			Vel = 16.88	
	0.0									
	750.00					117.183			K Factor = 69.28	

# Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa  Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
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