



**... Fire Protection by Computer Design**

F.P.S.S  
278 Harris Road  
Minot, Maine 04258  
(207) 393-7422

Job Name : Unit 1K Calculation  
Drawing : The Portland House  
Location : 45 Eastern Promenade  
Remote Area : NFPA 13  
Contract : NA  
Data File : Unit 1K Calc.wxf

Hydraulic Design Information Sheet

Name - Unit 1K Calculation Date - 01/25/2016  
 Location - 45 Eastern Promenade  
 Building - The Portland House System No. - NFPA 13  
 Contractor - Fire Protection Sprinkler Services Contract No. - NA  
 Calculated By - Tim Fortin Drawing No. - FP-1  
 Construction: ( ) Combustible (X) Non-Combustible Ceiling Height - 8'-0"  
 Occupancy - Residential - High Rise

S (X) NFPA 13 (X) Lt. Haz. Ord.Haz.Gp. ( ) 1 ( ) 2 ( ) 3 ( ) Ex.Haz.  
 Y ( ) NFPA 231 ( ) NFPA 231C ( ) Figure Curve

S Other

T Specific Ruling Made By Date

M	Area of Sprinkler Operation	- 480	System Type	Sprinkler/Nozzle
	Density	- .1	(X) Wet	Make Reliable
D	Area Per Sprinkler	- 196	( ) Dry	Model F1 Res 44
E	Elevation at Highest Outlet	- 38	( ) Deluge	Size 1/2"
S	Hose Allowance - Inside	-	( ) Preaction	K-Factor 4.4
I	Rack Sprinkler Allowance	-	( ) Other	Temp.Rat.155
G	Hose Allowance - Outside	- 100		

N Note 4 Most Demanding Heads

Calculation Flow Required - 182 Press Required - 113  
 Summary C-Factor Used: 150 Overhead 120 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 09/10/2014		Cap. -
T	Time of Test -	Rated Cap.-	Elev.-
E	Static Press - 150	@ Press -	
R	Residual Press - 120	Elev. -	Well
	Flow - 550		Proof Flow
S	Elevation - 10		

U Location - Main Drain Information from Base of System Riser

P  
 L Source of Information - Existing Main Drain Test Tag  
 Y

C	Commodity	Class	Location
O	Storage Ht.	Area	Aisle W.
M	Storage Method:	%	Palletized % Rack
	( ) Single Row	( ) Conven. Pallet	( ) Auto. Storage ( ) Encap.
S	( ) Double Row	( ) Slave Pallet	( ) Solid Shelf ( ) Non
T	( ) Mult. Row		( ) Open Shelf

O C  
 R K Flue Spacing Clearance:Storage to Ceiling  
 A Longitudinal Transverse

G  
 E Horizontal Barriers Provided:

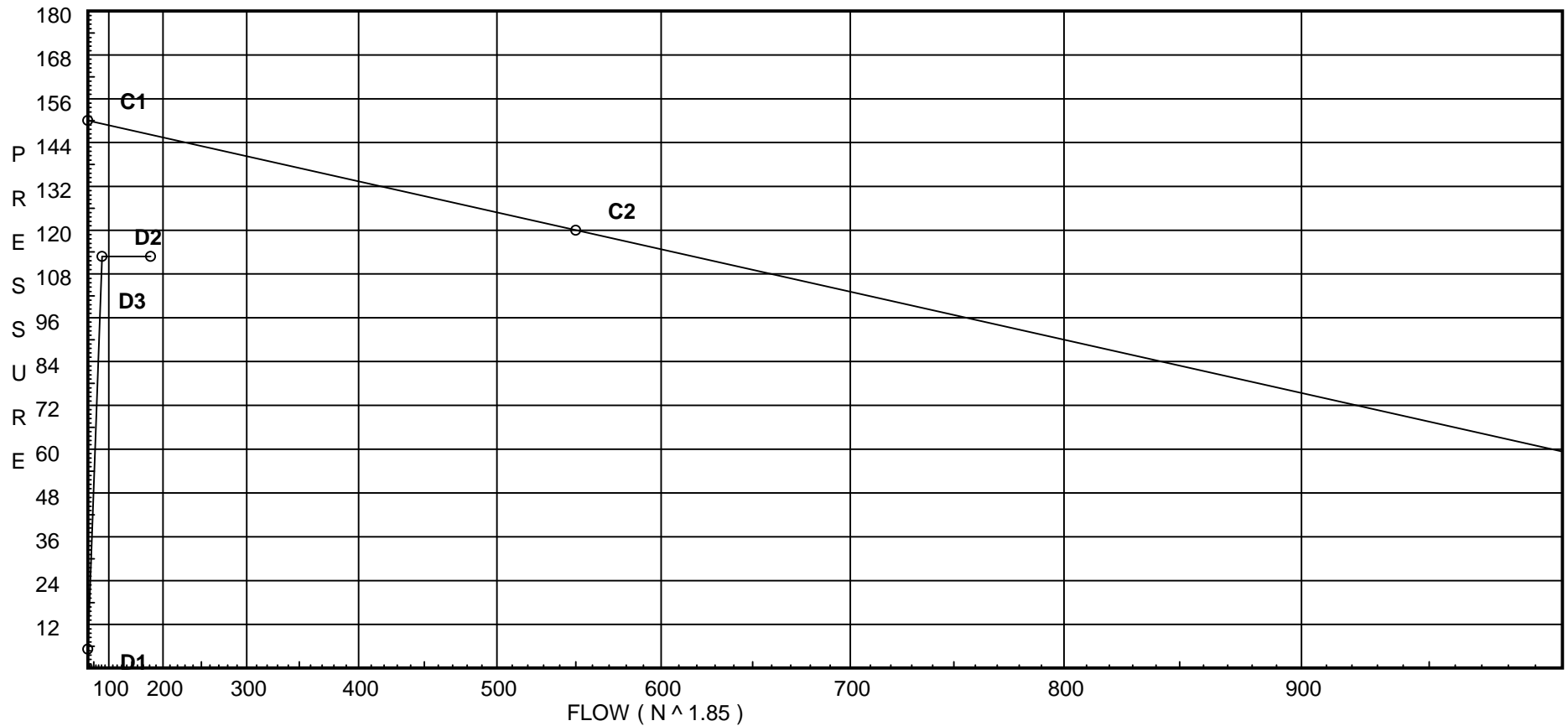
# Water Supply Curve (C)

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City Water Supply:  
C1 - Static Pressure : 150  
C2 - Residual Pressure: 120  
C2 - Residual Flow : 550

Demand:  
D1 - Elevation : 5.197  
D2 - System Flow : 81.461  
D2 - System Pressure : 112.783  
Hose ( Adj City ) : \_\_\_\_\_  
Hose ( Demand ) : 100  
D3 - System Demand : 181.461  
Safety Margin : 33.360



# 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	Generic Butterfly Valve	0	0	0	0	7	7	7	10	0	12	9	10	12	19	21	0	0	0	0	0
E	90' Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Fsw	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
N	CPVC 90'El Harvel-Spears	7	7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
S	Generic Swing Check Valve	4	5	5	7	9	11	14	16	19	22	27	32	45	55	65	76	87	98	109	130
T	90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121

# Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
1	22.0	4.4	19.84	na	19.6	0.1	196	7.0
2	22.0	4.4	20.2	na	19.78	0.1	196	7.0
3	22.0	4.4	22.94	na	21.08	0.1	196	7.0
4	22.0	4.4	22.8	na	21.01	0.1	196	7.0
5	22.0		23.21	na				
6	22.0		99.37	na				
7	22.0		100.02	na				
8	22.0		106.53	na				
9	10.0		111.74	na				
10	10.0		112.78	na	100.0			

The maximum velocity is 27.45 and it occurs in the pipe between nodes 5 and 6

# 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	*****
1	19.60	1.101	1O	5.0	0.500	19.843			K Factor = 4.40	
to		150		0.0	5.000	0.0				
2	19.6	0.0656		0.0	5.500	0.361			Vel = 6.60	
2	19.78	1.101		0.0	11.500	20.204			K Factor = 4.40	
to		150		0.0	0.0	0.0				
3	39.38	0.2383		0.0	11.500	2.740			Vel = 13.27	
3	21.07	1.101		0.0	0.500	22.944			K Factor = 4.40	
to		150		0.0	0.0	0.0				
5	60.45	0.5260		0.0	0.500	0.263			Vel = 20.37	
	0.0									
	60.45					23.207			K Factor = 12.55	
4	21.01	1.101	1O	5.0	0.500	22.797			K Factor = 4.40	
to		150		0.0	5.000	0.0				
5	21.01	0.0745		0.0	5.500	0.410			Vel = 7.08	
5	60.45	1.101	4N	28.0	45.300	23.207				
to		150	2O	10.0	38.000	0.0				
6	81.46	0.9144		0.0	83.300	76.167			Vel = 27.45	
6	0.0	2.003	1O	10.0	3.000	99.374				
to		150		0.0	10.000	0.0				
7	81.46	0.0496		0.0	13.000	0.645			Vel = 8.29	
7	0.0	2.067	3E	15.0	11.600	100.019				
to		120	1T	10.0	43.000	3.000			* Fixed loss = 3	
8	81.46	0.0643	1B	7.0	54.600	3.511			Vel = 7.79	
			1Fsw	0.0						
			1S	11.0						
8	0.0	6.065	1E	14.0	12.000	106.530				
to		120		0.0	14.000	5.197				
9	81.46	0.0003		0.0	26.000	0.009			Vel = 0.90	
9	0.0	6.065	2E	28.0	81.000	111.736				
to		120	1T	30.0	58.000	1.000			* Fixed loss = 1	
10	81.46	0.0003	1Fsw	0.0	139.000	0.047			Vel = 0.90	
	100.00								Qa = 100.00	
	181.46					112.783			K Factor = 17.09	