

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

FREEDOM FIRE PROTECTION INC.  
209 QUAKER RIDGE ROAD  
CASCO, MAINE 04015  
207-627-4109

Job Name : 178 MIDDLE STREET HC3  
Building : 178 MIDDLE STREET  
Location : PORTLAND, MAINE 04101  
System : #1 AREA#3  
Contract :  
Data File : 178 MIDDLE STREET HC3.WXF

Hydraulic Design Information Sheet

Name - 178 MIDDLE STREET Date - 1/22/13  
Location - PORTLAND, MAINE 04101  
Building - 178 MIDDLE STREET System No. - #1 AREA#3  
Contractor - Contract No. -  
Calculated By - MIKE NOBLIT Drawing No. - FP-2  
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height - 7'-11"  
Occupancy - BASEMENT STORAGE

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

S Other

T Specific Ruling

Made By

Date

E

M	Area of Sprinkler Operation	- ROOM	System Type	Sprinkler/Nozzle
	Density	- 0.15	(X) Wet	Make TYCO
D	Area Per Sprinkler	- 130	( ) Dry	Model TY-FRB
E	Elevation at Highest Outlet	- 6'-11"	( ) Deluge	Size 1/2"
S	Hose Allowance - Inside	-	( ) Preaction	K-Factor 5.6
I	Rack Sprinkler Allowance	-	( ) Other	Temp.Rat.155
G	Hose Allowance - Outside	- 250		

N

Note

Calculation Flow Required - 407.054 Press Required - 52.216 At Test  
Summary C-Factor Used: 120 Overhead 140 Underground

W Water Flow Test:

Pump Data:

Tank or Reservoir:

A Date of Test - 7/19/2009

Cap. -

T Time of Test -

Rated Cap.-

Elev.-

E Static Press - 83

@ Press -

R Residual Press - 0

Elev. -

Well

Flow - 1342

Proof Flow

S Elevation -

U

P Location -

P

L Source of Information - PORTLAND WATER DISTRICT

Y

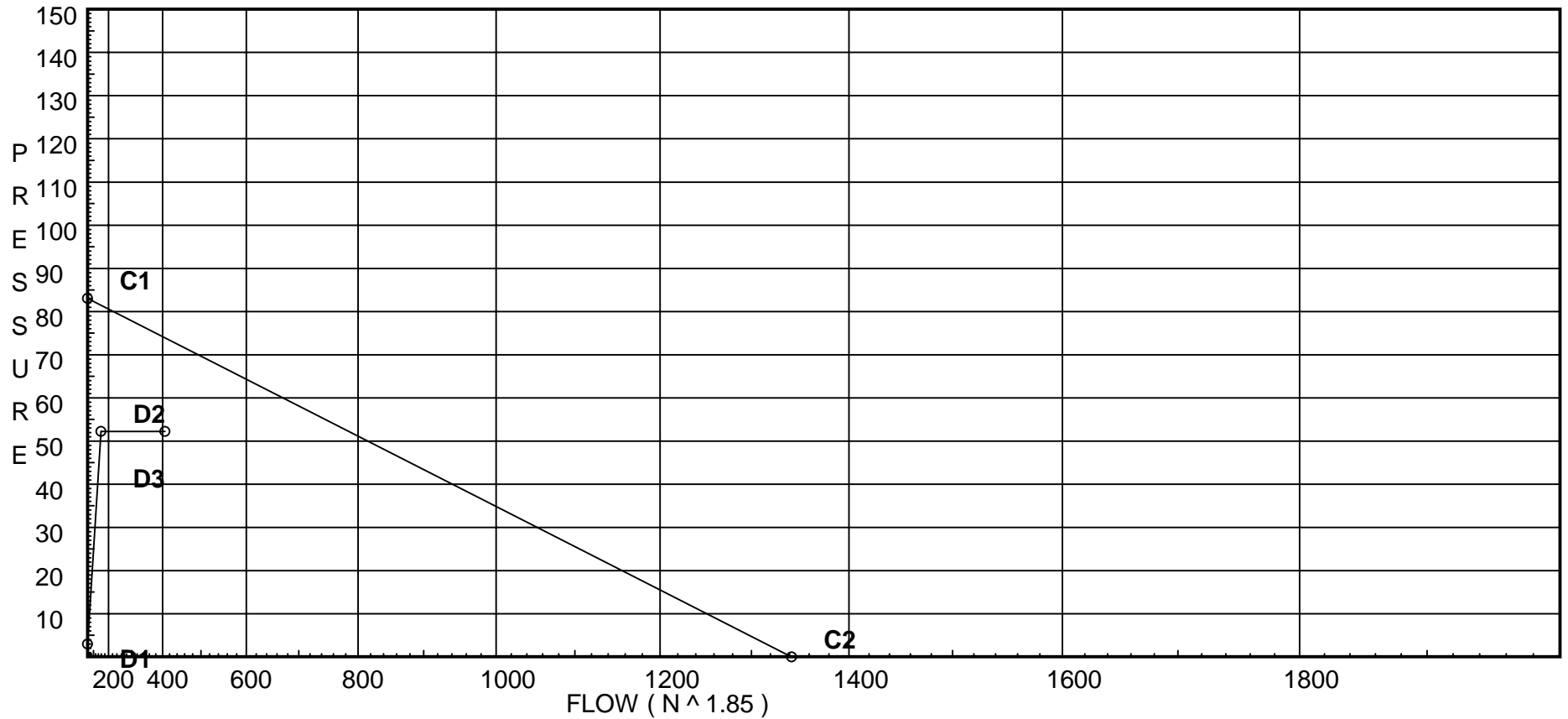
# Water Supply Curve (C)

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City Water Supply:  
C1 - Static Pressure : 83  
C2 - Residual Pressure: 0  
C2 - Residual Flow : 1342

Demand:  
D1 - Elevation : 2.995  
D2 - System Flow : 157.054  
D2 - System Pressure : 52.216  
Hose ( Adj City ) :  
Hose ( Demand ) : 250  
D3 - System Demand : 407.054  
Safety Margin : 21.651



# Fittings Used Summary

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Fitting Legend																						
Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24	
A	Generic Alarm Valve	0	0	0	0	0	0	7.7	21.5	0	17	17	27	29	0	0	0	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	
G	Generic Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13	
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.
304	6.916	5.6	12.13	na	19.5	0.15	130	7.0
303	6.916	5.6	13.12	na	20.28	0.15	130	7.0
302	6.916	5.6	18.89	na	24.34	0.15	130	7.0
301	6.916	5.6	21.91	na	26.21	0.15	130	7.0
306	6.916	5.6	14.21	na	21.11	0.15	130	7.0
307	6.916	5.6	13.82	na	20.82	0.15	130	7.0
35	6.916		15.07	na				
305	6.916	5.6	19.59	na	24.79	0.15	130	7.0
34	6.916		25.45	na				
33	6.916		25.81	na				
32	6.916		40.11	na				
31	6.416		42.58	na				
30	6.416		49.11	na				
2	6.416		49.21	na				
1	0.0		52.2	na				
TEST	0.0		52.22	na	250.0			

The maximum velocity is 19.38 and it occurs in the pipe between nodes 301 and 33

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	*****
304 to 303	19.50 19.5	1.049 120 0.1242		8.000 0.0 8.000	12.125 0.0 0.994			K Factor = 5.60 Vel = 7.24	
303 to 302	20.28 39.78	1.049 120 0.4644		12.416 0.0 12.416	13.119 0.0 5.766			K Factor = 5.60 Vel = 14.77	
302 to 301	24.34 64.12	1.38 120 0.2954		10.250 0.0 10.250	18.885 0.0 3.028			K Factor = 5.60 Vel = 13.75	
301 to 33	26.21 90.33	1.38 120 0.5569	1T 6.0 0.0 0.0	1.000 6.000 7.000	21.913 0.0 3.898			K Factor = 5.60 Vel = 19.38	
	0.0 90.33				25.811			K Factor = 17.78	
306 to 35	21.11 21.11	1.049 120 0.1437	1T 5.0 0.0 0.0	1.000 5.000 6.000	14.212 0.0 0.862			K Factor = 5.60 Vel = 7.84	
	0.0 21.11				15.074			K Factor = 5.44	
307 to 35	20.82 20.82	1.049 120 0.1402		8.916 0.0 8.916	13.824 0.0 1.250			K Factor = 5.60 Vel = 7.73	
35 to 305	21.11 41.93	1.049 120 0.5120		8.830 0.0 8.830	15.074 0.0 4.521			Vel = 15.57	
305 to 34	24.79 66.72	1.38 120 0.3179	1T 6.0 0.0 0.0	12.416 6.000 18.416	19.595 0.0 5.855			K Factor = 5.60 Vel = 14.31	
34 to 33	0.0 66.72	2.157 120 0.0361		10.000 0.0 10.000	25.450 0.0 0.361			Vel = 5.86	
33 to 32	90.33 157.05	2.157 120 0.1760	1E 6.153 0.0 0.0	75.083 6.153 81.236	25.811 0.0 14.297			Vel = 13.79	
32 to 31	0.0 157.05	2.157 120 0.1759	1T 12.307 0.0 0.0	0.500 12.307 12.807	40.108 0.217 2.253			Vel = 13.79	
31 to 30	0.0 157.05	2.157 120 0.1760	1T 12.307 0.0 0.0	24.830 12.307 37.137	42.578 0.0 6.536			Vel = 13.79	
30 to 2	0.0 157.05	4.26 120 0.0064	1E 13.167 0.0 0.0	2.000 13.167 15.167	49.114 0.0 0.097			Vel = 3.54	

Final Calculations - Standard

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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	*****
2 to 1	0.0  157.05	4.026 120 0.0084	1A 17.0 1G 2.0	6.416 19.000 25.416	49.211 2.779 0.214		Vel =	3.96	
1 to TEST	0.0  157.05	6.16 140 0.0008	0.0 0.0 0.0	15.000 0.0 15.000	52.204 0.0 0.012		Vel =	1.69	
	250.00 407.05				52.216		Qa =	250.00	K Factor = 56.33