



. . . Fire Protection by Computer Design

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

Job Name : 178 MIDDLE STREET HC2
Building : 178 MIDDLE STREET
Location : PORTLAND, MAINE 04101
System : #1 AREA#2
Contract :
Data File : 178 MIDDLE STREET HC2.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#2
 Contractor - Contract No. -
 Calculated By - MIKE NOBLIT Drawing No. - FP-3
 Construction: (X) Combustible () Non-Combustible Ceiling Height - 9'-7"
 Occupancy - OFFICES

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

E

M	Area of Sprinkler Operation - ROOM	System Type	Sprinkler/Nozzle
	Density - 0.10	(X) Wet	Make TYCO
D	Area Per Sprinkler - 120	() Dry	Model TY-FRB
E	Elevation at Highest Outlet - 44'-4"	() 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 - 100		

N

Note

Calculation Flow Required - 247.278 Press Required - 70.999 At Test
 Summary C-Factor Used: 150 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

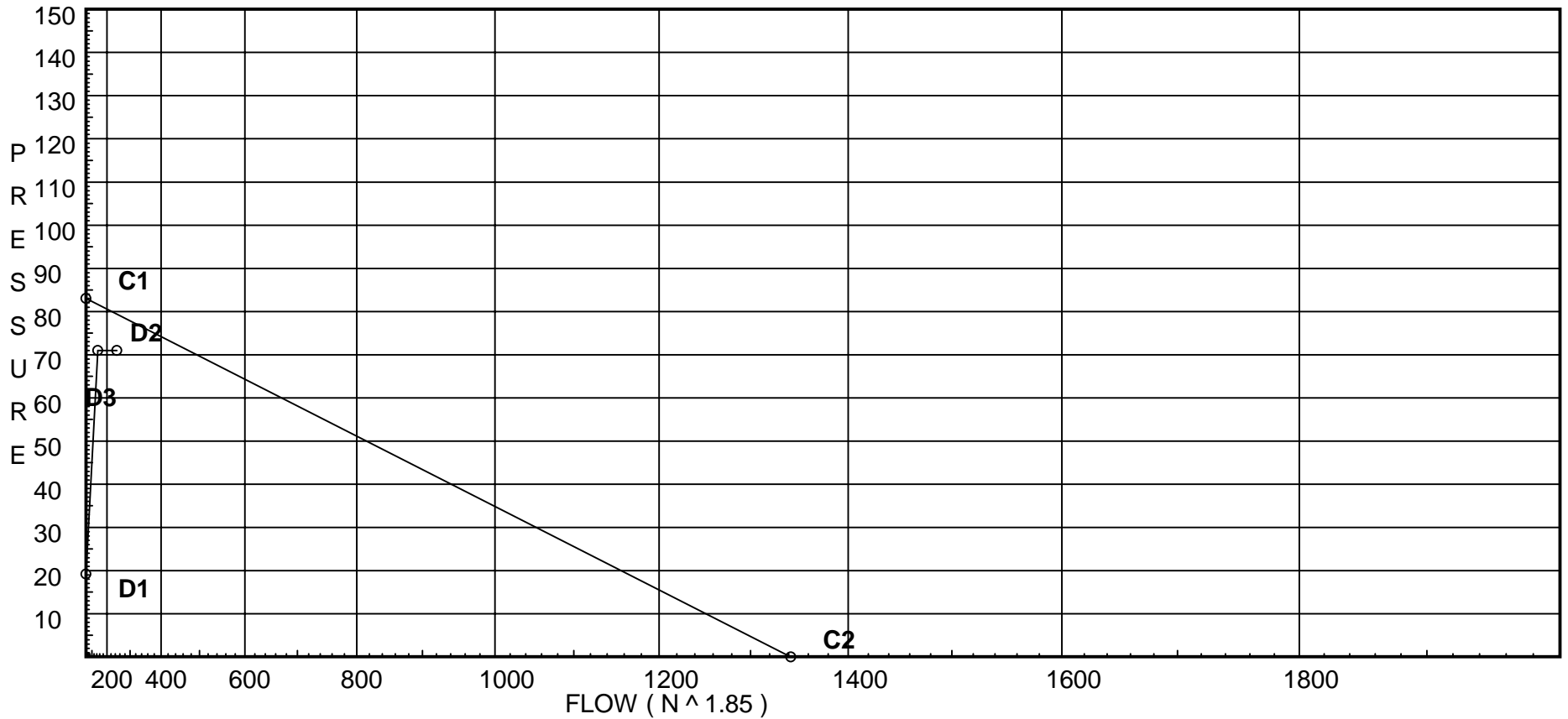
Water Supply Curve (C)

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

Demand:
D1 - Elevation : 19.199
D2 - System Flow : 147.278
D2 - System Pressure : 70.999
Hose (Adj City) :
Hose (Demand) : 100
D3 - System Demand : 247.278
Safety Margin : 8.370



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.
201	44.33	5.6	14.53	na	21.35	0.1	120	7.0
204	44.33	5.6	12.23	na	19.59	0.1	120	7.0
203	44.33	5.6	13.02	na	20.21	0.1	120	7.0
202	44.33	5.6	15.93	na	22.35	0.1	120	7.0
205	44.33	5.6	8.86	na	16.67	0.1	120	7.0
208	44.33	5.6	7.0	na	14.82	0.1	120	7.0
207	44.33	5.6	7.47	na	15.3	0.1	120	7.0
206	44.33	5.6	9.21	na	17.0	0.1	120	7.0
25	44.33		9.32	na				
24	44.33		9.86	na				
23	44.33		16.11	na				
22	43.66		21.82	na				
21	43.66		36.24	na				
20	43.66		46.2	na				
4	6.416		65.01	na				
3	6.416		67.91	na				
2	6.416		68.02	na				
1	0.0		70.99	na				
TEST	0.0		71.0	na	100.0			

The maximum velocity is 23.56 and it occurs in the pipe between nodes 23 and 22

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	*****
201 to 23	21.35	1.101 150	1T	9.563 0.0	11.000 9.562	14.532 0.0		K Factor = 5.60	
	21.35	0.0768		0.0	20.562	1.579		Vel = 7.19	
	0.0 21.35					16.111		K Factor = 5.32	
204 to 203	19.59	1.101 150		0.0 0.0	12.000 0.0	12.234 0.0		K Factor = 5.60	
	19.59	0.0655		0.0	12.000	0.786		Vel = 6.60	
203 to 202	20.20	1.101 150		0.0 0.0	12.000 0.0	13.020 0.0		K Factor = 5.60	
	39.79	0.2429		0.0	12.000	2.915		Vel = 13.41	
202 to 23	22.36	1.394 150		0.0 0.0	1.000 0.0	15.935 0.0		K Factor = 5.60	
	62.15	0.1760		0.0	1.000	0.176		Vel = 13.06	
	0.0 62.15					16.111		K Factor = 15.48	
205 to 24	16.67	1.101 150	1T	9.563 0.0	11.000 9.562	8.858 0.0		K Factor = 5.60	
	16.67	0.0486		0.0	20.562	0.999		Vel = 5.62	
	0.0 16.67					9.857		K Factor = 5.31	
208 to 207	14.82	1.101 150		0.0 0.0	12.000 0.0	7.000 0.0		K Factor = 5.60	
	14.82	0.0391		0.0	12.000	0.469		Vel = 4.99	
207 to 206	15.30	1.101 150		0.0 0.0	12.000 0.0	7.469 0.0		K Factor = 5.60	
	30.12	0.1451		0.0	12.000	1.741		Vel = 10.15	
206 to 25	17.00	1.394 150		0.0 0.0	1.000 0.0	9.210 0.0		K Factor = 5.60	
	47.12	0.1060		0.0	1.000	0.106		Vel = 9.91	
25 to 24	0.0	1.598 150		0.0 0.0	10.000 0.0	9.316 0.0			
	47.12	0.0541		0.0	10.000	0.541		Vel = 7.54	
24 to 23	16.66	1.598 150	1E	5.828 0.0	60.166 5.828	9.857 0.0			
	63.78	0.0948		0.0	65.994	6.254		Vel = 10.20	
23 to 22	83.50	1.598 150	1T	11.656 0.0	0.500 11.656	16.111 0.290			
	147.28	0.4456		0.0	12.156	5.417		Vel = 23.56	
22 to 21	0.0	1.598 150	1E	5.828 0.0	26.541 5.828	21.818 0.0			
	147.28	0.4457		0.0	32.369	14.426		Vel = 23.56	

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 *****
21 to 20	0.0 147.28	1.61 120 0.6493	1E 4.0 0.0	11.330 4.000 15.330	36.244 0.0 9.954		Vel = 23.21
20 to 4	0.0 147.28	2.635 120 0.0590	1E 8.237 0.0	37.250 8.237 45.487	46.198 16.130 2.682		Vel = 8.67
4 to 3	0.0 147.28	2.635 120 0.0590	2E 16.474 0.0	32.660 16.474 49.134	65.010 0.0 2.897		Vel = 8.67
3 to 2	0.0 147.28	4.026 120 0.0075	1E 10.0 0.0	5.000 10.000 15.000	67.907 0.0 0.112		Vel = 3.71
2 to 1	0.0 147.28	4.026 120 0.0075	1A 17.0 1G 2.0 0.0	6.416 19.000 25.416	68.019 2.779 0.190		Vel = 3.71
1 to TEST	0.0 147.28	6.16 140 0.0007	0.0 0.0 0.0	15.000 0.0 15.000	70.988 0.0 0.011		Vel = 1.59
	100.00 247.28				70.999		Qa = 100.00 K Factor = 29.35