

HYDRAULIC DESIGN INFORMATION SHEET

Name - PFD Fireboat Quarters Date - 4-12-13
Location - Living area
Building - System No. - 1 of 1
Contractor - Residential Fire Protection Contract No. - C13007
Calculated By - JAL Drawing No. - 1 of 1
Construction: () Combustible (X) Non-Combustible Ceiling Height 8'-0"
OCCUPANCY - Residential

S Type of Calculation: ()NFPA 13 Residential (X)NFPA 13R ()NFPA 13D
Y Number of Sprinklers Flowing: ()1 ()2 (X)4 ()
S ()Other
T ()Specific Ruling Made by Date
E
M Listed Flow at Start Point - 14 Gpm System Type
Listed Pres. at Start Point - 8.2 Psi (X) Wet () Dry
D MAXIMUM LISTED SPACING 16 x 16 () Deluge () PreAction
E Domestic Flow Added - Gpm Sprinkler or Nozzle
S Additional Flow Added - 100 Gpm Make Viking Model VK456
I Elevation at Highest Outlet - Feet Size 1/2" K-Factor 4.9
G Note:Safety Margin: 73.880 Temperature Rating 155
N

Calculation Gpm Required 157.916 Psi Required 35.070 At Test
Summary C-Factor Used: Overhead 120 Underground 140

W Water Flow Test: Pump Data: Tank or Reservoir:
A Date of Test - 10-5-07 Rated Cap. Cap.
T Time of Test - @ Psi Elev.
E Static (Psi) - 109 Elev.
R Residual (Psi) - 99 Other Well
Flow (Gpm) - 2786 Proof Flow Gpm
S Elevation -

P Location:
P
L Source of Information:
Y

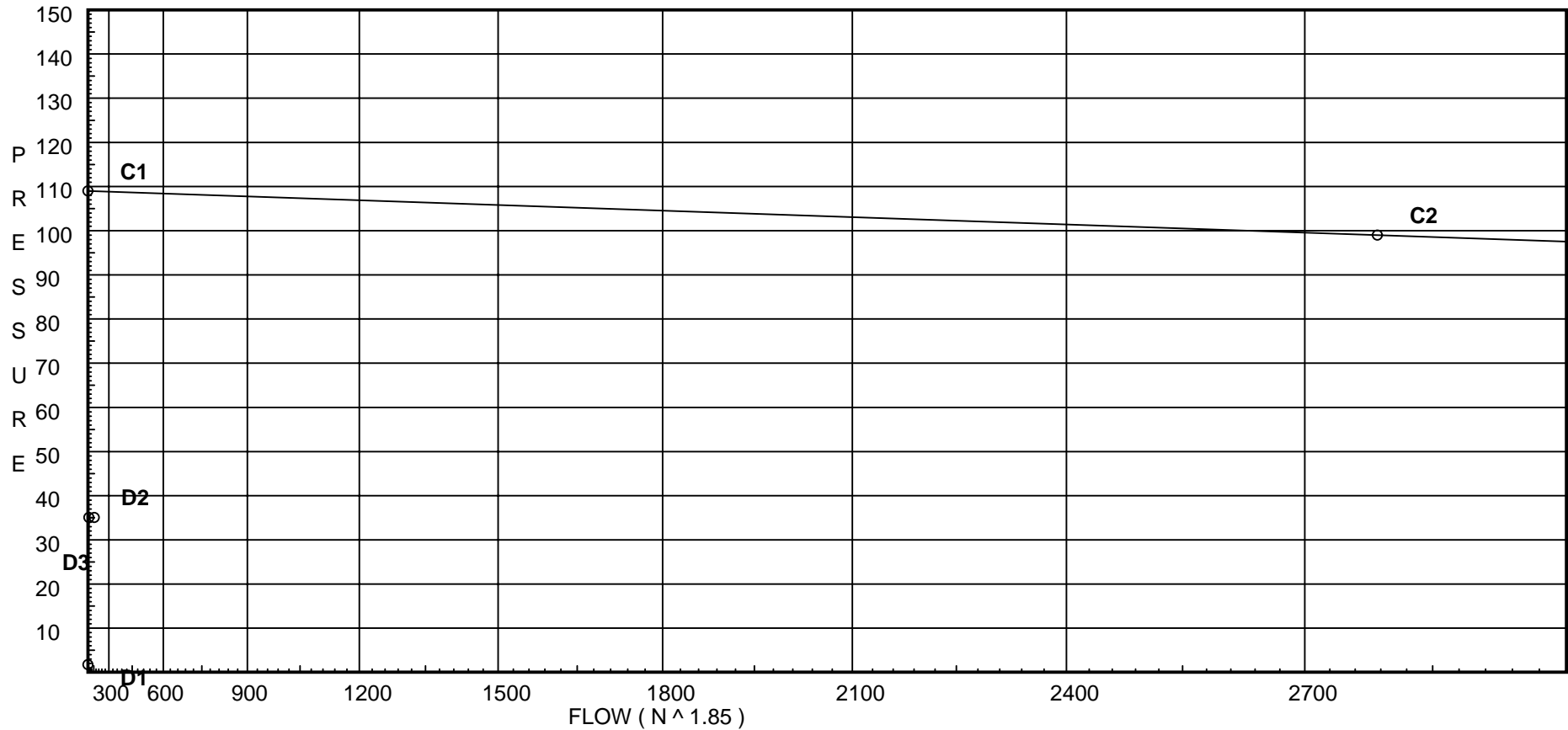
Water Supply Curve (C)

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City Water Supply:
C1 - Static Pressure : 109
C2 - Residual Pressure: 99
C2 - Residual Flow : 2786

Demand:
D1 - Elevation : 1.732
D2 - System Flow : 57.916
D2 - System Pressure : 35.070
Hose (Adj City) : _____
Hose (Demand) : 100
D3 - System Demand : 157.916
Safety Margin : 73.880



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
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	1	1	1	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
Z	Generic Flow Switch	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Zwa	Watts 007	Fitting generates a Fixed Loss Based on Flow																			

Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
HD1	8.0	4.9	8.2	na	14.03	0.1	140	8.2
HD2	8.0	4.9	8.2	na	14.03	0.1	140	8.2
1	0.0	K = K @ DRP1	11.9	na	14.05			
2	0.0	K = K @ DRP2	12.07	na	14.03			
3	0.0	K = K @ DRP2	12.86	na	14.49			
4	0.0	K = K @ DRP2	14.44	na	15.35			
10	0.0		12.93	na				
11	0.0		13.6	na				
12	0.0		15.27	na				
TR	0.0		23.61	na				
BR	1.0		30.93	na				
UG1	-4.0		35.04	na	100.0			
TEST	-4.0		35.07	na				

The maximum velocity is 12.42 and it occurs in the pipe between nodes 12 and TR

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftg's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
HD1 to DRP1	14.03 14.03	1.049 120 0.0673	1E	2.0 0.0 0.0	1.000 2.000 3.000	8.200 3.465 0.202			K Factor = 4.90 Vel = 5.21	
	0.0 14.03					11.867			K Factor = 4.07	
HD2 to DRP2	14.03 14.03	1.049 120 0.0675	1T	5.0 0.0 0.0	1.000 5.000 6.000	8.200 3.465 0.405			K Factor = 4.90 Vel = 5.21	
	0.0 14.03					12.070			K Factor = 4.04	
1 to 10	14.05 14.05	1.049 120 0.0677	1E	2.0 0.0 0.0	13.250 2.000 15.250	11.899 0.0 1.032			K Factor @ node DRP1 Vel = 5.22	
	0.0 14.05					12.931			K Factor = 3.91	
2 to 10	14.03 14.03	1.049 120 0.0675	1T	5.0 0.0 0.0	7.750 5.000 12.750	12.070 0.0 0.861			K Factor @ node DRP2 Vel = 5.21	
	0.0 14.03					12.931			K Factor = 3.90	
3 to 11	14.49 14.49	1.049 120 0.0717	1T	5.0 0.0 0.0	5.330 5.000 10.330	12.864 0.0 0.741			K Factor @ node DRP2 Vel = 5.38	
	0.0 14.49					13.605			K Factor = 3.93	
4 to 12	15.35 15.35	1.049 120 0.0798	1T	5.0 0.0 0.0	5.330 5.000 10.330	14.442 0.0 0.824			K Factor @ node DRP2 Vel = 5.70	
	0.0 15.35					15.266			K Factor = 3.93	
10 to 11	28.08 28.08	1.38 120 0.0642		0.0 0.0 0.0	10.500 0.0 10.500	12.931 0.0 0.674			Vel = 6.02	
11 to 12	14.49 42.57	1.38 120 0.1384		0.0 0.0 0.0	12.000 0.0 12.000	13.605 0.0 1.661			Vel = 9.13	
12 to TR	15.35 57.92	1.38 120 0.2447	2E	6.0 0.0 0.0	28.100 6.000 34.100	15.266 0.0 8.344			Vel = 12.42	
TR to BR	0.0 57.92	1.38 120 0.2447	1Zwa 1Z	0.0 3.0 0.0	6.000 3.000 9.000	23.610 5.117 2.202			* Fixed loss = 5.55 Vel = 12.42	
BR to UG1	0.0 57.92	1.72 140 0.0629	1G 1T	0.543 5.435 0.0	25.000 5.978 30.978	30.929 2.166 1.949			Vel = 8.00	
UG1 to TEST	100.00 157.92	8.27 140 0.0002	1G 1T	6.326 55.354 0.0	75.000 61.680 136.680	35.044 0.0 0.026			Qa = 100 Vel = 0.94	

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	*****
	0.0								
	157.92				35.070			K Factor = 26.67	