

. . . Fire Protection by Computer Design

ADVANCED FIRE PROTECTION
P.O. BOX 81
MINOT, MAINE
04258
(207) 513-6480

Job Name : NEW YARD YATCH BLDG CALC
Building : NEW YARD
Location : 40 WEST COMMERCIAL ST
System : DRY
Contract :
Data File : NEW YARD 40 WEST COMMERCIAL ST.WXF

Hydraulic Design Information Sheet

Name - NEW YARD YATCH BLDG. Date - 9-27-13
 Location - 40 WEST COMMERCIAL ST
 Building - NEW YARD System No. - DRY
 Contractor - ADVANCED FIRE PROTECTION Contract No. -
 Calculated By - TIM FORTIN Drawing No. - FP-1
 Construction: () Combustible (X) Non-Combustible Ceiling Height - VARIES
 Occupancy - BOAT STORAGE AND REPAIR

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

S Other

T Specific Ruling Made By Date

E	Specific Ruling	Made By	Date
M	Area of Sprinkler Operation - 2535	System Type	Sprinkler/Nozzle
	Density - .2	() Wet	Make VIKING
D	Area Per Sprinkler - 130	(X) Dry	Model MICROMATIC
E	Elevation at Highest Outlet - 49	() Deluge	Size 3/4"
S	Hose Allowance - Inside -	() Preaction	K-Factor 8.0
I	Rack Sprinkler Allowance -	() Other	Temp.Rat.155
G	Hose Allowance - Outside - 250		

N Note

Calculation Flow Required - 1062 Press Required - 94
 Summary C-Factor Used: 100 Overhead 140 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 9-13-2011		Cap. -
T	Time of Test -	Rated Cap.-	Elev.-
E	Static Press - 106	@ Press -	
R	Residual Press - 100	Elev. -	Well
	Flow - 1209		Proof Flow
S	Elevation - 0		

U Location - COMMERCIAL ST 400'-0" EAST OF BEACH ST.

P Source of Information - PORTLAND WATER DEPT.
 L
 Y

C	Commodity BOATS	Class	Location
O	Storage Ht. 12'-0"	Area	Aisle W.
M	Storage Method: Solid Piled	% Palletized	% Rack
	() Single Row	() Conven. Pallet	() Auto. Storage
S	() Double Row	() Slave Pallet	() Encap.
R	() Mult. Row	() Open Shelf	() Non
T			
A			
O			
C			

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

E Horizontal Barriers Provided:

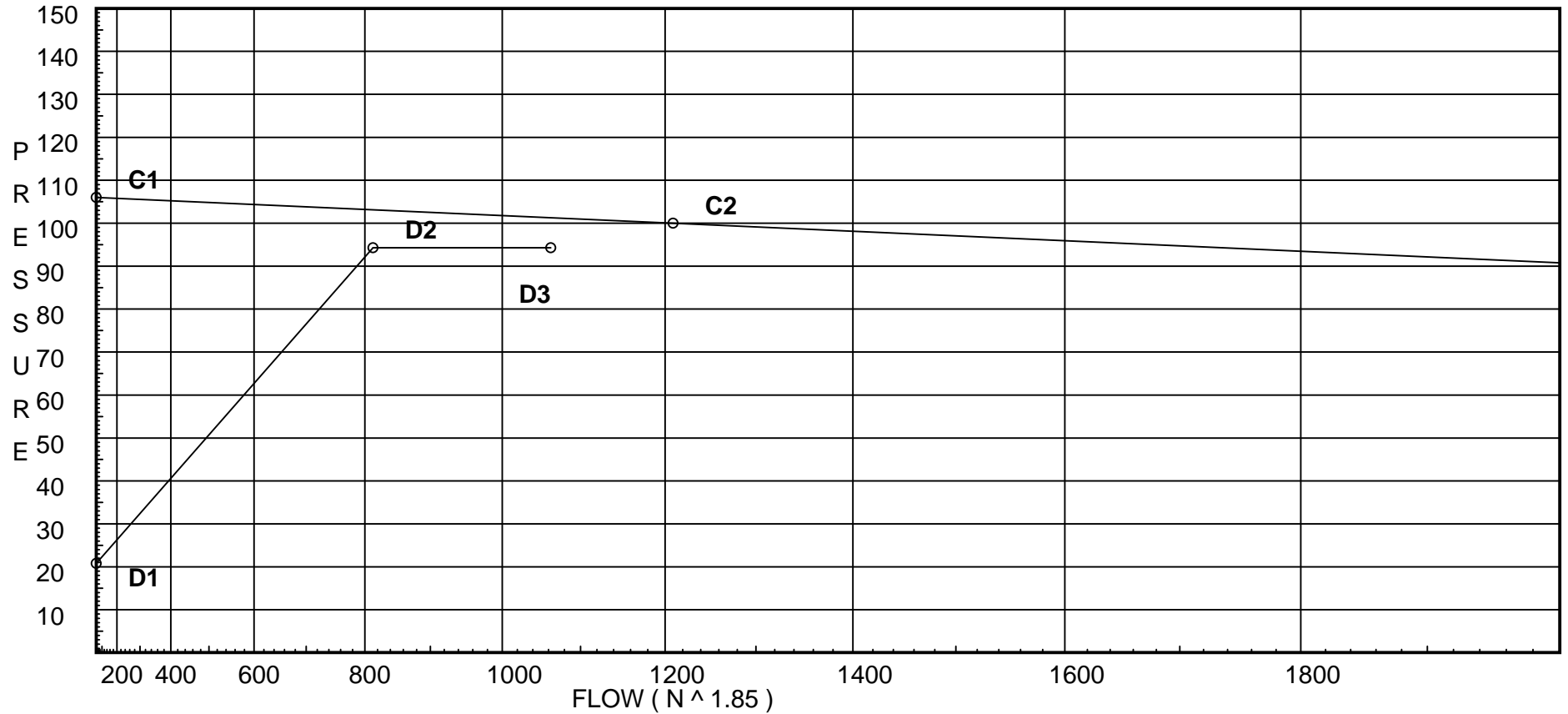
Water Supply Curve (C)

ADVANCED FIRE PROTECTION
NEW YARD YATCH BLDG CALC

Page 2
Date 9-27-13

City Water Supply:
C1 - Static Pressure : 106
C2 - Residual Pressure: 100
C2 - Residual Flow : 1209

Demand:
D1 - Elevation : 20.789
D2 - System Flow : 812.94
D2 - System Pressure : 94.286
Hose (Adj City) :
Hose (Demand) : 250
D3 - System Demand : 1062.94
Safety Margin : 6.986



Fittings Used Summary

ADVANCED FIRE PROTECTION
NEW YARD YATCH BLDG CALC

Page 3
Date 9-27-13

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	
D	Dry Viking F1								3	3		5										
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	
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	
Zia	Wilkins 350	Fitting generates a Fixed Loss Based on Flow																				

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

ADVANCED FIRE PROTECTION
NEW YARD YATCH BLDG CALC

Page 4
Date 9-27-13

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
10	48.0	8	10.56	na	26.0	0.2	130	7.0
11	45.0	8	11.92	na	27.62	0.2	130	7.0
12	39.0	8	14.96	na	30.94	0.2	130	7.0
13	33.0	8	18.58	na	34.48	0.2	130	7.0
14	26.0	8	23.53	na	38.81	0.2	130	7.0
15	21.0	8	28.93	na	43.03	0.2	130	7.0
16	18.5		31.68	na				
20	48.0	8	10.64	na	26.1	0.2	130	7.0
21	45.0	8	12.0	na	27.72	0.2	130	7.0
22	39.0	8	15.04	na	31.03	0.2	130	7.0
23	33.0	8	18.67	na	34.56	0.2	130	7.0
24	26.0	8	23.63	na	38.89	0.2	130	7.0
25	21.0	8	29.05	na	43.12	0.2	130	7.0
26	18.5		31.8	na				
30	48.0	8	10.93	na	26.45	0.2	130	7.0
31	45.0	8	12.29	na	28.05	0.2	130	7.0
32	39.0	8	15.34	na	31.34	0.2	130	7.0
33	33.0	8	18.99	na	34.86	0.2	130	7.0
34	26.0	8	23.99	na	39.18	0.2	130	7.0
35	21.0	8	29.47	na	43.43	0.2	130	7.0
36	18.5		32.25	na				
40	48.0	8	11.55	na	27.19	0.2	130	7.0
41	45.0	8	12.92	na	28.75	0.2	130	7.0
42	39.0	8	15.99	na	31.99	0.2	130	7.0
43	33.0	8	19.69	na	35.49	0.2	130	7.0
44	26.0	8	24.77	na	39.82	0.2	130	7.0
45	21.0	8	30.38	na	44.09	0.2	130	7.0
46	18.5		33.22	na				
M1	18.5		34.77	na				
M2	18.5		34.91	na				
M3	18.5		35.42	na				
M4	18.5		36.51	na				
M5	18.5		60.78	na				
TOR	6.0		66.78	na				
BOR	-3.0		75.34	na				
U1	-4.0		81.24	na				
U2	3.0		92.83	na				
TEST	0.0		94.29	na	250.0			

The maximum velocity is 18.3 and it occurs in the pipe between nodes M4 and M5

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
10	26.00	2.157		0.0	6.800	10.562			K Factor = 8.00	
to		100.0		0.0	0.0	1.299				
11	26.0	0.0090		0.0	6.800	0.061			Vel = 2.28	
11	27.62	2.157		0.0	13.000	11.922			K Factor = 8.00	
to		100.0		0.0	0.0	2.599				
12	53.62	0.0338		0.0	13.000	0.439			Vel = 4.71	
12	30.94	2.157		0.0	13.000	14.960			K Factor = 8.00	
to		100.0		0.0	0.0	2.599				
13	84.56	0.0784		0.0	13.000	1.019			Vel = 7.42	
13	34.49	2.157		0.0	13.000	18.578			K Factor = 8.00	
to		100.0		0.0	0.0	3.032				
14	119.05	0.1477		0.0	13.000	1.920			Vel = 10.45	
14	38.80	2.157		0.0	13.000	23.530			K Factor = 8.00	
to		100.0		0.0	0.0	2.166				
15	157.85	0.2488		0.0	13.000	3.235			Vel = 13.86	
15	43.03	2.157	1V	3.074	1.200	28.931			K Factor = 8.00	
to		100.0		0.0	3.074	1.083				
16	200.88	0.3889		0.0	4.274	1.662			Vel = 17.64	
16	0.0	2.157	1X	7.466	0.500	31.676				
to		100.0		0.0	7.465	0.0				
M1	200.88	0.3888		0.0	7.965	3.097			Vel = 17.64	
	0.0									
	200.88					34.773			K Factor = 34.07	
20	26.10	2.157		0.0	6.800	10.642			K Factor = 8.00	
to		100.0		0.0	0.0	1.299				
21	26.1	0.0090		0.0	6.800	0.061			Vel = 2.29	
21	27.71	2.157		0.0	13.000	12.002			K Factor = 8.00	
to		100.0		0.0	0.0	2.599				
22	53.81	0.0340		0.0	13.000	0.442			Vel = 4.72	
22	31.03	2.157		0.0	13.000	15.043			K Factor = 8.00	
to		100.0		0.0	0.0	2.599				
23	84.84	0.0788		0.0	13.000	1.025			Vel = 7.45	
23	34.57	2.157		0.0	13.000	18.667			K Factor = 8.00	
to		100.0		0.0	0.0	3.032				
24	119.41	0.1485		0.0	13.000	1.931			Vel = 10.48	
24	38.88	2.157		0.0	13.000	23.630			K Factor = 8.00	
to		100.0		0.0	0.0	2.166				
25	158.29	0.2502		0.0	13.000	3.252			Vel = 13.90	
25	43.12	2.157	1V	3.074	1.200	29.048			K Factor = 8.00	
to		100.0		0.0	3.074	1.083				
26	201.41	0.3907		0.0	4.274	1.670			Vel = 17.68	

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
26	0.0	2.157	1X	7.466	0.500	31.801			
to		100.0		0.0	7.465	0.0			
M2	201.41	0.3906		0.0	7.965	3.111		Vel = 17.68	
	0.0								
	201.41					34.912		K Factor = 34.09	
30	26.45	2.157		0.0	6.800	10.931		K Factor = 8.00	
to		100.0		0.0	0.0	1.299			
31	26.45	0.0091		0.0	6.800	0.062		Vel = 2.32	
31	28.05	2.157		0.0	13.000	12.292		K Factor = 8.00	
to		100.0		0.0	0.0	2.599			
32	54.5	0.0348		0.0	13.000	0.452		Vel = 4.79	
32	31.33	2.157		0.0	13.000	15.343		K Factor = 8.00	
to		100.0		0.0	0.0	2.599			
33	85.83	0.0806		0.0	13.000	1.048		Vel = 7.54	
33	34.87	2.157		0.0	13.000	18.990		K Factor = 8.00	
to		100.0		0.0	0.0	3.032			
34	120.7	0.1515		0.0	13.000	1.969		Vel = 10.60	
34	39.18	2.157		0.0	13.000	23.991		K Factor = 8.00	
to		100.0		0.0	0.0	2.166			
35	159.88	0.2548		0.0	13.000	3.313		Vel = 14.04	
35	43.43	2.157	1V	3.074	1.200	29.470		K Factor = 8.00	
to		100.0		0.0	3.074	1.083			
36	203.31	0.3975		0.0	4.274	1.699		Vel = 17.85	
36	0.0	2.157	1X	7.466	0.500	32.252			
to		100.0		0.0	7.465	0.0			
M3	203.31	0.3975		0.0	7.965	3.166		Vel = 17.85	
	0.0								
	203.31					35.418		K Factor = 34.16	
40	27.19	2.157		0.0	6.800	11.553		K Factor = 8.00	
to		100.0		0.0	0.0	1.299			
41	27.19	0.0096		0.0	6.800	0.065		Vel = 2.39	
41	28.75	2.157		0.0	13.000	12.917		K Factor = 8.00	
to		100.0		0.0	0.0	2.599			
42	55.94	0.0365		0.0	13.000	0.475		Vel = 4.91	
42	31.99	2.157		0.0	13.000	15.991		K Factor = 8.00	
to		100.0		0.0	0.0	2.599			
43	87.93	0.0843		0.0	13.000	1.096		Vel = 7.72	
43	35.50	2.157		0.0	13.000	19.686		K Factor = 8.00	
to		100.0		0.0	0.0	3.032			
44	123.43	0.1578		0.0	13.000	2.052		Vel = 10.84	
44	39.81	2.157		0.0	13.000	24.770		K Factor = 8.00	
to		100.0		0.0	0.0	2.166			
45	163.24	0.2648		0.0	13.000	3.443		Vel = 14.33	

Final Calculations - Hazen-Williams

ADVANCED FIRE PROTECTION
NEW YARD YATCH BLDG CALC

Page 7
Date 9-27-13

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
45	44.10	2.157	1V	3.074	1.200	30.379			K Factor = 8.00	
to		100.0		0.0	3.074	1.083				
46	207.34	0.4123		0.0	4.274	1.762			Vel = 18.20	
46	0.0	2.157	1X	7.466	0.500	33.224				
to		100.0		0.0	7.465	0.0				
M4	207.34	0.4122		0.0	7.965	3.283			Vel = 18.20	
	0.0									
	207.34					36.507			K Factor = 34.32	
M1	200.88	4.26		0.0	9.900	34.773				
to		100.0		0.0	0.0	0.0				
M2	200.88	0.0140		0.0	9.900	0.139			Vel = 4.52	
M2	201.41	4.26		0.0	9.900	34.912				
to		100.0		0.0	0.0	0.0				
M3	402.29	0.0511		0.0	9.900	0.506			Vel = 9.06	
M3	203.31	4.26		0.0	10.000	35.418				
to		100.0		0.0	0.0	0.0				
M4	605.6	0.1089		0.0	10.000	1.089			Vel = 13.63	
M4	207.34	4.26	1V	6.39	122.900	36.507				
to		100.0		0.0	6.390	0.0				
M5	812.94	0.1877		0.0	129.290	24.271			Vel = 18.30	
M5	0.0	6.357	1V	8.974	13.000	60.778				
to		100.0		0.0	8.974	5.414				
TOR	812.94	0.0267		0.0	21.974	0.587			Vel = 8.22	
TOR	0.0	6.357	1D	61.61	6.000	66.779				
to		120.0	1Zia	0.0	61.610	7.272			* Fixed loss = 3.374	
BOR	812.94	0.0191		0.0	67.610	1.290			Vel = 8.22	
BOR	0.0	6.16	1E	15.101	195.000	75.341				
to		120.0	1T	32.359	50.696	0.433				
U1	812.94	0.0222	1G	3.236	245.696	5.462			Vel = 8.75	
U1	0.0	6.16	3E	45.302	580.000	81.236				
to		120.0	1T	32.359	77.661	-3.032				
U2	812.94	0.0222		0.0	657.661	14.623			Vel = 8.75	
U2	0.0	12.34	1E	42.195	400.000	92.827				
to		140.0	1T	93.767	135.962	1.155				
TEST	812.94	0.0006		0.0	535.962	0.304			Vel = 2.18	
	250.00								Qa = 250.00	
	1062.94					94.286			K Factor = 109.47	