



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

DEAN & ALLYN, INC.  
32 LEWISTON ROAD BUILDING 1C  
P.O. BOX 709  
GRAY, ME 04039  
207-657-5646

Job Name : 129 MORNING STREET  
Building : 129 Morning Street  
Location : 3RD FLOOR - Portland, Maine  
System : WX2  
Contract : C770  
Data File : CALC.WX2

Hydraulic Design Information Sheet

Name - 129 Morning Street Date - 4/7/08  
 Location - 3RD FLOOR - Portland, Maine  
 Building - 129 Morning Street System No. - WX2  
 Contractor - Dean & Allyn, Inc Contract No. - C770  
 Calculated By - James R White Drawing No. - 1 OF 1  
 Construction: (X) Combustible ( ) Non-Combustible Ceiling Height - 8'-0"  
 Occupancy - RESIDENTIAL APARTMENTS

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

S Other NFPA 13 R

T Specific Ruling Made By Date

M	Area of Sprinkler Operation	- 4 HEADS	System Type	Sprinkler/Nozzle
	Density	- .05	(X) Wet	Make TYCO
D	Area Per Sprinkler	- 256/75	( ) Dry	Model TY2596
E	Elevation at Highest Outlet	- 36'-0"	( ) Deluge	Size 1/2"
S	Hose Allowance - Inside	- 0	( ) Preaction	K-Factor 4.2
I	Rack Sprinkler Allowance	- 0	( ) Other	Temp.Rat.155 DEGRE
G	Hose Allowance - Outside	- 0		

N Note SAFETY MARGIN = 7.61 LBS PSI

Calculation Flow Required - 58.78 Press Required - 64.37  
 Summary C-Factor Used: 120 Overhead 150 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 9/26/06		Cap. -
T	Time of Test -	Rated Cap.-	Elev.-
E	Static Press - 72	@ Press -	
R	Residual Press - 68	Elev. -	Well
	Flow - 903		Proof Flow
S	Elevation - 6		

U Location - HYDRANT # 413

P Source of Information - PORTLAND WATER DISTRICT

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

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

G Horizontal Barriers Provided:

E

# 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
E	90' Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
G	Generic Gate Valve	0	0	0	0	1	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
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
Zaa	Ames 2000B	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

# Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
D101	36.0	4.2	17.75	na	17.69	0.05	256	14.5
D102	36.0	4.2	9.6	na	13.01	0.05	75	9.6
D103	36.0	4.2	9.93	na	13.23	0.05	75	9.6
D104	36.0	4.2	12.49	na	14.85	0.05	75	9.6
20	36.0		12.72	na				
1	36.0		9.78	na				
2	36.0		10.29	na				
3	36.0		13.13	na				
4	36.0		16.21	na				
5	36.0		17.38	na				
6	36.0		18.37	na				
7	6.5		32.15	na				
8	6.5		36.12	na				
9	6.5		42.52	na				
10	6.5		43.71	na				
11	6.5		44.31	na				
12	6.5		44.69	na				
13	6.5		44.94	na				
14	6.5		45.17	na				
15	6.5		45.62	na				
16	6.5		46.0	na				
17	6.5		47.71	na				
18	6.5		48.02	na				
TOR	6.5		51.16	na				
BOR	6.5		57.44	na				
19	6.5		57.69	na				
TEST	6.0		64.36	na				

The maximum velocity is 15.25 and it occurs in the pipe between nodes 3 and 4

# 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	*****
D101 to 6	17.69 17.69 0.0 17.69	1.049 120 0.1038	1T	5.0 0.0 0.0	1.000 5.000 6.000	17.746 0.0 0.623			K Factor = 4.20 Vel = 6.57	
						18.369			K Factor = 4.13	
D102 to 1	13.01 13.01 0.0 13.01	1.049 120 0.0587	1E	2.0 0.0 0.0	1.000 2.000 3.000	9.600 0.0 0.176			K Factor = 4.20 Vel = 4.83	
						9.776			K Factor = 4.16	
D103 to 2	13.23 13.23 0.0 13.23	1.049 120 0.0607	1T	5.0 0.0 0.0	1.000 5.000 6.000	9.925 0.0 0.364			K Factor = 4.20 Vel = 4.91	
						10.289			K Factor = 4.12	
D104 to 20	14.85 14.85 0.0 14.85	1.049 120 0.0750	1E	2.0 0.0 0.0	1.000 2.000 3.000	12.493 0.0 0.225			K Factor = 4.20 Vel = 5.51	
						12.718			K Factor = 4.16	
20 to 3	14.85 14.85 0.0 14.85	1.049 120 0.0751	1T	5.0 0.0 0.0	0.500 5.000 5.500	12.718 0.0 0.413			Vel = 5.51	
						13.131			K Factor = 4.10	
1 to 2	13.01 13.01 0.0 13.01	1.049 120 0.0588		0.0 0.0 0.0	8.720 0.0 8.720	9.776 0.0 0.513			Vel = 4.83	
2 to 3	13.23 26.24 0.0 26.24	1.049 120 0.2151	1T	5.0 0.0 0.0	8.210 5.000 13.210	10.289 0.0 2.842			Vel = 9.74	
3 to 4	14.85 41.09 0.0 41.09	1.049 120 0.4930	1E	2.0 0.0 0.0	4.250 2.000 6.250	13.131 0.0 3.081			Vel = 15.25	
4 to 5	0.0 41.09 0.0 41.09	1.049 120 0.4932	1E	2.0 0.0 0.0	0.370 2.000 2.370	16.212 0.0 1.169			Vel = 15.25	
5 to 6	0.0 41.09 0.0 41.09	1.38 120 0.1297		0.0 0.0 0.0	7.620 0.0 7.620	17.381 0.0 0.988			Vel = 8.81	
6 to 7	17.69 58.78 0.0 58.78	1.61 120 0.1187	1T	8.0 0.0 0.0	0.500 8.000 8.500	18.369 12.776 1.009			Vel = 9.26	
7 to 8	0.0 58.78 0.0 58.78	1.61 120 0.1187	1T	8.0 0.0 0.0	25.410 8.000 33.410	32.154 0.0 3.967			Vel = 9.26	
8 to 9	0.0 58.78 0.0 58.78	1.61 120 0.1187	4E	16.0 0.0 0.0	37.910 16.000 53.910	36.121 0.0 6.400			Vel = 9.26	

# 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	*****
9 to 10	0.0 58.78	1.61 120 0.1187	1E	4.0 0.0 0.0	6.000 4.000 10.000	42.521 0.0 1.187		Vel =	9.26	
10 to 11	0.0 58.78	2.067 120 0.0352	1E 1S	5.0 11.0 0.0	1.000 16.000 17.000	43.708 0.0 0.598		Vel =	5.62	
11 to 12	0.0 58.78	2.067 120 0.0352	1E	5.0 0.0 0.0	6.000 5.000 11.000	44.306 0.0 0.387		Vel =	5.62	
12 to 13	0.0 58.78	2.067 120 0.0351	1E 1G	5.0 1.0 0.0	1.000 6.000 7.000	44.693 0.0 0.246		Vel =	5.62	
13 to 14	0.0 58.78	2.067 120 0.0352	1E	5.0 0.0 0.0	1.500 5.000 6.500	44.939 0.0 0.229		Vel =	5.62	
14 to 15	0.0 58.78	2.067 120 0.0352	1T	10.0 0.0 0.0	2.830 10.000 12.830	45.168 0.0 0.451		Vel =	5.62	
15 to 16	0.0 58.78	2.067 120 0.0352	1T	10.0 0.0 0.0	0.750 10.000 10.750	45.619 0.0 0.378		Vel =	5.62	
16 to 17	0.0 58.78	2.067 120 0.0352	2E	10.0 0.0 0.0	38.660 10.000 48.660	45.997 0.0 1.711		Vel =	5.62	
17 to 18	0.0 58.78	2.067 120 0.0351	1E	5.0 0.0 0.0	3.910 5.000 8.910	47.708 0.0 0.313		Vel =	5.62	
18 to TOR	0.0 58.78	2.067 120 0.0351	1Fsp	0.0 0.0 0.0	4.042 0.0 4.042	48.021 3.000 0.142		* Fixed loss = 3 Vel =	5.62	
TOR to BOR	0.0 58.78	2.067 120 0.0352	1E 1Zaa	5.0 0.0 0.0	10.500 5.000 15.500	51.163 5.736 0.545		* Fixed loss = 5.736 Vel =	5.62	
BOR to 19	0.0 58.78	2.067 120 0.0351	1E	5.0 0.0 0.0	2.000 5.000 7.000	57.444 0.0 0.246		Vel =	5.62	
19 to TEST	0.0 58.78	1.985 150 0.0283		0.0 0.0 0.0	227.870 0.0 227.870	57.690 0.217 6.458		Vel =	6.09	
	0.0 58.78					64.365		K Factor =	7.33	

# Water Supply Curve (C)

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City Water Supply:  
C1 - Static Pressure : 72  
C2 - Residual Pressure: 68  
C2 - Residual Flow : 903

Demand:  
D1 - Elevation : 12.993  
D2 - System Flow : 58.7834  
D2 - System Pressure : 64.365  
Hose ( Adj City ) : \_\_\_\_\_  
Hose ( Demand ) : \_\_\_\_\_  
D3 - System Demand : 58.7834  
Safety Margin : 7.610

