



. . . Fire Protection by Computer Design

DEAN & ALLYN, INC.
116 LEWISTON ROAD
GRAY, MAINE 04039
207-657-5646

Job Name : 10 Exchange Street-Standpipe
Building : 3RD AND 4TH FLOORS
Location : 10 EXCHANGE STREET
System : WX6
Contract : C161341
Data File : C1341 10 Exchange Street Standpipe.WX6

HYDRAULIC DESIGN INFORMATION SHEET

Name - 10 EXCHANGE STREET Date - 07/20/2016
 Location - 10 EXCHANGE STREET
 Building - 3RD AND 4TH FLOORS System No. - WX6
 Contractor - DEAN & ALLYN, INC. Contract No. - C161341
 Calculated By - T CLARKE Drawing No. - FP-103
 Occupancy - RESIDENTIAL

S (X)NFPA 14 Number of Standpipes ()1 (X)2 ()3 ()4 ()
 Y ()Other
 S ()Specific Ruling Made by Date

E	Flow at Top Most Outlet	- 250	Gpm	System Type
M	Pres. at Top Most Outlet	- 65	Psi	(X) Wet () Dry
	Flow For Ea. Additional Standpipe	- 250	Gpm	
D	Total Additional Flow	- 500	Gpm	
E	Elevation at Highest Outlet	- 57.5	Feet	
S	Hose Valve Connection	()1 1/2" (X)2 1/2"		
I	Class Service	(X)I ()II ()III		
G	Note:STANDPIPE IS MANUAL-WET CONNECTED TO CITY WATER BUT REQUIRING			
N	BOOSTING PRESSURE BY FIRE DEPT			

Calculation	Gpm Required 750	Psi Required 150	AT FDC
Summary	C-Factor Used:	Overhead 120	Underground 120

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test -		Cap.
T	Time of Test -	Rated Cap.	Elev.
E	Static (Psi) - 150	@ Psi	
R	Residual (Psi) - 150	Elev.	Well
	Flow (Gpm) - 750		Proof Flow Gpm
S	Elevation - 10		

U Location: AT FIRE DEPT CONNECTION

P Source of Information:

Y

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	
Bvca	B Fly Vic 705						6	6	7		8	12	14	16	18	19						
I	90' Grvd-Vic Elbow #10	0	0	2	3	4	3.5	6	5	8	7	8.5	10	13	17	20	23	25	33	36	40	
Rck	Riser Check Rel G							7	7		10		16	15.9								
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65						
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121	
U	45' Ell Firelock #003	0	0	0	0	0	1.8	2.2	2.6	0	3.4	4.2	5	5	0	0	0	0	0	0	0	0
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	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	0

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

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
H1	57.542		65.0	na	250.0			
H2	44.625		70.69	na	250.0			
1	57.542		74.37	na				
2	44.625		80.06	na				
4	48.042		78.95	na				
H3	52.625		84.74	na	250.0			
3	52.625		94.11	na				
7	45.0		98.21	na				
5	45.0		91.5	na				
6	6.75		117.35	na				
TR	6.75		132.15	na				
BR	2.917		138.15	na				
10	2.917		139.19	na				
FDC	10.0		146.49	na				

The maximum velocity is 16.88 and it occurs in the pipe between nodes 6 and TR

Final Calculations - Hazen-Williams - 2007

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftn'g's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
H1 to 1	250.00 250.0	2.469 120.0 0.2154	T Eq	12.0 31.0 0.0	0.500 43.000 43.500	65.000 0.0 9.370		Qa = 250.00 Vel = 16.75		
	0.0 250.00						74.370		K Factor = 28.99	
H2 to 2	250.00 250.0	2.469 120.0 0.2154	T Eq	12.0 31.0 0.0	0.500 43.000 43.500	70.685 0.0 9.370		Qa = 250.00 Vel = 16.75		
	0.0 250.00						80.055		K Factor = 27.94	
1 to 4	250.00 250.0	4.26 120.0 0.0151	X	21.067 0.0 0.0	9.500 21.067 30.567	74.370 4.114 0.463		Vel = 5.63		
	0.0 250.00						78.947		K Factor = 28.14	
2 to 4	250.00 250.0	4.26 120.0 0.0151	X	21.067 0.0 0.0	3.500 21.067 24.567	80.055 -1.480 0.372		Vel = 5.63		
4 to 5	250.00 500.0	4.26 120.0 0.0545	8U 8V	35.814 71.629 0.0	98.708 107.443 206.151	78.947 1.317 11.239		Vel = 11.25		
	0.0 500.00						91.503		K Factor = 52.27	
H3 to 3	250.00 250.0	2.469 120.0 0.2154	T Eq	12.0 31.0 0.0	0.500 43.000 43.500	84.735 0.0 9.370		Qa = 250.00 Vel = 16.75		
3 to 7	0.0 250.0	4.26 120.0 0.0151	2V X	17.907 21.067 0.0	13.833 38.974 52.807	94.105 3.302 0.799		Vel = 5.63		
7 to 6	0.0 250.0	4.26 120.0 0.0151	10I Bvca	92.17 10.534 0.0	67.458 102.704 170.162	98.206 16.566 2.574		Vel = 5.63		
	0.0 250.00						117.346		K Factor = 23.08	
5 to 6	500.00 500.0	4.26 120.0 0.0545	10I Bvca	92.17 10.534 0.0	67.458 102.704 170.162	91.503 16.566 9.277		Vel = 11.25		
6 to TR	250.00 750.0	4.26 120.0 0.1154	8I	73.736 0.0 0.0	54.542 73.736 128.278	117.346 0.0 14.806		Vel = 16.88		
TR to BR	0.0 750.0	4.26 120.0 0.1154	Bvca I Rck	10.534 9.217 13.167	4.667 32.918 37.585	132.152 1.660 4.338		Vel = 16.88		
BR to 10	0.0 750.0	6.357 120.0 0.0164	X 2V	31.433 25.147 0.0	6.833 56.580 63.413	138.150 0.0 1.042		Vel = 7.58		
10 to FDC	0.0 750.0	4.26 120.0 0.1154	5I S	46.085 28.968 0.0	14.750 75.053 89.803	139.192 -3.068 10.366		Vel = 16.88		

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	*****
	0.0 750.00				146.490			K Factor = 61.97	

Water Supply Curve C

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City Water Supply:
C1 - Static Pressure : 150
C2 - Residual Pressure: 150
C2 - Residual Flow : 750

Demand:
D1 - Elevation : 20.590
D2 - System Flow : 750
D2 - System Pressure : 146.490
Hose (Demand) : _____
D3 - System Demand : 750
Safety Margin : 3.510

