

... Fire Protection by Computer Design

FIRE PROTECTION SPRINKLER SER.
278 HARRIS RD
MINOT, MAINE
04258
207-393-7422

Job Name : JEFFREY BANKER RES. CALC #1
Building : FP-1
Location : 14 BLYTHE CT.
System : #1
Contract :
Data File :

HYDRAULIC CALCULATIONS
for

Project name: JEFFREY BANKER RES. CALC #1
Location: 14 BLYTHE CT.
Drawing no: FP-1
Date: 6-17-14

Design

Remote area number: #1
Remote area location: BATHROOM AND STAIRWAY
Occupancy classification: LIGHT HAZARD
Density: .05 - Gpm/SqFt
Area of application: 122 - SqFt
Coverage per sprinkler: 144 - SqFt
Type of sprinklers calculated: RELIABLE HSW SPRINKLER HEADS K=4.4
No. of sprinklers calculated: 2
In-rack demand: - GPM
Hose streams: 0 - GPM
Total water required (including hose streams): 24.0998 - GPI@ 38.2648 - Psi
Type of system: NFPA 13D
Volume of dry or preaction system: - Gal

Water supply information

Date: 4-25-14
Location: TEST HYD IS LOCATED ON BRAKETT ST
Source: PORTLAND WATER DIST.

Name of contractor: FIRE PROTECTION SPRINKLER SER.
Address: 278 HARRIS RD / MINOT, MAINE / 04258
Phone number: 207-393-7422
Name of designer: TIM FORTIN
Authority having jurisdiction: STATE OF MAINE / CITY OF PORTLAND
Notes: (Include peaking information or gridded systems here.)

Water Supply Curve (C)

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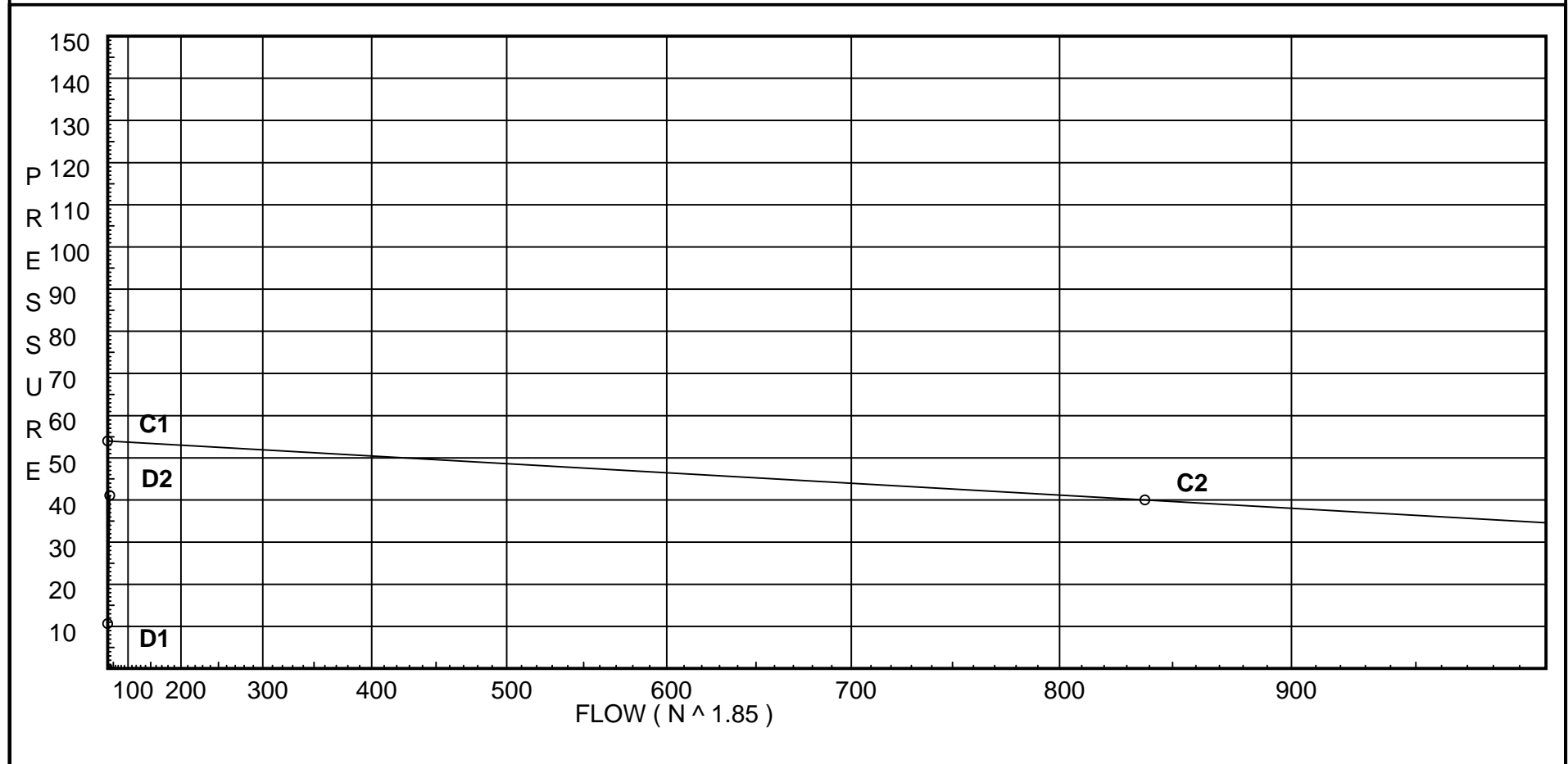
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City Water Supply:

C1 - Static Pressure : 54
C2 - Residual Pressure: 40
C2 - Residual Flow : 838

Demand:

D1 - Elevation : 10.654
D2 - System Flow : 29.0998
D2 - System Pressure : 41.074
Hose (Adj City) : _____
Hose (Demand) : _____
D3 - System Demand : 29.0998
Safety Margin : 12.898



Fittings Used Summary

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Fitting Legend		½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24	
Abbrev.	Name																					
G	Generic Gate Valve	0	0	1	1	1	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13	
N *	CPVC 90'Ell Harvel-Spears	7	7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0	0
O *	CPVC Tee-Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0	0
R *	CPVC Coupling Tee-Run	1	1	1	1	1	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0
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	
Zik	Wilkins 950XL	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

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
1	24.6	4.4	7.5	na	12.05	0.05	144	7.5
2	24.6	4.4	7.5	na	12.05	0.05	144	7.5
3	24.6		7.64	na				
4	8.6		16.78	na				
5	8.6		18.02	na				
6	8.6		18.28	na				
7	8.0		18.89	na				
8	8.0		19.3	na				
9	8.0		19.83	na				
10	8.0		20.24	na				
11	7.0		21.29	na				
TOR	8.0		21.32	na	5.0			
BOR	8.0		28.92	na				
UG	0.0		38.22	na				
UG1	-2.0		41.91	na				
TEST	0.0		41.07	na				

The maximum velocity is 10.76 and it occurs in the pipe between nodes BOR and UG

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
1	12.05	1.101	1O	5.0	0.200	7.500			K Factor = 4.40	
to		150.0		0.0	5.000	0.0				
3	12.05	0.0267		0.0	5.200	0.139			Vel = 4.06	
	0.0									
	12.05					7.639			K Factor = 4.36	
2	12.05	1.101	1O	5.0	0.200	7.500			K Factor = 4.40	
to		150.0		0.0	5.000	0.0				
3	12.05	0.0267		0.0	5.200	0.139			Vel = 4.06	
3	12.05	1.101	1N	7.0	16.000	7.639				
to		150.0		0.0	7.000	6.930				
4	24.1	0.0960		0.0	23.000	2.209			Vel = 8.12	
4	0.0	1.101	1N	7.0	5.900	16.778				
to		150.0		0.0	7.000	0.0				
5	24.1	0.0960		0.0	12.900	1.239			Vel = 8.12	
5	0.0	1.394	1N	8.0	0.500	18.017				
to		150.0		0.0	8.000	0.0				
6	24.1	0.0305		0.0	8.500	0.259			Vel = 5.07	
6	0.0	1.394	1N	8.0	3.700	18.276				
to		150.0		0.0	8.000	0.260				
7	24.1	0.0304		0.0	11.700	0.356			Vel = 5.07	
7	0.0	1.394	1N	8.0	5.300	18.892				
to		150.0		0.0	8.000	0.0				
8	24.1	0.0305		0.0	13.300	0.405			Vel = 5.07	
8	0.0	1.394	1N	8.0	8.600	19.297				
to		150.0	1R	1.0	9.000	0.0				
9	24.1	0.0305		0.0	17.600	0.536			Vel = 5.07	
9	0.0	1.394	1N	8.0	5.300	19.833				
to		150.0		0.0	8.000	0.0				
10	24.1	0.0305		0.0	13.300	0.405			Vel = 5.07	
10	0.0	1.394	1N	8.0	11.300	20.238				
to		150.0	1R	1.0	9.000	0.433				
11	24.1	0.0304		0.0	20.300	0.618			Vel = 5.07	
11	0.0	1.394	1N	8.0	7.300	21.289				
to		150.0		0.0	8.000	-0.433				
TOR	24.1	0.0305		0.0	15.300	0.466			Vel = 5.07	
TOR	5.00	1.394	1N	8.0	7.000	21.322			Qa = 5.00	
to		150.0	1Zik	0.0	8.000	6.953			* Fixed loss = 6.953	
BOR	29.1	0.0431		0.0	15.000	0.647			Vel = 6.12	
BOR	0.0	1.051	1T	7.626	25.000	28.922				
to		150.0	1G	1.525	9.150	3.465				
UG	29.1	0.1707		0.0	34.150	5.831			Vel = 10.76	

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 *****
UG to UG1	0.0 29.1	2.067 120.0 0.0096	1T 0.0	10.0 0.0 0.0	285.000 10.000 295.000	38.218 0.866 2.825	Vel = 2.78
UG1 to TEST	0.0 29.1	6.065 120.0 0.0001	1T 0.0	30.0 0.0 0.0	580.000 30.000 610.000	41.909 -0.866 0.031	Vel = 0.32
	0.0 29.10					41.074	K Factor = 4.54