

... Fire Protection by Computer Design

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

Job Name : 77 WILLAMS ST 3RD FL CALC
Building : FP-01
Location : 77 WILLAMS ST PORTLAND
System : #1
Contract :
Data File : 77 WILLAMS ST.WXF

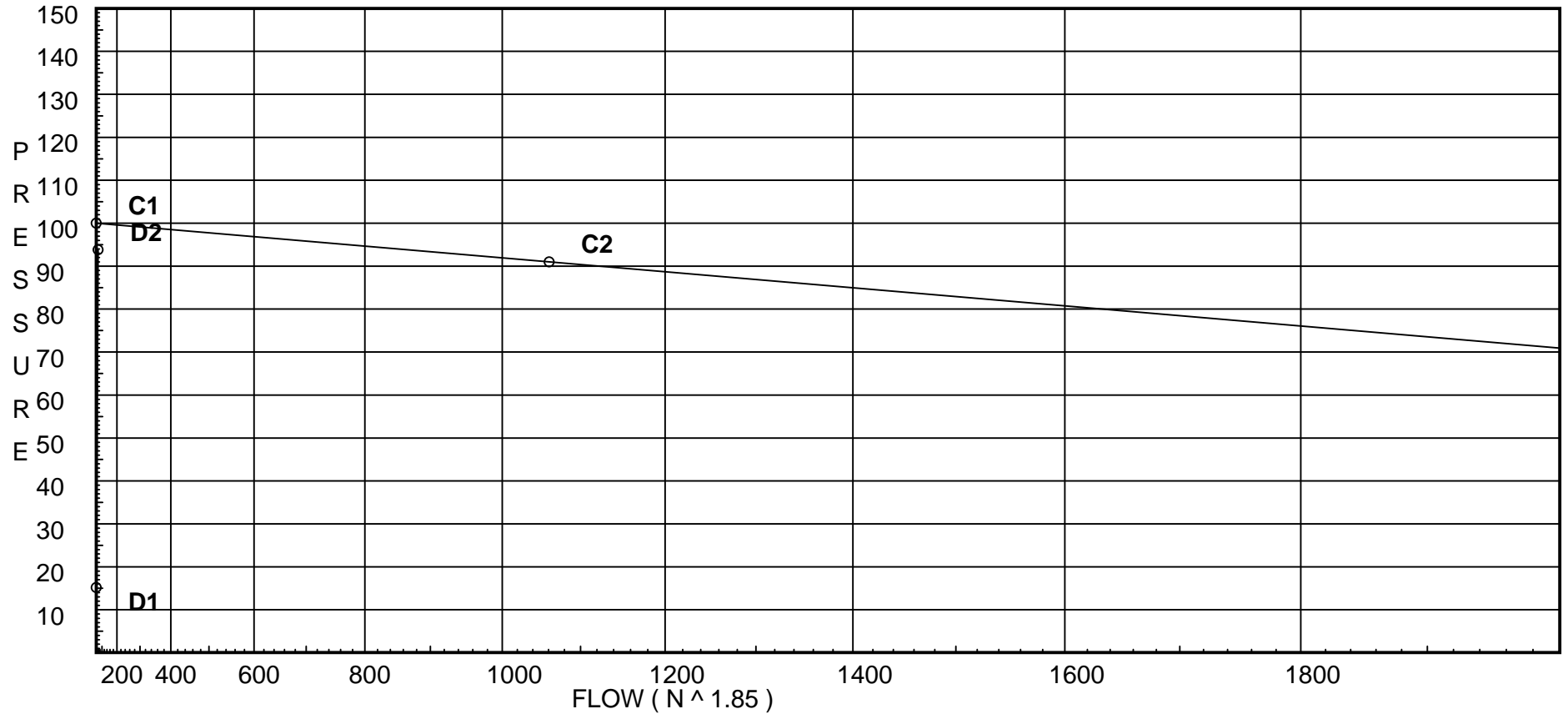
Water Supply Curve (C)

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City Water Supply:
C1 - Static Pressure : 100
C2 - Residual Pressure: 91
C2 - Residual Flow : 1061

Demand:
D1 - Elevation : 15.158
D2 - System Flow : 54.2348
D2 - System Pressure : 93.822
Hose (Adj City) : _____
Hose (Demand) : _____
D3 - System Demand : 54.2348
Safety Margin : 6.141



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
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
O *	CPVC Tee-Branch	3	3	5	6	8	10	12	15	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
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
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	35.0	4.9	7.18	na	13.13	0.05	256	7.0
2	31.0		9.37	na				
3	31.0		9.93	na				
4	31.0		10.31	na				
5	35.0	4.9	7.66	na	13.56	0.05	256	7.0
6	31.0		9.87	na				
7	31.0		10.47	na				
8	31.0		10.87	na				
9	31.0		11.68	na				
10	31.0		13.71	na				
20	35.0	4.9	7.0	na	12.96	0.05	256	7.0
21	31.0		9.21	na				
22	31.0		9.75	na				
23	31.0		10.09	na				
24	31.0	4.9	8.86	na	14.58	0.05	256	7.0
25	31.0		9.45	na				
26	31.0		10.13	na				
27	31.0		10.64	na				
28	31.0		13.05	na				
11	31.0		14.67	na				
30	22.0		24.99	na				
31	13.0		36.3	na				
32	13.0		45.37	na				
33	13.0		50.31	na				
TOR	1.0		64.57	na				
BOR	5.0		84.93	na				
UG	0.0		93.72	na				
UG1	0.0		93.82	na				
TEST	0.0		93.82	na				

The maximum velocity is 20.13 and it occurs in the pipe between nodes 11 and 30

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	*****
1	13.13	1.101	1N	7.0	7.500	7.180			K Factor = 4.90	
to		150.0		0.0	7.000	1.732				
2	13.13	0.0312		0.0	14.500	0.453			Vel = 4.42	
2	0.0	1.101	2N	14.0	4.000	9.365				
to		150.0		0.0	14.000	0.0				
3	13.13	0.0313		0.0	18.000	0.563			Vel = 4.42	
3	0.0	1.101	1N	7.0	5.200	9.928				
to		150.0		0.0	7.000	0.0				
4	13.13	0.0312		0.0	12.200	0.381			Vel = 4.42	
4	0.0	1.101	1O	5.0	12.000	10.309				
to		150.0	1R	1.0	6.000	0.0				
8	13.13	0.0312		0.0	18.000	0.562			Vel = 4.42	
	0.0									
	13.13					10.871			K Factor = 3.98	
5	13.56	1.101	1N	7.0	7.500	7.657			K Factor = 4.90	
to		150.0		0.0	7.000	1.732				
6	13.56	0.0332		0.0	14.500	0.481			Vel = 4.57	
6	0.0	1.101	2N	14.0	4.000	9.870				
to		150.0		0.0	14.000	0.0				
7	13.56	0.0331		0.0	18.000	0.596			Vel = 4.57	
7	0.0	1.101	1N	7.0	5.200	10.466				
to		150.0		0.0	7.000	0.0				
8	13.56	0.0332		0.0	12.200	0.405			Vel = 4.57	
8	13.13	1.101	1O	5.0	2.000	10.871				
to		150.0		0.0	5.000	0.0				
9	26.69	0.1160		0.0	7.000	0.812			Vel = 8.99	
9	0.0	1.101	1R	1.0	11.500	11.683				
to		150.0	1O	5.0	6.000	0.0				
10	26.69	0.1161		0.0	17.500	2.031			Vel = 8.99	
10	0.0	1.101	1O	5.0	3.200	13.714				
to		150.0		0.0	5.000	0.0				
11	26.69	0.1160		0.0	8.200	0.951			Vel = 8.99	
	0.0									
	26.69					14.665			K Factor = 6.97	
20	12.96	1.101	1N	7.0	8.500	7.000			K Factor = 4.90	
to		150.0		0.0	7.000	1.732				
21	12.96	0.0305		0.0	15.500	0.473			Vel = 4.37	
21	0.0	1.101	2N	14.0	4.000	9.205				
to		150.0		0.0	14.000	0.0				
22	12.96	0.0305		0.0	18.000	0.549			Vel = 4.37	
22	0.0	1.101	1N	7.0	4.100	9.754				
to		150.0		0.0	7.000	0.0				
23	12.96	0.0305		0.0	11.100	0.339			Vel = 4.37	

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftgng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
23	0.0	1.101	1O	5.0	12.000	10.093				
to		150.0	1R	1.0	6.000	0.0				
27	12.96	0.0305		0.0	18.000	0.549		Vel =	4.37	
	0.0									
	12.96					10.642		K Factor =	3.97	
24	14.58	1.101	1N	7.0	8.600	8.856		K Factor =	4.90	
to		150.0		0.0	7.000	0.0				
25	14.58	0.0379		0.0	15.600	0.592		Vel =	4.91	
25	0.0	1.101	2N	14.0	4.000	9.448				
to		150.0		0.0	14.000	0.0				
26	14.58	0.0379		0.0	18.000	0.682		Vel =	4.91	
26	0.0	1.101	1N	7.0	6.500	10.130				
to		150.0		0.0	7.000	0.0				
27	14.58	0.0379		0.0	13.500	0.512		Vel =	4.91	
27	12.97	1.101	1R	1.0	11.600	10.642				
to		150.0	1N	7.0	8.000	0.0				
28	27.55	0.1231		0.0	19.600	2.412		Vel =	9.28	
28	0.0	1.101	1O	5.0	8.100	13.054				
to		150.0		0.0	5.000	0.0				
11	27.55	0.1230		0.0	13.100	1.611		Vel =	9.28	
11	26.68	1.049	1N	7.0	0.800	14.665				
to		120.0		0.0	7.000	3.898				
30	54.23	0.8240		0.0	7.800	6.427		Vel =	20.13	
30	0.0	1.049		0.0	9.000	24.990				
to		120.0		0.0	0.0	3.898				
31	54.23	0.8239		0.0	9.000	7.415		Vel =	20.13	
31	0.0	1.049	1E	2.0	9.000	36.303				
to		120.0		0.0	2.000	0.0				
32	54.23	0.8239		0.0	11.000	9.063		Vel =	20.13	
32	0.0	1.049	1T	5.0	1.000	45.366				
to		120.0		0.0	5.000	0.0				
33	54.23	0.8240		0.0	6.000	4.944		Vel =	20.13	
33	0.0	1.049	1E	2.0	4.000	50.310				
to		120.0	1T	5.0	7.000	5.197				
TOR	54.23	0.8239		0.0	11.000	9.063		Vel =	20.13	
TOR	0.0	1.049	1Zik	0.0	6.000	64.570				
to		120.0	1Z	2.0	9.000	8.001		* Fixed loss =	9.733	
BOR	54.23	0.8239	1E	2.0	15.000	12.359		Vel =	20.13	
			1T	5.0						
BOR	0.0	1.332	1G	1.272	30.000	84.930				
to		150.0	1T	7.631	8.902	2.166				
UG	54.23	0.1704		0.0	38.902	6.628		Vel =	12.49	

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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 54.23	6.16 150.0 0.0001	1T	48.896 0.0 0.0	928.000 48.896 976.896	93.724 0.0 0.096		Vel = 0.58	
UG1 to TEST	0.0 54.23	12.34 140.0 0.0	1E 1T	42.195 93.767 0.0	297.000 135.962 432.962	93.820 0.0 0.002		Vel = 0.15	
	0.0 54.23					93.822		K Factor = 5.60	