

... Fire Protection by Computer Design

ALTERNATIVE SPRINKLER
39 JACKSON RD.
POLAND SPRING, ME
04274
207-838-8930

Job Name : 428 FOREST AVE RES CALC
Building : FP-01
Location : 428 FOREST AVE
System : #2
Contract :
Data File : 428 FOREST AVE RES CALC.WXF

HYDRAULIC CALCULATIONS
for

Project name: 428 FOREST AVE RES CALC
Location: 428 FOREST AVE
Drawing no: FP-01
Date: 12-20-16

Design

Remote area number: #2
Remote area location: 2ND FLOOR APT UNIT#3
Occupancy classification: LIGHT HAZARD
Density: .05 - Gpm/SqFt
Area of application: 442 - SqFt
Coverage per sprinkler: 256 - SqFt
Type of sprinklers calculated: RELIABLE RES-49 PENDENTS
No. of sprinklers calculated: 4
In-rack demand: - GPM
Hose streams: 0 - GPM
Total water required (including hose streams): 54.2289 - GPM @ 67.0505 - Psi
Type of system: NFPA 13 WET
Volume of dry or preaction system: - Gal

Water supply information

Date: 11-2-16
Location: CORNER OF FOREST AVE AND PITT ST.
Source: PORTLAND WATER DIST.

Name of contractor: ALTERNATIVE SPRINKLER FIRE PROTECTION
Address: 39 JACKSON ROAD
Phone number: 207-838-8930
Name of designer: TIM FORTIN
Authority having jurisdiction: STATE OF MAINE / CITY OF PORTLAND
Notes: (Include peaking information or gridded systems here.)

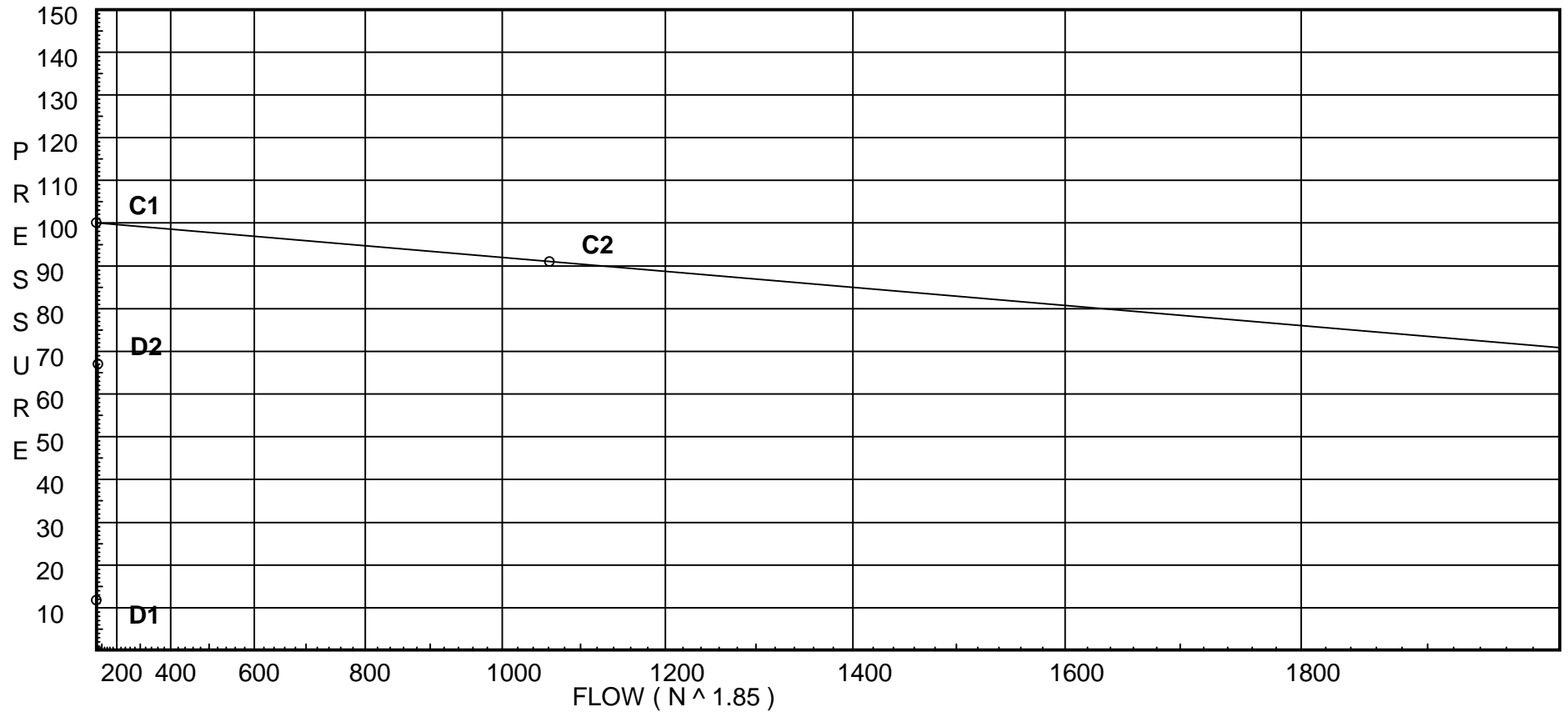
Water Supply Curve (C)

ALTERNATIVE SPRINKLER
428 FOREST AVE RES CALC

Page 2
Date 12-20-16

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

Demand:
D1 - Elevation : 11.694
D2 - System Flow : 54.2289
D2 - System Pressure : 67.050
Hose (Adj City) : _____
Hose (Demand) : _____
D3 - System Demand : 54.2289
Safety Margin : 32.913



Fittings Used Summary

ALTERNATIVE SPRINKLER
428 FOREST AVE RES CALC

Page 3
Date 12-20-16

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	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
Zid	Wilkins 350DA	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

ALTERNATIVE SPRINKLER
428 FOREST AVE RES CALC

Page 4
Date 12-20-16

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
DP1	12.9	5.6	21.56	na	26.0	0.2	130	7.0
30	27.0	4.9	7.82	na	13.7	0.05	256	7.0
31	27.0		8.11	na				
33	27.0	4.9	7.0	na	12.96	0.05	256	7.0
35	27.0	4.9	7.29	na	13.23	0.05	256	7.0
34	27.0		7.28	na				
36	27.0		7.56	na				
32	27.0	4.9	8.56	na	14.34	0.05	256	7.0
37	27.0		12.14	na				
38	27.0		20.58	na				
39	27.0		27.43	na				
40	27.0		31.56	na				
41	18.0		39.34	na				
42	9.0		48.76	na				
43	9.0		54.62	na				
TOR	7.0		55.59	na				
BOR	-4.0		68.72	na				
UG	-4.0		68.77	na				
TEST	0.0		67.05	na				

The maximum velocity is 20.13 and it occurs in the pipe between nodes 42 and 43

Final Calculations - Hazen-Williams

ALTERNATIVE SPRINKLER
428 FOREST AVE RES CALC

Page 5
Date 12-20-16

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	*****
DP1	26.00	1.049	1E	2.0	1.500	21.556			K Factor = 5.60	
to		120.0	1T	5.0	7.000	5.587				
EQO1	26.0	0.2114		0.0	8.500	1.797			Vel = 9.65	
	0.0									
	26.00					28.940			K Factor = 4.83	
30	13.70	1.101	1O	5.0	3.700	7.818			K Factor = 4.90	
to		150.0		0.0	5.000	0.0				
31	13.7	0.0338		0.0	8.700	0.294			Vel = 4.62	
31	0.0	1.101	1O	5.0	8.300	8.112				
to		150.0		0.0	5.000	0.0				
32	13.7	0.0338		0.0	13.300	0.450			Vel = 4.62	
	0.0									
	13.70					8.562			K Factor = 4.68	
33	12.96	1.101	1O	5.0	4.100	7.000			K Factor = 4.90	
to		150.0		0.0	5.000	0.0				
34	12.96	0.0305		0.0	9.100	0.278			Vel = 4.37	
	0.0									
	12.96					7.278			K Factor = 4.80	
35	13.23	1.101	1O	5.0	3.800	7.286			K Factor = 4.90	
to		150.0		0.0	5.000	0.0				
36	13.23	0.0316		0.0	8.800	0.278			Vel = 4.46	
	0.0									
	13.23					7.564			K Factor = 4.81	
34	12.96	1.101	1O	5.0	4.400	7.278				
to		150.0		0.0	5.000	0.0				
36	12.96	0.0304		0.0	9.400	0.286			Vel = 4.37	
36	13.23	1.101	1O	5.0	3.900	7.564				
to		150.0		0.0	5.000	0.0				
32	26.19	0.1121		0.0	8.900	0.998			Vel = 8.83	
32	28.04	1.101	1R	1.0	7.300	8.562			K Factor = 4.90	
to		150.0		0.0	1.000	0.0				
37	54.23	0.4307		0.0	8.300	3.575			Vel = 18.27	
37	0.0	1.101	1O	5.0	14.600	12.137				
to		150.0		0.0	5.000	0.0				
38	54.23	0.4307		0.0	19.600	8.442			Vel = 18.27	
38	0.0	1.101	1O	5.0	10.900	20.579				
to		150.0		0.0	5.000	0.0				
39	54.23	0.4307		0.0	15.900	6.848			Vel = 18.27	
39	0.0	1.101	1N	7.0	2.600	27.427				
to		150.0		0.0	7.000	0.0				
40	54.23	0.4307		0.0	9.600	4.135			Vel = 18.27	

Final Calculations - Hazen-Williams

ALTERNATIVE SPRINKLER
428 FOREST AVE RES CALC

Page 6
Date 12-20-16

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	***** Notes *****
40	0.0	1.101	0.0	9.000	31.562		
to		150.0	0.0	0.0	3.898		
41	54.23	0.4307	0.0	9.000	3.876		Vel = 18.27
41	0.0	1.101	1E 3.825	9.000	39.336		
to		150.0	0.0	3.825	3.898		
42	54.23	0.4307	0.0	12.825	5.524		Vel = 18.27
42	0.0	1.049	1T 7.555	3.200	48.758		
to		150.0	0.0	7.555	0.0		
43	54.23	0.5451	0.0	10.755	5.863		Vel = 20.13
43	0.0	3.26	2E 18.815	12.000	54.621		
to		120.0	0.0	18.815	0.866		
TOR	54.23	0.0033	0.0	30.815	0.102		Vel = 2.08
TOR	0.0	3.26	1Z 9.408	7.000	55.589		
to		120.0	1Zid 0.0	9.408	13.079		* Fixed loss = 8.315
BOR	54.23	0.0033	0.0	16.408	0.054		Vel = 2.08
BOR	0.0	4.1	1G 3.302	30.000	68.722		
to		150.0	1T 33.024	36.326	0.0		
UG	54.23	0.0007	0.0	66.326	0.047		Vel = 1.32
UG	0.0	6.16	1E 20.084	60.000	68.769		
to		140.0	1T 43.037	63.121	-1.732		
TEST	54.23	0.0001	0.0	123.121	0.013		Vel = 0.58
	0.0						
	54.23				67.050		K Factor = 6.62