Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 05/05/16

. . . Fire Protection by Computer Design

SPRINKLER SYSTEMS INC.
4 AVON STREET
P O BOX 1285
LEWISTON, ME. 04243
207-782-0104

Job Name	:	89 Anderson Street Dry System Area 1
Building	:	NEW
Location	:	89 ANDERSON STREET PORTLAND, MAINE
System	:	2 DRY
Contract	:	15-126
Data File	:	89 Anderson Street Dry System Area 1.WXF

SPRINKLER SYSTEMS INC.
89 Anderson Street Dry System Area 1

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Hydraulic Design Information Sheet

Name - 89 ANDERSON STREET APARTMENTS DRY SYSTEM AREA 1 Date - 3/1
Location - 89 ANDERSON STREET PORTLAND, MAINE
Building - NEW System No. - 2 DR
Contractor - SPRINKLER SYSTEMS INC Contract No. - 15-
Calculated By - CDS Drawing No. - 1-3
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height - VARIES
Occupancy - APARTMENTS/ PARKING

SYSTEM

( ) NFPA 13 ( ) Lt. Haz. Ord.Haz.Gp. (X) 1 ( ) 2 ( ) 3 ( ) Ex.Haz.
( ) NFPA 231 ( ) NFPA 231C ( ) Figure Curve
Other NFPA 13R
Specific Ruling Made By Date

DESIGN

Area of Sprinkler Operation - 1950	System Type	Sprinkler/Nozzle
Density - .15	(X) Wet	Make RELIABLE
Area Per Sprinkler - 130	( ) Dry	Model F1FR56
Elevation at Highest Outlet - 110	( ) Deluge	Size 1/2" X 1/2"
Hose Allowance - Inside - 0	( ) Preaction	K-Factor 5.6
Rack Sprinkler Allowance - 0	( ) Other	Temp.Rat.200 DEG.
Hose Allowance - Outside - 250		

Note

Calculation Summary: Flow Required - 483.64 Press Required - 789.236 AT BASE
C-Factor Used: 100 Overhead 150 Underground

WATER SUPPLY

Water Flow Test:	Pump Data:	Tank or Reservoir:
Date of Test - 5-23-15		Cap. -
Time of Test - AM	Rated Cap.-	Elev.-
Static Press - 86	@ Press -	
Residual Press - 78	Elev. -	Well
Flow - 1299		Proof Flow
Elevation - 160.0'		

Location - ON SITE

Source of Information - OWNER AND WATER DISTRICT

COMMODITY STORAGE

Commodity Class Location
Storage Ht. Area Aisle W.
Storage Method: Solid Piled % Palletized % Rack

( ) Single Row ( ) Conven. Pallet ( ) Auto. Storage ( ) Encap.
( ) Double Row ( ) Slave Pallet ( ) Solid Shelf ( ) Non
( ) Mult. Row ( ) Open Shelf

Flue Spacing Clearance:Storage to Ceiling
Longitudinal Transverse

Horizontal Barriers Provided:

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	1	4
Bvcb	B Fly Vic 705W	0	0	0	0	0	0	5	5	0	12	12	8	11	12	1	
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	2	1
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	3
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	6	21
Zac	Ames 2000SS	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
TYP	0.0	5.6	12.13	na	19.5	0.15
224	110.0	K = K @ SPRG	24.7	na	26.96	
225	110.0	K = K @ SPRG	25.07	na	27.17	
226	110.0	K = K @ SPRG	26.43	na	27.89	
215	110.0	K = K @ SPRG	13.44	na	19.89	
213	110.0	K = K @ SPRG	14.34	na	20.54	
214	110.0	K = K @ SPRG	14.49	na	20.65	
211	110.0	K = K @ SPRG	12.92	na	19.5	
209	110.0	K = K @ SPRG	13.79	na	20.14	
210	110.0	K = K @ SPRG	13.93	na	20.25	
212	110.0		14.54	na		
216	110.0		15.12	na		
217	110.0	K = K @ SPRG	17.73	na	22.84	
218	110.0		17.75	na		
219	110.0	K = K @ SPRG	18.98	na	23.63	
220	110.0	K = K @ SPRG	20.21	na	24.39	
221	110.0	K = K @ SPRG	21.79	na	25.32	
222	110.0	K = K @ SPRG	23.78	na	26.46	
205	110.0	K = K @ SPRG	23.17	na	26.11	
206	110.0	K = K @ SPRG	23.43	na	26.26	
207	110.0	K = K @ SPRG	24.22	na	26.7	
201	110.0	K = K @ SPRG	23.08	na	26.07	
202	110.0	K = K @ SPRG	23.35	na	26.21	
203	110.0	K = K @ SPRG	24.13	na	26.65	
204	110.0		26.46	na		
208	110.0		26.56	na		
223	110.0		26.87	na		
227	110.0		28.94	na		
233	110.0		31.84	na		
239	110.0		34.75	na		
241	110.0		37.66	na		
242	110.0		56.72	na		
TDR	110.0		59.28	na		
TDV	106.0		62.07	na		
BDR	104.0		71.69	na		
H	104.0		73.14	na		
BKFL	103.5		73.38	na		
BASE	100.0		79.24	na		
HOSE	100.0		86.94	na	250.0	
TEST	160.0		60.98	na		

The maximum velocity is 20.99 and it occurs in the pipe between nodes TDV and BDR

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	**
TYP	19.50	1.049	T	3.568	1.000	12.125		K Factor = 5.60
to		100.0		0.0	3.568	0.0		
SPRG	19.5	0.1740		0.0	4.568	0.795		Vel = 7.24
	0.0							
	19.50					12.920		K Factor = 5.43
224	26.96	1.682		0.0	11.750	24.701		K Factor @ node SPRG
to		100.0		0.0	0.0	0.0		
225	26.96	0.0317		0.0	11.750	0.373		Vel = 3.89
225	27.17	1.682		0.0	11.750	25.074		K Factor @ node SPRG
to		100.0		0.0	0.0	0.0		
226	54.13	0.1154		0.0	11.750	1.356		Vel = 7.82
226	27.89	1.682	T	7.065	3.000	26.430		K Factor @ node SPRG
to		100.0		0.0	7.066	0.0		
227	82.02	0.2490		0.0	10.066	2.506		Vel = 11.84
	0.0							
	82.02					28.936		K Factor = 15.25
215	19.89	1.049	T	3.568	5.750	13.440		K Factor @ node SPRG
to		100.0		0.0	3.568	0.0		
216	19.89	0.1805		0.0	9.318	1.682		Vel = 7.38
	0.0							
	19.89					15.122		K Factor = 5.11
213	20.54	1.682		0.0	7.750	14.341		K Factor @ node SPRG
to		100.0		0.0	0.0	0.0		
214	20.54	0.0192		0.0	7.750	0.149		Vel = 2.97
214	20.66	1.682	T	7.065	2.000	14.490		K Factor @ node SPRG
to		100.0		0.0	7.066	0.0		
216	41.2	0.0697		0.0	9.066	0.632		Vel = 5.95
	0.0							
	41.20					15.122		K Factor = 10.59
211	19.50	1.049	T	3.568	5.750	12.920		K Factor @ node SPRG
to		100.0		0.0	3.568	0.0		
212	19.5	0.1740		0.0	9.318	1.621		Vel = 7.24
	0.0							
	19.50					14.541		K Factor = 5.11
209	20.14	1.682		0.0	7.750	13.789		K Factor @ node SPRG
to		100.0		0.0	0.0	0.0		
210	20.14	0.0185		0.0	7.750	0.143		Vel = 2.91
210	20.25	1.682	T	7.065	2.000	13.932		K Factor @ node SPRG
to		100.0		0.0	7.066	0.0		
212	40.39	0.0672		0.0	9.066	0.609		Vel = 5.83
212	19.50	2.157		0.0	14.000	14.541		
to		100.0		0.0	0.0	0.0		
216	59.89	0.0415		0.0	14.000	0.581		Vel = 5.26
216	61.09	2.157	T	8.783	8.500	15.122		
to		100.0		0.0	8.783	0.0		
218	120.98	0.1521		0.0	17.283	2.629		Vel = 10.62

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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	**
	0.0							
	120.98					17.751		K Factor = 28.71
217	22.84	2.635		0.0	8.000	17.730		K Factor @ node SPRG
to		100.0		0.0	0.0	0.0		
218	22.84	0.0026		0.0	8.000	0.021		Vel = 1.34
218	120.98	2.635	T	11.758	3.750	17.751		
to		100.0		0.0	11.757	0.0		
219	143.82	0.0791		0.0	15.507	1.226		Vel = 8.46
219	23.64	2.635		0.0	11.750	18.977		K Factor @ node SPRG
to		100.0		0.0	0.0	0.0		
220	167.46	0.1048		0.0	11.750	1.231		Vel = 9.85
220	24.38	2.635		0.0	11.750	20.208		K Factor @ node SPRG
to		100.0		0.0	0.0	0.0		
221	191.84	0.1347		0.0	11.750	1.583		Vel = 11.29
221	25.33	2.635		0.0	11.750	21.791		K Factor @ node SPRG
to		100.0		0.0	0.0	0.0		
222	217.17	0.1694		0.0	11.750	1.991		Vel = 12.78
222	26.45	2.635	T	11.758	3.000	23.782		K Factor @ node SPRG
to		100.0		0.0	11.757	0.0		
223	243.62	0.2095		0.0	14.757	3.092		Vel = 14.33
	0.0							
	243.62					26.874		K Factor = 46.99
205	26.11	1.682		0.0	8.750	23.172		K Factor @ node SPRG
to		100.0		0.0	0.0	0.0		
206	26.11	0.0299		0.0	8.750	0.262		Vel = 3.77
206	26.27	1.682		0.0	7.250	23.434		K Factor @ node SPRG
to		100.0		0.0	0.0	0.0		
207	52.38	0.1086		0.0	7.250	0.787		Vel = 7.56
207	26.70	1.682	T	7.065	3.000	24.221		K Factor @ node SPRG
to		100.0		0.0	7.066	0.0		
208	79.08	0.2327		0.0	10.066	2.342		Vel = 11.42
	0.0							
	79.08					26.563		K Factor = 15.34
201	26.07	1.682		0.0	8.750	23.084		K Factor @ node SPRG
to		100.0		0.0	0.0	0.0		
202	26.07	0.0299		0.0	8.750	0.262		Vel = 3.76
202	26.21	1.682		0.0	7.250	23.346		K Factor @ node SPRG
to		100.0		0.0	0.0	0.0		
203	52.28	0.1081		0.0	7.250	0.784		Vel = 7.55
203	26.65	1.682	T	7.065	3.000	24.130		K Factor @ node SPRG
to		100.0		0.0	7.066	0.0		
204	78.93	0.2319		0.0	10.066	2.334		Vel = 11.40
204	0.0	3.26		0.0	10.750	26.464		
to		100.0		0.0	0.0	0.0		
208	78.93	0.0092		0.0	10.750	0.099		Vel = 3.03

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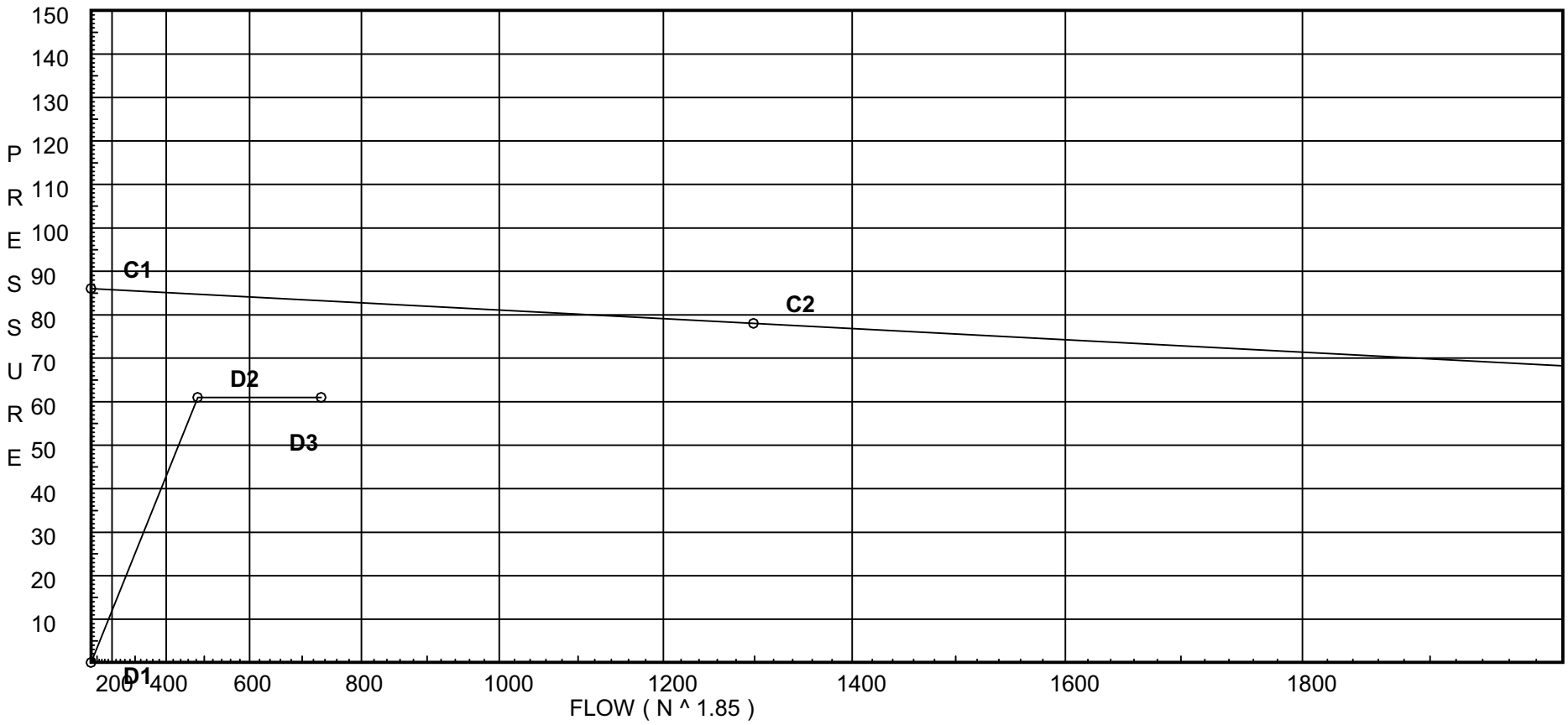
Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	**
208	79.07	3.26		0.0	9.330	26.563		
to		100.0		0.0	0.0	0.0		
223	158.0	0.0333		0.0	9.330	0.311		Vel = 6.07
223	243.62	3.26		0.0	11.000	26.874		
to		100.0		0.0	0.0	0.0		
227	401.62	0.1875		0.0	11.000	2.062		Vel = 15.44
227	82.02	3.26		0.0	11.000	28.936		
to		100.0		0.0	0.0	0.0		
233	483.64	0.2644		0.0	11.000	2.908		Vel = 18.59
233	0.0	3.26		0.0	11.000	31.844		
to		100.0		0.0	0.0	0.0		
239	483.64	0.2643		0.0	11.000	2.907		Vel = 18.59
239	0.0	3.26		0.0	11.000	34.751		
to		100.0		0.0	0.0	0.0		
241	483.64	0.2644		0.0	11.000	2.908		Vel = 18.59
241	0.0	3.26	E	6.714	51.000	37.659		
to		100.0	T	14.388	21.101	0.0		
242	483.64	0.2643		0.0	72.101	19.058		Vel = 18.59
242	0.0	3.26	E	6.714	3.000	56.717		
to		100.0		0.0	6.714	0.0		
TDR	483.64	0.2644		0.0	9.714	2.568		Vel = 18.59
TDR	0.0	3.26		0.0	4.000	59.285		
to		100.0		0.0	0.0	1.732		
TDV	483.64	0.2642		0.0	4.000	1.057		Vel = 18.59
TDV	0.0	3.068	Bvcb	5.0	0.500	62.074		
to		120.0	T	15.0	34.000	0.866		
BDR	483.64	0.2536	Eql	14.0	34.500	8.748		Vel = 20.99
BDR	0.0	4.26	T	26.334	2.000	71.688		
to		120.0		0.0	26.334	0.0		
H	483.64	0.0512		0.0	28.334	1.452		Vel = 10.89
H	0.0	4.26		0.0	0.500	73.140		
to		120.0		0.0	0.0	0.217		
BKFL	483.64	0.0500		0.0	0.500	0.025		Vel = 10.89
BKFL	0.0	4.026	Zac	0.0	0.500	73.382		
to		120.0		0.0	0.0	5.820		* * Fixed Loss = 4.304
BASE	483.64	0.0680		0.0	0.500	0.034		Vel = 12.19
BASE	0.0	4.07	2E	31.864	115.000	79.236		
to		150.0	T	31.864	66.914	0.0		
HOSE	483.64	0.0424	G	3.186	181.914	7.707		Vel = 11.93
HOSE	250.00	20.57		0.0	685.000	86.943		Qa = 250
to		140.0		0.0	0.0	-25.986		
TEST	733.64	0.0		0.0	685.000	0.026		Vel = 0.71
	0.0							
	733.64					60.983		K Factor = 93.95

Water Supply Curve C

SPRINKLER SYSTEMS INC.
89 Anderson Street Dry System Area 1

City Water Supply:
C1 - Static Pressure : 86
C2 - Residual Pressure: 78
C2 - Residual Flow : 1299

Demand:
D1 - Ele
D2 - Sy
D2 - Sy
Hose (
D3 - Sy
Safety Margin : 22.237

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