

Hydraulic Calculations Summary

for

Project Name: Cherry Emerson Building (066)

Location: 310 Ferst Dr NW, Atlanta, GA 30332, ,

Drawing Name: RVT2019 066AMM Cherry Emerson Fire v20

Calculation Date: 11/2/2020

Design

Remote Area Number: REMOTE AREA 1

Occupancy Classification: Ordinary Hazard Group 1

Density 0 GPM/SF

Area of Application: 1500.00 SF

Coverage per Sprinkler: 130.00 SF

Type of Sprinklers Calculated:

No. of Sprinklers Calculated: 11

Type of System: Fire Protection Wet Volume of Dry or PreAction System: 0.0 gal

In-rack Demand: N/A at Node: N/A

Hose Streams: 250 GPM at Node: 1 Type Allowance at Source

Total Water Required (including Hose Streams where applicable)

FROM: Water Supply at Node 1: 502 GPM @ 103.37 psi

Safety Margin: 16.93 psi

Contact Name

Address:

Phone Number:

Name of Designer:

Authority Having Jurisdiction:

Notes:

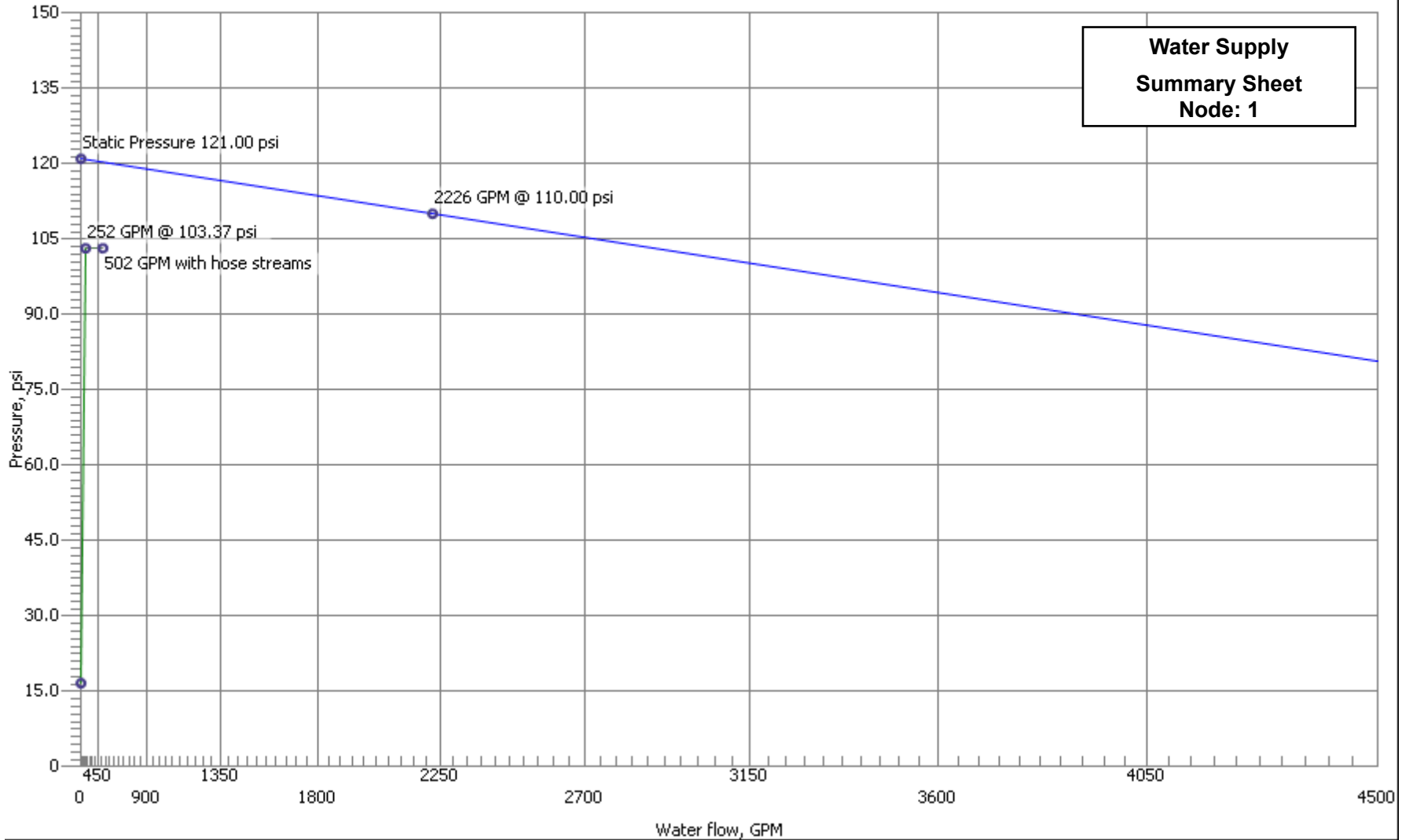
Automatic Peaking Results

Hydraulic Graph

Job Name: Cherry Emerson Building (066)
Remote Area Number: REMOTE AREA 1

N 1.85

Date: 11/2/2020



Elevation + Static: Pressure

118.89 psi

A negative result in Required Pressure indicates that the Pump is capable of furnishing all of the pressure required by the demand reported within this calculation.
No pressure is being required from the Source/Supply to meet the demand (by a margin of this negative value).



Outflowing Devices

Job Number: N/A

Report Description: Ordinary Hazard Group 1

Device		Actual Flow (GPM)	Minimum Flow (GPM)	K-Factor (K)	Pressure (psi)		
Sprinkler	102	22 GPM	21 GPM	8	7.24 psi		
Sprinkler	105	23 GPM	21 GPM	8	8.58 psi		
Sprinkler	103	22 GPM	21 GPM	8	7.58 psi		
Sprinkler	107	24 GPM	21 GPM	8	8.98 psi		
⇒ Sprinkler	100	21 GPM	21 GPM	8	7.00 psi		
Sprinkler	104	23 GPM	21 GPM	8	8.55 psi		
Sprinkler	109	23 GPM	15 GPM	5.6	17.55 psi		
Sprinkler	110	25 GPM	15 GPM	5.6	19.29 psi		
Sprinkler	101	21 GPM	21 GPM	8	7.19 psi		
Sprinkler	106	24 GPM	21 GPM	8	8.78 psi		
Sprinkler	108	23 GPM	15 GPM	5.6	17.34 psi		

⇒ Most Demanding Sprinkler Data

Supply Analysis							
Node	Name	Static (psi)	Residual (psi)	@ Flow (GPM)	Available (psi)	@ Total Demand (GPM)	Required Pressure (psi)
1	Water Supply	121.00 psi	110.00 psi	2226 GPM	120.30 psi	502 GPM	103.37 psi

Node Analysis					
Node Number	Elevation (ft)	Node Type	Pressure at Node (psi)	Discharge at Node (GPM)	Notes
1	-4' - 10 73/256"	Supply	103.37 psi	252 GPM	
108	33' - 7 247/256"	Sprinklers	17.34 psi	23 GPM	
106	32' - 8 159/256"	Sprinklers	8.78 psi	24 GPM	
101	32' - 8 159/256"	Sprinklers	7.19 psi	21 GPM	
110	33' - 8 135/256"	Sprinklers	19.29 psi	25 GPM	
109	33' - 8 135/256"	Sprinklers	17.55 psi	23 GPM	
104	32' - 8 159/256"	Sprinklers	8.55 psi	23 GPM	
100	32' - 8 159/256"	Sprinklers	7.00 psi	21 GPM	
107	32' - 8 159/256"	Sprinklers	8.98 psi	24 GPM	
103	32' - 8 159/256"	Sprinklers	7.58 psi	22 GPM	
105	32' - 8 159/256"	Sprinklers	8.58 psi	23 GPM	
102	32' - 8 159/256"	Sprinklers	7.24 psi	22 GPM	

Pipe Information

Node 1	Elev 1 ft	K-Factor	Flow added this step Q	Nominal ID	Fittings & Devices	Length ft	C Factor or Roughness	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.

100	32' - 8 159/256"	8	21 GPM	1"	(See Notes)	1' - 1 23/32"	120	7.00 psi Route 1 Sprinkler, T(5' - 0")
31	33' - 10 87/256"	8 FPS	21 GPM	1"		5' - 0"	0.14 psi	-0.50 psi	
						6' - 1 23/32"		0.89 psi	
31	33' - 10 87/256"			1"		12' - 0"	120	7.39 psi	
30	33' - 10 87/256"	8 FPS	21 GPM	1"		12' - 0"	0.14 psi	1.73 psi	
30	33' - 10 87/256"		23 GPM	1"	(See Notes)	7' - 4 11/64"	120	9.13 psi	Flow (q) from Route 5 E(2' - 0")
29	33' - 10 87/256"	17 FPS	45 GPM	1"		2' - 0"	0.57 psi		
					9' - 4 11/64"	5.36 psi			
29	33' - 10 87/256"			1"	(See Notes)	2' - 0"	120	14.48 psi	T(5' - 0")
28	31' - 10 87/256"	17 FPS	45 GPM	1"		5' - 0"	0.57 psi	0.87 psi	
						7' - 0"		4.01 psi	
28	31' - 10 87/256"		68 GPM	3"		3' - 11 15/64"	120	19.36 psi	Flow (q) from Route 3
27	31' - 10 87/256"	8 FPS	113 GPM	2"		3' - 11 15/64"	0.05 psi	0.19 psi	
27	31' - 10 87/256"		23 GPM	3"		4' - 0 49/64"	120	19.55 psi	Flow (q) from Route 10
26	31' - 10 87/256"	9 FPS	136 GPM	2"		4' - 0 49/64"	0.07 psi	0.29 psi	
26	31' - 10 87/256"		45 GPM	3"		2' - 4 145/256"	120	19.84 psi	Flow (q) from Route 2
25	31' - 10 87/256"	12 FPS	181 GPM	2"		2' - 4 145/256"	0.12 psi	0.28 psi	
25	31' - 10 87/256"		46 GPM	3"		1' - 0 171/256"	120	20.12 psi	Flow (q) from Route 4
24	31' - 10 87/256"	15 FPS	227 GPM	2"		1' - 0 171/256"	0.18 psi	1.28 psi	
24	31' - 10 87/256"		25 GPM	3"	(See Notes)	8' - 2 193/256"	120	21.40 psi	Flow (q) from Route 11 2T(12' - 0"), red, 2E(6' - 0")
23	31' - 11 49/128"	17 FPS	252 GPM	2"		36' - 0"	0.22 psi	-0.04 psi	
					14' - 2 193/256"	42.47 psi			
23	31' - 11 49/128"			3"	(See Notes)	2' - 2"	120	63.84 psi	E(6' - 0")
22	34' - 1 49/128"	17 FPS	252 GPM	2"		6' - 0"	0.22 psi	-0.94 psi	
						8' - 2"		1.79 psi	
22	34' - 1 49/128"			3"	(See Notes)	9' - 8 59/64"	120	64.68 psi	E(6' - 0")
21	34' - 1 49/128"	17 FPS	252 GPM	2"		6' - 0"	0.22 psi		
					15' - 8 59/64"	3.44 psi			

Pipe Information

Node 1	Elev 1 ft	K-Factor	Flow added this step Q	Nominal ID	Fittings & Devices	Length ft	C Factor or Roughness	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.

21	34' - 1 49/128"			3"	(See Notes)	3' - 0"	120	68.12 psi	E(6' - 0")
20	31' - 1 49/128"	17 FPS	252 GPM	2"		6' - 0"	0.22 psi	1.30 psi	
						9' - 0"		1.97 psi	
20	31' - 1 49/128"			3"	(See Notes)	1' - 3 5/16"	120	71.39 psi	CV(14' - 0"), BV(7' - 0")
19	31' - 1 49/128"	17 FPS	252 GPM	2"		21' - 0"	0.22 psi		
						22' - 3 5/16"		4.87 psi	
19	31' - 1 49/128"			3"	(See Notes)	0' - 0"	120	76.26 psi	T(12' - 0")
18	31' - 1 49/128"	17 FPS	252 GPM	2"		12' - 0"	0.22 psi		
						12' - 0"		2.62 psi	
18	31' - 1 49/128"			6"	(See Notes)	20' - 3 43/64"	120	78.89 psi	T(30' - 0")
17	10' - 9 91/128"	3 FPS	252 GPM	6"		30' - 0"	0.00 psi	8.80 psi	
						50' - 3 43/64"		0.14 psi	
17	10' - 9 91/128"			6"	(See Notes)	3' - 3 137/256"	120	87.83 psi	4E(14' - 0")
16	8' - 11 183/256"	3 FPS	252 GPM	6"		56' - 0"	0.00 psi	0.79 psi	
						9' - 3 137/256"		0.19 psi	
16	8' - 11 183/256"			6"	(See Notes)	7' - 10"	120	88.82 psi	E(14' - 0")
15	1' - 1 183/256"	3 FPS	252 GPM	6"		14' - 0"	0.00 psi	3.40 psi	
						21' - 10"		0.06 psi	
15	1' - 1 183/256"			6"	(See Notes)	16' - 3"	120	92.27 psi	3E(14' - 0"), BV(10' - 0")
14	1' - 1 183/256"	3 FPS	252 GPM	6"		52' - 0"	0.00 psi	0.00 psi	
						68' - 3"		0.19 psi	
14	1' - 1 183/256"			6"	(See Notes)	6' - 0"	120	92.46 psi	E(14' - 0")
13	-4' - 10 73/256"	3 FPS	252 GPM	6"		14' - 0"	0.00 psi	2.60 psi	
						20' - 0"		0.05 psi	
13	-4' - 10 73/256"			6"		2' - 7 1/32"	120	95.12 psi	
12	-4' - 10 73/256"	3 FPS	252 GPM	6"			0.00 psi		
						2' - 7 1/32"		0.01 psi	
12	-4' - 10 73/256"			6"	(See Notes)	2' - 0 109/128"	120	95.12 psi	EE(7' - 0")
1	-4' - 10 73/256"	3 FPS	252 GPM	6"		7' - 0"	0.00 psi		UNK(-8.00 psi), S
						9' - 0 109/128"		8.24 psi	
			250 GPM					103.37 psi	Hose Allowance At Source
1			502 GPM						Total(Pt) Route 1

Pipe Information

Node 1	Elev 1 ft	K-Factor	Flow added this step Q	Nominal ID	Fittings & Devices	Length ft	C Factor or Roughness	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.

101	32' - 8 159/256"	8	21 GPM	1"	(See Notes)	1' - 1 23/32"	120	7.19 psi	••••• Route 2 ••••• Sprinkler, T(5' - 0")	
11	33' - 10 87/256"	8 FPS	21 GPM	1"		5' - 0"	0.15 psi	-0.50 psi		
						6' - 1 23/32"		0.91 psi		
11	33' - 10 87/256"			1"		12' - 0"	120	7.60 psi	Flow (q) from Route 7 E(2' - 0")	
10	33' - 10 87/256"	8 FPS	21 GPM	1"		12' - 0"	0.15 psi	1.78 psi		
10	33' - 10 87/256"		24 GPM	1"	(See Notes)	7' - 4 11/64"	120	9.38 psi	Flow (q) from Route 7 E(2' - 0")	
9	33' - 10 87/256"	17 FPS	45 GPM	1"			2' - 0"	0.59 psi		5.49 psi
						9' - 4 11/64"				
9	33' - 10 87/256"			1"	(See Notes)	2' - 0"	120	14.86 psi	T(5' - 0")	
							5' - 0"	0.59 psi		0.87 psi
26	31' - 10 87/256"	17 FPS	45 GPM	1"			7' - 0"			4.11 psi
								19.84 psi	Total(Pt) Route 2	

102	32' - 8 159/256"	8	22 GPM	1"	(See Notes)	1' - 1 23/32"	120	7.24 psi	••••• Route 3 ••••• Sprinkler, T(5' - 0")	
8	33' - 10 87/256"	8 FPS	22 GPM	1"			5' - 0"	0.15 psi		-0.50 psi
							6' - 1 23/32"			0.92 psi
8	33' - 10 87/256"			1"		10' - 0"	120	7.67 psi	Flow (q) from Route 6 E(2' - 0"), T(5' - 0")	
7	33' - 10 87/256"	8 FPS	22 GPM	1"		10' - 0"	0.15 psi	1.49 psi		
7	33' - 10 87/256"		23 GPM	1"	(See Notes)	3' - 11 59/256"	120	9.16 psi	Flow (q) from Route 9 Flow (q) from Route 9	
6	31' - 10 87/256"	17 FPS	45 GPM	1"			7' - 0"	0.58 psi		0.87 psi
							5' - 11 59/256"			9.28 psi
6	31' - 10 87/256"		23 GPM	3"		2' - 7 5/8"	120	19.31 psi	Flow (q) from Route 9	
28	31' - 10 87/256"	5 FPS	68 GPM	2"		2' - 7 5/8"	0.02 psi	0.05 psi		
								19.36 psi	Total(Pt) Route 3	

103	32' - 8 159/256"	8	22 GPM	1"	(See Notes)	1' - 1 23/32"	120	7.58 psi	••••• Route 4 ••••• Sprinkler, T(5' - 0")	
5	33' - 10 87/256"	8 FPS	22 GPM	1"			5' - 0"	0.16 psi		-0.50 psi
							6' - 1 23/32"			0.96 psi
5	33' - 10 87/256"			1"		10' - 0"	120	8.04 psi	Flow (q) from Route 9	
4	33' - 10 87/256"	8 FPS	22 GPM	1"		10' - 0"	0.16 psi	1.56 psi		

Pipe Information

Node 1	Elev 1 ft	K-Factor	Flow added this step Q	Nominal ID	Fittings & Devices	Length ft	C Factor or Roughness	Total(Pt)	Notes
4	33' - 10 87/256"		24 GPM	1"	(See Notes)	- 10 203/256"	120	9.60 psi	Flow (q) from Route 8 E(2' - 0")
3	33' - 10 87/256"	17 FPS	46 GPM	1"		- 10 203/256"	0.61 psi	5.41 psi	
3	33' - 10 87/256"			1"	(See Notes)	2' - 0"	120	15.00 psi	
25	31' - 10 87/256"	17 FPS	46 GPM	1"		5' - 0"	0.61 psi	0.87 psi	
						7' - 0"		4.25 psi	T(5' - 0")
								20.12 psi	Total(Pt) Route 4
104	32' - 8 159/256"	8	23 GPM	1"	(See Notes)	1' - 1 23/32"	120	8.55 psi Route 5 Sprinkler, T(5' - 0")
30	33' - 10 87/256"	9 FPS	23 GPM	1"		5' - 0"	0.17 psi	-0.50 psi	
						6' - 1 23/32"		1.07 psi	
								9.13 psi	Total(Pt) Route 5
105	32' - 8 159/256"	8	23 GPM	1"	(See Notes)	1' - 1 23/32"	120	8.58 psi Route 6 Sprinkler, T(5' - 0")
7	33' - 10 87/256"	9 FPS	23 GPM	1"		5' - 0"	0.17 psi	-0.50 psi	
						6' - 1 23/32"		1.07 psi	
								9.16 psi	Total(Pt) Route 6
106	32' - 8 159/256"	8	24 GPM	1"	(See Notes)	1' - 1 23/32"	120	8.78 psi Route 7 Sprinkler, T(5' - 0")
10	33' - 10 87/256"	9 FPS	24 GPM	1"		5' - 0"	0.18 psi	-0.50 psi	
						6' - 1 23/32"		1.09 psi	
								9.38 psi	Total(Pt) Route 7
107	32' - 8 159/256"	8	24 GPM	1"	(See Notes)	1' - 1 23/32"	120	8.98 psi Route 8 Sprinkler, T(5' - 0")
4	33' - 10 87/256"	9 FPS	24 GPM	1"		5' - 0"	0.18 psi	-0.50 psi	
						6' - 1 23/32"		1.12 psi	
								9.60 psi	Total(Pt) Route 8
108	33' - 7 247/256"	5.6	23 GPM	1"	(See Notes)	1' - 9 5/8"	120	17.34 psi Route 9 Sprinkler, T(5' - 0")
2	31' - 10 87/256"	9 FPS	23 GPM	1"		5' - 0"	0.17 psi	0.78 psi	
						6' - 9 5/8"		1.18 psi	
2	31' - 10 87/256"			3"		5' - 9 9/64"	120	19.29 psi	
6	31' - 10 87/256"	2 FPS	23 GPM	2"		5' - 9 9/64"	0.00 psi	0.02 psi	
								19.31 psi	
109	33' - 8 135/256"	5.6	23 GPM	1"	(See Notes)	1' - 10 3/16"	120	17.55 psi Route 10 Sprinkler, T(5' - 0")
27	31' - 10 87/256"	9 FPS	23 GPM	1"		5' - 0"	0.17 psi	0.80 psi	
						6' - 10 3/16"		1.20 psi	

Pipe Information

Node 1	Elev 1 ft	K-Factor	Flow added this step Q	Nominal ID	Fittings & Devices	Length ft	C Factor or Roughness	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.	
Node 2	Elev 2 ft	Velocity	Total Flow Q	Actual ID	Equiv. Length ft	Fitting ft	Pf Friction Loss Per Unit psi	Elev(Pe)		
								Friction(Pf)		
								19.55 psi	Total(Pt) Route 10	
110	33' - 8 135/256"	5.6	25 GPM	1"	(See Notes)	1' - 10 3/16"	120	19.29 psi	••••• Route 11 ••••• Sprinkler, T(5' - 0")	
						5' - 0"	0.19 psi	0.80 psi		
24	31' - 10 87/256"	9 FPS	25 GPM	1"		6' - 10 3/16"		1.31 psi		
								21.40 psi	Total(Pt) Route 11	

Equivalent Pipe Lengths of Valves and Fittings (C=120 only)

C Value Multiplier

$$\left(\frac{\text{Actual Inside Diameter}}{\text{Schedule 40 Steel Pipe Inside Diameter}} \right)^{4.87} = \text{Factor}$$

Value Of C	100	130	140	150
Multiplying Factor	0.713	1.16	1.33	1.51

Fittings Legend

BV	Butterfly Valve	CV	Check Valve	E	90° Elbow
EE	45° Elbow	red	Reducer/Adapter	S	Supply
Spr	Sprinkler	T	Tee Flow Turn 90°	UNK	Undefined Accessory