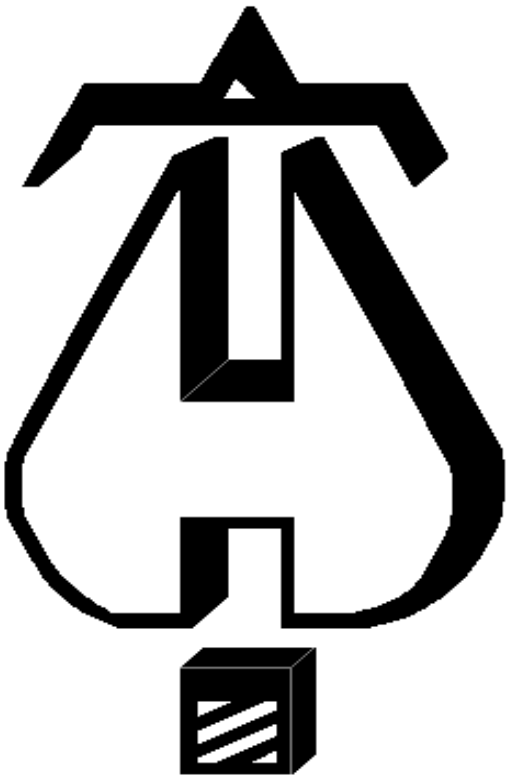

. . . Fire Protection by Computer Design

Dean & Allyn, Inc
116 Lewiston Road
Gray, ME 04039
207-657-5646

Job Name	:	Little Caesar Pizza
Drawing	:	
Location	:	91 Auburn Street Portland Maine, 04103
Remote Area	:	1
Contract	:	C111041
Data File	:	C111041.WX1

Hydraulic Design Information Sheet

Name - Little Caesars Pizza Date - 11/2/11
Location - 91 Auburn Street Portland Maine, 04103
Building - System No. - 1
Contractor - Dean & Allyn, Inc. Contract No. - C111041
Calculated By - C. Stewart Drawing No. - 1 of 1
Construction: ( ) Combustible (X) Non-Combustible Ceiling Height - 10'-0"
Occupancy - Restaurant

SYSTEM DESIGN

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

Area of Sprinkler Operation - 900	System Type	Sprinkler/Nozzle
Density - .10/.15	(X) Wet	Make Viking
Area Per Sprinkler - 225/130	( ) Dry	Model Microfast
Elevation at Highest Outlet - 10'-0"	( ) Deluge	Size 1/2"
Hose Allowance - Inside -	( ) Preaction	K-Factor 5.6
Rack Sprinkler Allowance -	( ) Other	Temp.Rat.155F
Hose Allowance - Outside - 250		

Note *43.1 psi Safety Margin

Calculation Summary Flow Required - 452.3 Press Required - 28.7
C-Factor Used: 120 Overhead 140 Underground

WATER SUPPLY

Water Flow Test:	Pump Data:	Tank or Reservoir:
Date of Test - 08/09/2003		Cap. -
Time of Test -	Rated Cap.-	Elev.-
Static Press - 72	@ Press -	
Residual Press - 71	Elev. -	Well
Flow - 963		Proof Flow
Elevation - -6		

Location - 91 Auburn Street

Source of Information - Portland Water District

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

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
Aty	Alarm Tyco AV-1							14			23		24	23							
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
G	NFPA 13 Gate Valve	0	0	0	1	1	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121

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

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
100A	10.0	5.6	7.17	na	15.0	0.1	150	7.0
100B	14.37		6.57	na				
101A	10.0	5.6	7.17	na	15.0	0.1	150	7.0
101B	14.37		6.48	na				
105A	10.0	5.6	7.17	na	15.0	0.1	150	7.0
105B	14.37		6.3	na				
106A	10.0	5.6	7.17	na	15.0	0.1	150	7.0
106B	14.37		6.55	na				
110A	9.0	5.6	7.0	na	14.82	0.15	80	7.0
110B	14.37		5.75	na				
114A	9.0	5.6	7.0	na	14.82	0.15	80	7.0
114B	14.37		5.75	na				
115A	9.0	5.6	7.91	na	15.75	0.15	105	7.0
115B	14.37		7.25	na				
119A	9.0	5.6	7.0	na	14.82	0.15	80	7.0
119B	12.83		6.49	na				
120A	9.0	5.6	7.0	na	14.82	0.15	80	7.0
120B	12.83		6.12	na				
121A	9.0	5.6	7.0	na	14.82	0.15	80	7.0
121B	12.83		5.89	na				
122A	9.0	5.6	7.0	na	14.82	0.15	80	7.0
122B	12.83		6.32	na				
100	14.37	K = K @ 100B	8.94	na	17.5			
101	14.37	K = K @ 101B	9.4	na	18.07			
102	14.37		15.56	na				
103	14.37		17.05	na				
104	14.37		18.45	na				
105	14.37	K = K @ 105B	8.41	na	17.32			
106	14.37	K = K @ 106B	9.49	na	18.06			
107	14.37		15.6	na				
108	14.37		17.07	na				
109	14.37		18.46	na				
110	14.37	K = K @ 110B	12.7	na	22.01			
111	14.37		17.54	na				
112	14.37		18.15	na				
113	14.37		18.44	na				
114	14.37	K = K @ 114B	9.48	na	19.03			
115	14.37	K = K @ 115B	10.38	na	18.84			
116	14.37		15.24	na				
117	14.37		16.91	na				
118	14.37		18.49	na				
119	12.83	K = K @ 119B	6.49	na	14.82			
120	12.83	K = K @ 120B	7.09	na	15.95			
121	12.83	K = K @ 121B	10.45	na	19.73			
15	12.83		11.19	na				
122	12.83	K = K @ 122B	12.71	na	21.0			
123	12.83		15.43	na				
16	12.83		19.57	na				
10	14.37		18.66	na				
11	14.37		18.67	na				
12	14.37		18.69	na				
13	14.37		18.72	na				
14	14.37		19.09	na				
TR	14.37		19.52	na				
BR	2.37		24.78	na				
1	-6.0		28.66	na				
TEST	-6.0		28.66	na	250.0			

The maximum velocity is 14.06 and it occurs in the pipe between nodes 115 and 116

Final Calculations - Hazen-Williams

Dean & Allyn, Inc
Little Caesar Pizza

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
100A	15.00	1.049	3E	6.0	10.830	7.175		K Factor = 5.60
to		120.0		0.0	6.000	-1.893		
100B	15.0	0.0764		0.0	16.830	1.286		Vel = 5.57
	0.0							
	15.00					6.568		K Factor = 5.85
101A	15.00	1.049	2E	4.0	6.620	7.175		K Factor = 5.60
to		120.0	1T	5.0	9.000	-1.893		
101B	15.0	0.0764		0.0	15.620	1.194		Vel = 5.57
	0.0							
	15.00					6.476		K Factor = 5.89
105A	15.00	1.049	3E	6.0	7.370	7.175		K Factor = 5.60
to		120.0		0.0	6.000	-1.893		
105B	15.0	0.0764		0.0	13.370	1.022		Vel = 5.57
	0.0							
	15.00					6.304		K Factor = 5.97
106A	15.00	1.049	2E	4.0	7.580	7.175		K Factor = 5.60
to		120.0	1T	5.0	9.000	-1.893		
106B	15.0	0.0764		0.0	16.580	1.267		Vel = 5.57
	0.0							
	15.00					6.549		K Factor = 5.86
110A	14.82	1.049	3E	6.0	8.460	7.000		K Factor = 5.60
to		120.0		0.0	6.000	-2.326		
110B	14.82	0.0747		0.0	14.460	1.080		Vel = 5.50
	0.0							
	14.82					5.754		K Factor = 6.18
114A	14.82	1.049	3E	6.0	8.370	7.000		K Factor = 5.60
to		120.0		0.0	6.000	-2.326		
114B	14.82	0.0747		0.0	14.370	1.074		Vel = 5.50
	0.0							
	14.82					5.748		K Factor = 6.18
115A	15.75	1.049	1E	2.0	7.960	7.910		K Factor = 5.60
to		120.0	2T	10.0	12.000	-2.326		
115B	15.75	0.0837		0.0	19.960	1.670		Vel = 5.85
	0.0							
	15.75					7.254		K Factor = 5.85
119A	14.82	1.049	3E	6.0	9.370	7.000		K Factor = 5.60
to		120.0		0.0	6.000	-1.659		
119B	14.82	0.0747		0.0	15.370	1.148		Vel = 5.50
	0.0							
	14.82					6.489		K Factor = 5.82
120A	14.82	1.049	1T	5.0	5.370	7.000		K Factor = 5.60
to		120.0		0.0	5.000	-1.659		
120B	14.82	0.0747		0.0	10.370	0.775		Vel = 5.50
	0.0							
	14.82					6.116		K Factor = 5.99
121A	14.82	1.049	1E	2.0	5.370	7.000		K Factor = 5.60
to		120.0		0.0	2.000	-1.659		
121B	14.82	0.0748		0.0	7.370	0.551		Vel = 5.50

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
	0.0							
	14.82					5.892		K Factor = 6.11
122A	14.82	1.049	1E	2.0	6.160	7.000		K Factor = 5.60
to		120.0	1T	5.0	7.000	-1.659		
122B	14.82	0.0747		0.0	13.160	0.983		Vel = 5.50
	0.0							
	14.82					6.324		K Factor = 5.89
100	17.50	1.049		0.0	4.500	8.938		K Factor @ node 100B
to		120.0		0.0	0.0	0.0		
101	17.5	0.1016		0.0	4.500	0.457		Vel = 6.50
101	18.07	1.049		0.0	16.330	9.395		K Factor @ node 101B
to		120.0		0.0	0.0	0.0		
102	35.57	0.3775		0.0	16.330	6.164		Vel = 13.20
102	0.0	1.38		0.0	15.000	15.559		
to		120.0		0.0	0.0	0.0		
103	35.57	0.0993		0.0	15.000	1.489		Vel = 7.63
103	0.0	1.61		0.0	30.000	17.048		
to		120.0		0.0	0.0	0.0		
104	35.57	0.0469		0.0	30.000	1.406		Vel = 5.61
104	0.0	2.067	1T	10.0	5.160	18.454		
to		120.0		0.0	10.000	0.0		
10	35.57	0.0139		0.0	15.160	0.211		Vel = 3.40
	0.0							
	35.57					18.665		K Factor = 8.23
105	17.32	1.049		0.0	10.870	8.407		K Factor @ node 105B
to		120.0		0.0	0.0	0.0		
106	17.32	0.0997		0.0	10.870	1.084		Vel = 6.43
106	18.06	1.049		0.0	16.330	9.491		K Factor @ node 106B
to		120.0		0.0	0.0	0.0		
107	35.38	0.3738		0.0	16.330	6.104		Vel = 13.13
107	0.0	1.38		0.0	15.000	15.595		
to		120.0		0.0	0.0	0.0		
108	35.38	0.0983		0.0	15.000	1.475		Vel = 7.59
108	0.0	1.61		0.0	30.000	17.070		
to		120.0		0.0	0.0	0.0		
109	35.38	0.0464		0.0	30.000	1.392		Vel = 5.58
109	0.0	2.067	1T	10.0	5.160	18.462		
to		120.0		0.0	10.000	0.0		
11	35.38	0.0138		0.0	15.160	0.209		Vel = 3.38
	0.0							
	35.38					18.671		K Factor = 8.19
110	22.01	1.049		0.0	31.160	12.697		K Factor @ node 110B
to		120.0		0.0	0.0	0.0		
111	22.01	0.1553		0.0	31.160	4.839		Vel = 8.17
111	0.0	1.38		0.0	15.000	17.536		
to		120.0		0.0	0.0	0.0		
112	22.01	0.0409		0.0	15.000	0.613		Vel = 4.72

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
112	0.0	1.61		0.0	15.000	18.149		
to		120.0		0.0	0.0	0.0		
113	22.01	0.0193		0.0	15.000	0.290		Vel = 3.47
113	0.0	1.61	1T	8.0	5.160	18.439		
to		120.0		0.0	8.000	0.0		
12	22.01	0.0192		0.0	13.160	0.253		Vel = 3.47
	0.0							
	22.01					18.692		K Factor = 5.09
114	19.03	1.049		0.0	7.580	9.479		K Factor @ node 114B
to		120.0		0.0	0.0	0.0		
115	19.03	0.1187		0.0	7.580	0.900		Vel = 7.06
115	18.84	1.049		0.0	11.460	10.379		K Factor @ node 115B
to		120.0		0.0	0.0	0.0		
116	37.87	0.4238		0.0	11.460	4.857		Vel = 14.06
116	0.0	1.38		0.0	15.000	15.236		
to		120.0		0.0	0.0	0.0		
117	37.87	0.1115		0.0	15.000	1.673		Vel = 8.12
117	0.0	1.61		0.0	30.000	16.909		
to		120.0		0.0	0.0	0.0		
118	37.87	0.0526		0.0	30.000	1.578		Vel = 5.97
118	0.0	2.067	1T	10.0	5.160	18.487		
to		120.0		0.0	10.000	0.0		
13	37.87	0.0156		0.0	15.160	0.237		Vel = 3.62
	0.0							
	37.87					18.724		K Factor = 8.75
119	14.82	1.049		0.0	8.000	6.489		K Factor @ node 119B
to		120.0		0.0	0.0	0.0		
120	14.82	0.0748		0.0	8.000	0.598		Vel = 5.50
120	15.95	1.049	1T	5.0	9.200	7.087		K Factor @ node 120B
to		120.0		0.0	5.000	0.0		
15	30.77	0.2887		0.0	14.200	4.099		Vel = 11.42
	0.0							
	30.77					11.186		K Factor = 9.20
121	19.73	1.049	1T	5.0	0.790	10.451		K Factor @ node 121B
to		120.0		0.0	5.000	0.0		
15	19.73	0.1269		0.0	5.790	0.735		Vel = 7.32
15	30.77	1.38		0.0	8.000	11.186		
to		120.0		0.0	0.0	0.0		
122	50.5	0.1899		0.0	8.000	1.519		Vel = 10.83
122	21.00	1.61		0.0	16.000	12.705		K Factor @ node 122B
to		120.0		0.0	0.0	0.0		
123	71.5	0.1706		0.0	16.000	2.729		Vel = 11.27
123	0.0	2.067	2E	10.0	61.920	15.434		
to		120.0	1T	10.0	20.000	0.0		
16	71.5	0.0505		0.0	81.920	4.138		Vel = 6.84
16	0.0	4.026	1T	20.0	71.670	19.572		
to		120.0		0.0	20.000	-0.667		
14	71.5	0.0020		0.0	91.670	0.180		Vel = 1.80

Final Calculations - Hazen-Williams

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
	0.0							
	71.50					19.085		K Factor = 16.37
10	35.57	4.026		0.0	11.160	18.665		
to		120.0		0.0	0.0	0.0		
11	35.57	0.0005		0.0	11.160	0.006		Vel = 0.90
11	35.37	4.026		0.0	11.160	18.671		
to		120.0		0.0	0.0	0.0		
12	70.94	0.0019		0.0	11.160	0.021		Vel = 1.79
12	22.01	4.026		0.0	9.830	18.692		
to		120.0		0.0	0.0	0.0		
13	92.95	0.0033		0.0	9.830	0.032		Vel = 2.34
13	37.87	4.026		0.0	60.160	18.724		
to		120.0		0.0	0.0	0.0		
14	130.82	0.0060		0.0	60.160	0.361		Vel = 3.30
14	71.50	4.026	1T	20.0	12.000	19.085		
to		120.0		0.0	20.000	0.0		
TR	202.32	0.0135		0.0	32.000	0.431		Vel = 5.10
TR	0.0	6.065	1Aty	24.0	12.000	19.516		
to		120.0	1G	3.0	27.000	5.197		
BR	202.32	0.0018		0.0	39.000	0.071		Vel = 2.25
BR	0.0	6.16	1T	43.037	150.000	24.784		
to		140.0		0.0	43.037	3.625		
1	202.32	0.0013		0.0	193.037	0.247		Vel = 2.18
1	0.0	12.34		0.0	200.000	28.656		
to		140.0		0.0	0.0	0.0		
TEST	202.32	0.0		0.0	200.000	0.008		Vel = 0.54
	250.00							Qa = 250.00
	452.32					28.664		K Factor = 84.48

Water Supply Curve (C)

Dean & Allyn, Inc
Little Caesar Pizza

Date 11/2/11

City Water Supply:
- C1 - Static Pressure : 72
- C2 - Residual Pressure: 71
- C2 - Residual Flow : 963

Demand:

D1 - Elevation	:	8.155
D2 - System Flow	:	202.317
D2 - System Pressure	:	28.664
Hose (Demand)	:	250
D3 - System Demand	:	452.317
Safety Margin	:	43.088