



... Fire Protection by Computer Design

Dean and Allyn Inc
116 Lewiston Road
Gray ME, 04039
(207)657-5646

Job Name : MMC BRAMHALL TRAINING FACILITY
Building : PAVILION A
Location : PORTLAND
System :
Contract : C1280
Data File : C1280.WXF

Hydraulic Design Information Sheet

Name - MAINE MEDICAL CENTER Date - 7/16/15
 Location - PORTLAND
 Building - PAVILION A System No. -
 Contractor - DEAN AND ALLYN INC Contract No. - C1280
 Calculated By - S.COTE Drawing No. - 1 OF 1
 Construction: () Combustible (X) Non-Combustible Ceiling Height -
 Occupancy - OFFICES

S (X) NFPA 13 () Lt. Haz. Ord.Haz.Gp. () 1 () 2 () 3 () Ex.Haz.
 Y () NFPA 231 () NFPA 231C () Figure Curve

S Other

T Specific Ruling Made By Date

E
 M Area of Sprinkler Operation - 982 System Type Sprinkler/Nozzle
 Density - .10 (X) Wet Make RELIABLE
 D Area Per Sprinkler - 225 () Dry Model F1FR56
 E Elevation at Highest Outlet - 38.916 () Deluge Size 1/2"
 S Hose Allowance - Inside - () Preaction K-Factor 5.6
 I Rack Sprinkler Allowance - () Other Temp.Rat.155
 G Hose Allowance - Outside - 100

N Note

Calculation Flow Required - 263.951 Press Required - 143.988
 Summary C-Factor Used: 120 Overhead 120 Underground

W Water Flow Test: Pump Data: Tank or Reservoir:
 A Date of Test - 9/18/14 Cap. -
 T Time of Test - AM Rated Cap.- 500 Elev.-
 E Static Press - 172 @ Press - 105
 R Residual Press - 130 Elev. - -16.510 Well
 Flow - 790 Proof Flow
 S Elevation -

U Location - RICHARDS BUILDING

P Source of Information - DEAN AND ALLYN

C Commodity Class Location
 O Storage Ht. Area Aisle W.
 M Storage Method: Solid Piled % Palletized % Rack
 M
 () Single Row () Conven. Pallet () Auto. Storage () Encap.
 S R () Double Row () Slave Pallet () Solid Shelf () Non
 T A () Mult. Row () Open Shelf

O C
 R K Flue Spacing Clearance:Storage to Ceiling
 A Longitudinal Transverse

G Horizontal Barriers Provided:
 E

Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
10	38.916	5.6	7.0	na	14.82	0.1	135	7.0
11	38.916	5.6	7.56	na	15.4	0.1	135	7.0
12	38.916	5.6	7.28	na	15.11	0.1	137	7.0
13	38.916	5.6	8.01	na	15.85	0.1	137	7.0
14	38.916	5.6	8.93	na	16.74	0.1	99	7.0
15	38.916	5.6	9.81	na	17.54	0.1	99	7.0
16	38.916	5.6	13.38	na	20.48	0.1	133	7.0
17	38.916	5.6	14.4	na	21.25	0.1	150	7.0
18	38.916	5.6	22.85	na	26.77	0.1	137	7.0
10A	39.541		7.23	na				
11A	39.541		7.82	na				
12A	39.541		7.53	na				
13A	39.541		8.3	na				
14A	39.541		9.35	na				
15A	39.541		10.28	na				
16A	39.541		14.01	na				
17A	39.541		15.1	na				
18A	39.541		24.06	na				
100	39.541		8.85	na				
101	39.541		10.06	na				
102	39.541		12.22	na				
103	39.541		16.21	na				
104	39.541		24.49	na				
105	38.583		69.68	na				
106	39.583		108.14	na				
107	39.583		117.98	na				
108	-3.5		137.21	na				
109	-8.5		139.48	na				
BR	-8.5		140.49	na				
TEST	-16.51		143.99	na	100.0			

The maximum velocity is 25.84 and it occurs in the pipe between nodes 104 and 105

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	*****
10 to 10A	14.82 14.82	1.049 120.0 0.0747	3E	6.0 0.0 0.0	0.666 6.000 6.666	7.000 -0.271 0.498			K Factor = 5.60 Vel = 5.50	
	0.0 14.82						7.227		K Factor = 5.51	
11 to 11A	15.40 15.4	1.049 120.0 0.0803	3E	6.0 0.0 0.0	0.666 6.000 6.666	7.561 -0.271 0.535			K Factor = 5.60 Vel = 5.72	
	0.0 15.40						7.825		K Factor = 5.51	
12 to 12A	15.11 15.11	1.049 120.0 0.0776	3E	6.0 0.0 0.0	0.666 6.000 6.666	7.283 -0.271 0.517			K Factor = 5.60 Vel = 5.61	
	0.0 15.11						7.529		K Factor = 5.51	
13 to 13A	15.85 15.85	1.049 120.0 0.0846	3E	6.0 0.0 0.0	0.666 6.000 6.666	8.011 -0.271 0.564			K Factor = 5.60 Vel = 5.88	
	0.0 15.85						8.304		K Factor = 5.50	
14 to 14A	16.74 16.74	1.049 120.0 0.0935	3E	6.0 0.0 0.0	1.333 6.000 7.333	8.933 -0.271 0.686			K Factor = 5.60 Vel = 6.21	
	0.0 16.74						9.348		K Factor = 5.48	
15 to 15A	17.54 17.54	1.049 120.0 0.1020	3E	6.0 0.0 0.0	1.333 6.000 7.333	9.807 -0.271 0.748			K Factor = 5.60 Vel = 6.51	
	0.0 17.54						10.284		K Factor = 5.47	
16 to 16A	20.48 20.48	1.049 120.0 0.1361	3E	6.0 0.0 0.0	0.666 6.000 6.666	13.377 -0.271 0.907			K Factor = 5.60 Vel = 7.60	
	0.0 20.48						14.013		K Factor = 5.47	
17 to 17A	21.25 21.25	1.049 120.0 0.1457	3E	6.0 0.0 0.0	0.666 6.000 6.666	14.401 -0.271 0.971			K Factor = 5.60 Vel = 7.89	
	0.0 21.25						15.101		K Factor = 5.47	
18 to 18A	26.77 26.77	1.049 120.0 0.2232	3E	6.0 0.0 0.0	0.666 6.000 6.666	22.846 -0.271 1.488			K Factor = 5.60 Vel = 9.94	
	0.0 26.77						24.063		K Factor = 5.46	
10A to 11A	14.82 14.82	1.049 120.0 0.0748		0.0 0.0 0.0	8.000 0.0 8.000	7.227 0.0 0.598			Vel = 5.50	

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	*****
11A to 100	15.39 30.21	1.049 120.0 0.2791	E	2.0 0.0 0.0	1.666 2.000 3.666	7.825 0.0 1.023				Vel = 11.21
	0.0 30.21						8.848			K Factor = 10.16
12A to 13A	15.11	1.049 120.0 0.0775		0.0 0.0 0.0	10.000 0.0 10.000	7.529 0.0 0.775				Vel = 5.61
13A to 101	15.85 30.96	1.049 120.0 0.2922	T	5.0 0.0 0.0	1.000 5.000 6.000	8.304 0.0 1.753				Vel = 11.49
	0.0 30.96						10.057			K Factor = 9.76
14A to 15A	16.74	1.049 120.0 0.0936		0.0 0.0 0.0	10.000 0.0 10.000	9.348 0.0 0.936				Vel = 6.21
15A to 102	17.53 34.27	1.049 120.0 0.3525	T	5.0 0.0 0.0	0.500 5.000 5.500	10.284 0.0 1.939				Vel = 12.72
	0.0 34.27						12.223			K Factor = 9.80
16A to 17A	20.48	1.049 120.0 0.1360		0.0 0.0 0.0	8.000 0.0 8.000	14.013 0.0 1.088				Vel = 7.60
17A to 103	21.25 41.73	1.38 120.0 0.1334	T	6.0 0.0 0.0	2.333 6.000 8.333	15.101 0.0 1.112				Vel = 8.95
	0.0 41.73						16.213			K Factor = 10.36
18A to 104	26.77	1.38 120.0 0.0586	T	6.0 0.0 0.0	1.333 6.000 7.333	24.063 0.0 0.430				Vel = 5.74
	0.0 26.77						24.493			K Factor = 5.41
100 to 101	30.21	1.38 120.0 0.0735		0.0 0.0 0.0	16.458 0.0 16.458	8.848 0.0 1.209				Vel = 6.48
101 to 102	30.97	1.38 120.0 0.2708		0.0 0.0 0.0	8.000 0.0 8.000	10.057 0.0 2.166				Vel = 13.12
102 to 103	34.27	1.61 120.0 0.2911		0.0 0.0 0.0	13.708 0.0 13.708	12.223 0.0 3.990				Vel = 15.04
103 to 104	41.73	1.61 120.0 0.5694		0.0 0.0 0.0	14.541 0.0 14.541	16.213 0.0 8.280				Vel = 21.62
104 to 105	26.77	1.61 120.0 0.7918	3E	12.0 0.0 0.0	44.541 12.000 56.541	24.493 0.415 44.771				Vel = 25.84

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	*****
105	0.0	1.61	4E	16.0	33.125	69.679				
to		120.0		0.0	16.000	-0.433				
106	163.95	0.7918		0.0	49.125	38.899		Vel = 25.84		
106	0.0	1.61	T	8.0	4.416	108.145				
to		120.0		0.0	8.000	0.0				
107	163.95	0.7918		0.0	12.416	9.831		Vel = 25.84		
107	0.0	4.026	T	20.0	43.083	117.976				
to		120.0		0.0	20.000	18.659				
108	163.95	0.0091		0.0	63.083	0.576		Vel = 4.13		
108	0.0	6.065	T	30.0	57.000	137.211				
to		120.0		0.0	30.000	2.166				
109	163.95	0.0012		0.0	87.000	0.107		Vel = 1.82		
109	0.0	6.065	Fsp	0.0	5.000	139.484				
to		120.0	G	3.0	3.000	1.000		** Fixed Loss = 1		
BR	163.95	0.0012		0.0	8.000	0.010		Vel = 1.82		
BR	0.0	6.065	E	14.0	5.500	140.494				
to		120.0		0.0	14.000	3.469				
TEST	163.95	0.0013		0.0	19.500	0.025		Vel = 1.82		
	100.00							Qa = 100.00		
	263.95					143.988		K Factor = 22.00		

Water Supply Curve C

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City Water Supply:
C1 - Static Pressure : 172
C2 - Residual Pressure: 130
C2 - Residual Flow : 790

Demand:
D1 - Elevation : 24.005
D2 - System Flow : 163.951
D2 - System Pressure : 143.988
Hose (Demand) : 100
D3 - System Demand : 263.951
Safety Margin : 22.486

