



... Fire Protection by Computer Design

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

Job Name : MMC R6
Building : RICHARDS BUILDING
Location : LEVEL 6
System : WET
Contract : C1279
Data File : MMC R6.WXF

Hydraulic Design Information Sheet

Name - MAINE MEDICAL CENTER Date - 7/27/15
 Location - LEVEL 6
 Building - RICHARDS BUILDING System No. - WET
 Contractor - DEAN AND ALLYN INC Contract No. - C1279
 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

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	- 78.916	() Deluge	Size 1/2"
S	Hose Allowance - Inside	- 100	() Preaction	K-Factor 5.6
I	Rack Sprinkler Allowance	-	() Other	Temp.Rat.155
G	Hose Allowance - Outside	- 100		

N Note

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

P Location - RICHARDS BUILDING

L Source of Information - DEAN AND ALLYN

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

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

G Horizontal Barriers Provided:

Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
60	78.916	5.6	21.78	na	26.13	0.1	100	7.0
61	78.916	5.6	14.87	na	21.59	0.1	99	7.0
62	78.916	5.6	8.56	na	16.38	0.1	132	7.0
63	78.916	5.6	9.45	na	17.21	0.1	99	7.0
64	78.916	5.6	7.89	na	15.73	0.1	99	7.0
65	78.916	5.6	7.74	na	15.58	0.1	99	7.0
66	78.916	5.6	7.0	na	14.82	0.1	99	7.0
67	78.916	5.6	7.09	na	14.91	0.1	99	7.0
68	78.916	5.6	7.08	na	14.9	0.1	99	7.0
69	78.916	5.6	7.23	na	15.06	0.1	99	7.0
60A	80.0		23.23	na				
61A	80.0		15.75	na				
63A	80.0		9.86	na				
62A	80.0		8.9	na				
64A	80.0		8.17	na				
65A	80.0		8.01	na				
66A	80.0		7.2	na				
67A	80.0		7.3	na				
68A	80.0		7.29	na				
69A	80.0		7.46	na				
600	80.0		19.29	na				
601	80.0		16.15	na				
9	80.0		13.14	na				
602	80.0		10.17	na				
603	80.0		9.73	na				
604	80.0		8.39	na				
605	80.0		8.26	na				
606	80.0		8.0	na				
607	80.0		8.0	na				
608	80.0		8.1	na				
609	80.0		8.17	na				
7	80.0		12.5	na				
15	80.0		19.83	na				
6	80.0		28.18	na				
3	80.0		29.96	na				
4	80.0		30.55	na				
5	-3.5		66.72	na				
HOSE	80.0		30.12	na	100.0			
10	-3.5		66.51	na				
TR	-8.5		68.9	na				
BR	-8.5		69.92	na				
TEST	-16.51		73.46	na				

The maximum velocity is 20.69 and it occurs in the pipe between nodes 60A and HOSE

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	*****
60 to 60A	26.13 26.13	1.049 120.0 0.2133	E T	2.0 5.0 0.0	2.000 7.000 9.000	21.779 -0.469 1.920			K Factor = 5.60 Vel = 9.70	
	0.0 26.13						23.230		K Factor = 5.42	
61 to 61A	21.59 21.59	1.049 120.0 0.1499	E T	2.0 5.0 0.0	2.000 7.000 9.000	14.868 -0.469 1.349			K Factor = 5.60 Vel = 8.01	
	0.0 21.59						15.748		K Factor = 5.44	
62 to 62A	16.38 16.38	1.049 120.0 0.0900	E T	2.0 5.0 0.0	2.000 7.000 9.000	8.560 -0.469 0.810			K Factor = 5.60 Vel = 6.08	
	0.0 16.38						8.901		K Factor = 5.49	
63 to 63A	17.21 17.21	1.049 120.0 0.0984	E T	2.0 5.0 0.0	2.000 7.000 9.000	9.446 -0.469 0.886			K Factor = 5.60 Vel = 6.39	
	0.0 17.21						9.863		K Factor = 5.48	
64 to 64A	15.73 15.73	1.049 120.0 0.0833	E T	2.0 5.0 0.0	2.000 7.000 9.000	7.885 -0.469 0.750			K Factor = 5.60 Vel = 5.84	
	0.0 15.73						8.166		K Factor = 5.50	
65 to 65A	15.58 15.58	1.049 120.0 0.0820	E T	2.0 5.0 0.0	2.000 7.000 9.000	7.740 -0.469 0.738			K Factor = 5.60 Vel = 5.78	
	0.0 15.58						8.009		K Factor = 5.51	
66 to 66A	14.82 14.82	1.049 120.0 0.0747	E T	2.0 5.0 0.0	2.000 7.000 9.000	7.000 -0.469 0.672			K Factor = 5.60 Vel = 5.50	
	0.0 14.82						7.203		K Factor = 5.52	
67 to 67A	14.91 14.91	1.049 120.0 0.0756	E T	2.0 5.0 0.0	2.000 7.000 9.000	7.088 -0.469 0.680			K Factor = 5.60 Vel = 5.53	
	0.0 14.91						7.299		K Factor = 5.52	
68 to 68A	14.90 14.9	1.049 120.0 0.0754	E T	2.0 5.0 0.0	2.000 7.000 9.000	7.082 -0.469 0.679			K Factor = 5.60 Vel = 5.53	
	0.0 14.90						7.292		K Factor = 5.52	
69 to 69A	15.06 15.06	1.049 120.0 0.0769	E T	2.0 5.0 0.0	2.000 7.000 9.000	7.232 -0.469 0.692			K Factor = 5.60 Vel = 5.59	

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	*****
	0.0 15.06					7.455			K Factor = 5.52	
60A to 600	-105.14	1.61 120.0 -0.3481	T	8.0 0.0 0.0	3.333 8.000 11.333	23.230 0.0 -3.945			Vel = 16.57	
	0.0 -105.14					19.285			K Factor = -23.94	
61A to 601	21.59	1.38 120.0 0.0394	T	6.0 0.0 0.0	4.250 6.000 10.250	15.748 0.0 0.404			Vel = 4.63	
	0.0 21.59					16.152			K Factor = 5.37	
63A to 602	17.21	1.38 120.0 0.0260	T	6.0 0.0 0.0	5.666 6.000 11.666	9.863 0.0 0.303			Vel = 3.69	
	0.0 17.21					10.166			K Factor = 5.40	
62A to 603	16.38	1.049 120.0 0.0899	T	5.0 0.0 0.0	4.250 5.000 9.250	8.901 0.0 0.832			Vel = 6.08	
	0.0 16.38					9.733			K Factor = 5.25	
64A to 604	15.73	1.38 120.0 0.0220	T	6.0 0.0 0.0	4.250 6.000 10.250	8.166 0.0 0.225			Vel = 3.37	
	0.0 15.73					8.391			K Factor = 5.43	
65A to 605	15.58	1.38 120.0 0.0215	T	6.0 0.0 0.0	5.666 6.000 11.666	8.009 0.0 0.251			Vel = 3.34	
	0.0 15.58					8.260			K Factor = 5.42	
66A to 606	14.82	1.049 120.0 0.0747	T	5.0 0.0 0.0	5.666 5.000 10.666	7.203 0.0 0.797			Vel = 5.50	
	0.0 14.82					8.000			K Factor = 5.24	
67A to 607	14.91	1.049 120.0 0.0756	T	5.0 0.0 0.0	4.250 5.000 9.250	7.299 0.0 0.699			Vel = 5.53	
	0.0 14.91					7.998			K Factor = 5.27	
68A to 608	14.90	1.049 120.0 0.0756	T	5.0 0.0 0.0	5.666 5.000 10.666	7.292 0.0 0.806			Vel = 5.53	
	0.0 14.90					8.098			K Factor = 5.24	

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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	*****
69A to 609	15.06 15.06	1.049 120.0 0.0770	T	5.0 0.0 0.0	4.250 5.000 9.250	7.455 0.0 0.712				Vel = 5.59
	0.0 15.06					8.167				K Factor = 5.27
600 to 601	-105.14 -105.14	1.61 120.0 -0.3481		0.0 0.0 0.0	9.000 0.0 9.000	19.285 0.0 -3.133				Vel = 16.57
601 to 9	21.59 -83.55	1.61 120.0 -0.2275	T	8.0 0.0 0.0	5.250 8.000 13.250	16.152 0.0 -3.014				Vel = 13.17
9 to 602	0.0 -83.55	1.38 120.0 -0.4820		0.0 0.0 0.0	6.166 0.0 6.166	13.138 0.0 -2.972				Vel = 17.92
602 to 603	17.21 -66.34	1.38 120.0 -0.3149		0.0 0.0 0.0	1.375 0.0 1.375	10.166 0.0 -0.433				Vel = 14.23
603 to 604	16.38 -49.96	1.38 120.0 -0.1862		0.0 0.0 0.0	7.208 0.0 7.208	9.733 0.0 -1.342				Vel = 10.72
604 to 605	15.73 -34.23	1.38 120.0 -0.0925		0.0 0.0 0.0	1.416 0.0 1.416	8.391 0.0 -0.131				Vel = 7.34
605 to 606	15.58 -18.65	1.38 120.0 -0.0300		0.0 0.0 0.0	8.666 0.0 8.666	8.260 0.0 -0.260				Vel = 4.00
606 to 607	14.82 -3.83	1.38 120.0 -0.0016		0.0 0.0 0.0	1.250 0.0 1.250	8.000 0.0 -0.002				Vel = 0.82
607 to 608	14.90 11.07	1.38 120.0 0.0114		0.0 0.0 0.0	8.750 0.0 8.750	7.998 0.0 0.100				Vel = 2.37
608 to 609	14.91 25.98	1.38 120.0 0.0552		0.0 0.0 0.0	1.250 0.0 1.250	8.098 0.0 0.069				Vel = 5.57
609 to 7	15.06 41.04	1.38 120.0 0.1294	T	6.0 0.0 0.0	27.500 6.000 33.500	8.167 0.0 4.334				Vel = 8.80
7 to 15	0.0 41.04	1.38 120.0 0.1294	4E T	12.0 6.0 0.0	38.666 18.000 56.666	12.501 0.0 7.331				Vel = 8.80
15 to 6	0.0 41.04	1.38 120.0 0.1293		0.0 0.0 0.0	64.500 0.0 64.500	19.832 0.0 8.343				Vel = 8.80
6 to 3	0.0 41.04	1.61 120.0 0.0611	T	8.0 0.0 0.0	21.200 8.000 29.200	28.175 0.0 1.783				Vel = 6.47
3 to 4	0.0 41.04	1.61 120.0 0.0611	E	4.0 0.0 0.0	5.660 4.000 9.660	29.958 0.0 0.590				Vel = 6.47

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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	*****
4 to 5	0.0 41.04	6.065 120.0 0.0001	E 14.0 0.0 0.0	83.500 14.000 97.500	30.548 36.164 0.010		Vel = 0.46		
5 to TR	0.0 41.04	6.065 120.0 0.0001	G 3.0 T 30.0 0.0	91.500 33.000 124.500	66.722 2.166 0.011		Vel = 0.46		
	0.0 41.04				68.899		K Factor = 4.94		
60A to HOSE	131.28	1.61 120.0 0.5250	T 8.0 0.0 0.0	5.125 8.000 13.125	23.230 0.0 6.890		Vel = 20.69		
HOSE to 10	100.00 231.28	6.065 120.0 0.0023	E 14.0 0.0 0.0	83.500 14.000 97.500	30.120 36.164 0.228		Qa = 100 Vel = 2.57		
10 to TR	0.0 231.28	6.065 120.0 0.0023	T 30.0 0.0 0.0	64.500 30.000 94.500	66.512 2.166 0.221		Vel = 2.57		
TR to BR	41.04 272.32	6.065 120.0 0.0031	Fsp 0.0 G 3.0 0.0	5.000 3.000 8.000	68.899 1.000 0.025		* * Fixed Loss = 1 Vel = 3.02		
BR to TEST	0.0 272.32	6.065 120.0 0.0032	E 14.0 0.0 0.0	5.500 14.000 19.500	69.924 3.469 0.062		Vel = 3.02		
	0.0 272.32				73.455		K Factor = 31.77		

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 : 41.329
D2 - System Flow : 172.315
D2 - System Pressure : 73.455
Hose (Demand) : 100
D3 - System Demand : 272.315
Safety Margin : 92.690

