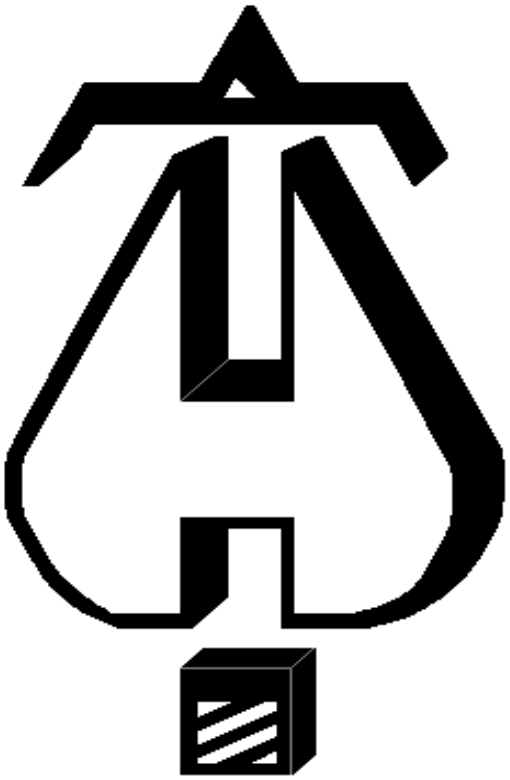

. . . Fire Protection by Computer Design

DEAN & ALLYN, INC.
32 LEWISTON ROAD BUILDING 1C
P.O. BOX 709
GRAY, ME 04039
207-657-5646

Job Name	:	MMC 2CND FLOOR RICHARDS
Building	:	Richards Building
Location	:	Maine Medical Center-22 Bramhall St-Portland, Me
System	:	WX4
Contract	:	C0810818
Data File	:	MMC---2C.WX4

Hydraulic Design Information Sheet

Name - Second Floor Fire Protection Upgrade Date - 11/7/08
Location - Maine Medical Center-22 Bramhall St-Portland, Me
Building - Richards Building System No. - WX4
Contractor - Dean & Allyn, Inc Contract No. - C0810818
Calculated By - James R White Drawing No. - 1 of 1
Construction: ( ) Combustible (X) Non-Combustible Ceiling Height - 8'-0"
Occupancy - Hospital- typical patient room

SYSTEM DESIGN

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

Area of Sprinkler Operation	- 5 HEADS	System Type	Sprinkler/Nozzle
Density	- .1	(X) Wet	Make VIKING
Area Per Sprinkler	- 138	( ) Dry	Model VK606/VK304
Elevation at Highest Outlet	- 8'-0"	( ) Deluge	Size 3/4"/1/2"
Hose Allowance - Inside	- 100	( ) Preaction	K-Factor 8.0/5.6
Rack Sprinkler Allowance	- 0	( ) Other	Temp.Rat.155 deg
Hose Allowance - Outside	- 0		

Note SAFETY MARGIN= 68.96 PSI - LARGEST ROOM + 2 (5 HEADS) (EXT COVERAGE)

Calculation Summary: Flow Required - 265.80 Press Required - 94.82
C-Factor Used: 120 Overhead 120 Underground

WATER SUPPLY

Water Flow Test:		Pump Data:		Tank or Reservoir:
Date of Test	- 10/11/07			Cap. -
Time of Test	-	Rated Cap.-		Elev.-
Static Press	- 170	@ Press	-	
Residual Press	- 75	Elev.	-	Well
Flow	- 1160			Proof Flow
Elevation	- 0			

Location - RICHARDS FIRE PUMP

Source of Information - ANNUAL PUMP TEST

STORAGE

Commodity N/A Class Location
Storage Ht. N/A 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 N/A Clearance:Storage to Ceiling
Longitudinal N/A Transverse N/A

Horizontal Barriers Provided: N/A

Fittings Used Summary

DEAN & ALLYN, INC.
MMC 2CND FLOOR RICHARDS

Date 110408

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
B	Generic Butterfly Valve	0	0	0	0	0	0	7	10	0	12	9	10	12	19	21	0	0	0	0	0
E	90' Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
G	Generic Gate Valve	0	0	0	0	1	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
Mbb	B Ball Milw BB-SC100			2.25	2	2.5	2.25	10													
N	CPVC 90'Ell Harvel-Spears	7	7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
S	Generic Swing Check Valve	4	5	5	7	9	11	14	16	19	22	27	32	45	55	65	76	87	98	109	130
T	90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121

Pressure / Flow Summary - STANDARD

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
D301	30.083	5.6	47.47	na	38.58	0.1	112	7.0
D302	30.083	5.6	51.6	na	40.23	0.1	96	7.0
69	29.083	5.6	20.15	na	25.14	0.1	70	7.0
71	0.0		62.33	na				
9	31.08		58.95	na				
10	31.083		71.63	na				
11	31.083		74.65	na				
12	31.083		77.03	na				
13	31.083		82.19	na				
14	11.5		90.68	na				
72	29.083	8	20.3	na	36.04	0.1	207	20.3
137	29.083		20.71	na				
68	29.083	5.6	21.25	na	25.82	0.1	70	7.0
138	31.08		31.18	na				
139	31.08		40.47	na				
140	31.08		48.9	na				
70	31.083		52.66	na				
64	31.08		64.07	na				
21	31.08		71.53	na				
20	31.08		71.52	na				
19	31.08		70.49	na				
18	31.083		70.39	na				
17	31.08		70.26	na				
5	31.08		70.23	na				
6	31.08		70.2	na				
7	31.08		70.05	na				
42	31.08		69.96	na				
43	31.08		69.81	na				
44	31.08		69.62	na				
41	31.08		69.58	na				
8	31.083		69.03	na				
15	31.083		73.44	na	100.0			
16	31.083		81.91	na				
14B	11.5		90.46	na				
14A	3.0		94.5	na				
TEST	3.0		94.82	na				

The maximum velocity is 29.32 and it occurs in the pipe between nodes 68 and 138

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
D301	38.58	1.101	1N	7.0	1.000	47.470		K Factor = 5.60
to		150		0.0	7.000	13.029		
71	38.58	0.2294		0.0	8.000	1.835		Vel = 13.00
	0.0							
	38.58					62.334		K Factor = 4.89
D302	40.23	1.101	1O	5.0	1.000	51.603		K Factor = 5.60
to		150		0.0	5.000	-0.433		
70	40.23	0.2478		0.0	6.000	1.487		Vel = 13.56
	0.0							
	40.23					52.657		K Factor = 5.54
69	25.14	1.101	1O	5.0	0.410	20.151		K Factor = 5.60
to		150		0.0	5.000	0.0		
137	25.14	0.1039		0.0	5.410	0.562		Vel = 8.47
	0.0							
	25.14					20.713		K Factor = 5.52
71	38.58	1.598		0.0	0.660	62.334		
to		150		0.0	0.0	-13.461		
140	38.58	0.0379		0.0	0.660	0.025		Vel = 6.17
	0.0							
	38.58					48.898		K Factor = 5.52
9	106.91	1.598	2O	16.0	24.950	58.945		
to		150		0.0	16.000	-0.001		
8	106.91	0.2464		0.0	40.950	10.090		Vel = 17.10
	0.0							
	106.91					69.034		K Factor = 12.87
10	83.28	1.598	1O	8.0	11.450	71.627		
to		150		0.0	8.000	0.0		
11	83.28	0.1552		0.0	19.450	3.019		Vel = 13.32
11	0.0	1.598	1N	9.0	6.330	74.646		
to		150		0.0	9.000	0.0		
12	83.28	0.1553		0.0	15.330	2.380		Vel = 13.32
12	0.0	2.067	3E	15.0	4.020	77.026		
to		120	1Mbb	2.25	28.250	3.000		* Fixed loss = 3
13	83.28	0.0670	1S	11.0	32.270	2.161		Vel = 7.96
			1Fsp	0.0				
13	0.0	6.065	1E	14.0	31.100	82.187		
to		120		0.0	14.000	8.481		
14	83.28	0.0004		0.0	45.100	0.016		Vel = 0.92
14	0.0	6.065	7E	98.0	207.000	90.684		
to		120	2T	60.0	164.000	3.681		
14A	83.28	0.0004	2G	6.0	371.000	0.132		Vel = 0.92
	0.0							
	83.28					94.497		K Factor = 8.57
72	36.04	1.101		0.0	2.040	20.300		K Factor = 8.00
to		150		0.0	0.0	0.0		
137	36.04	0.2025		0.0	2.040	0.413		Vel = 12.15
137	25.14	1.101		0.0	1.000	20.713		
to		150		0.0	0.0	0.0		
68	61.18	0.5380		0.0	1.000	0.538		Vel = 20.62

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
68	25.82	1.101	1N	7.0	3.450	21.251		K Factor = 5.60
to		150		0.0	7.000	-0.865		
138	87.0	1.0327		0.0	10.450	10.792		Vel = 29.32
138	0.0	1.101	1N	7.0	2.000	31.178		
to		150		0.0	7.000	0.0		
139	87.0	1.0327		0.0	9.000	9.294		Vel = 29.32
139	0.0	1.101	1O	5.0	3.160	40.472		
to		150		0.0	5.000	0.0		
140	87.0	1.0326		0.0	8.160	8.426		Vel = 29.32
140	38.58	1.598		0.0	11.330	48.898		
to		150		0.0	0.0	-0.001		
70	125.58	0.3319		0.0	11.330	3.760		Vel = 20.09
70	40.23	1.598		0.0	11.330	52.657		
to		150		0.0	0.0	0.001		
9	165.81	0.5549		0.0	11.330	6.287		Vel = 26.52
9	-106.92	1.598		0.0	62.660	58.945		
to		150		0.0	0.0	0.0		
64	58.89	0.0818		0.0	62.660	5.124		Vel = 9.42
64	0.0	1.598	2N	18.0	66.450	64.069		
to		150	1O	8.0	26.000	-0.001		
10	58.89	0.0818		0.0	92.450	7.559		Vel = 9.42
10	-83.27	1.598		0.0	6.370	71.627		
to		150		0.0	0.0	0.001		
21	-24.38	-0.0160		0.0	6.370	-0.102		Vel = 3.90
21	0.0	1.598		0.0	0.330	71.526		
to		150		0.0	0.0	0.0		
20	-24.38	-0.0152		0.0	0.330	-0.005		Vel = 3.90
20	0.0	1.598	1O	8.0	56.700	71.521		
to		150		0.0	8.000	0.0		
19	-24.38	-0.0160		0.0	64.700	-1.035		Vel = 3.90
19	0.0	1.598		0.0	6.000	70.486		
to		150		0.0	0.0	-0.001		
18	-24.38	-0.0160		0.0	6.000	-0.096		Vel = 3.90
18	0.0	1.598		0.0	8.000	70.389		
to		150		0.0	0.0	0.001		
17	-24.38	-0.0160		0.0	8.000	-0.128		Vel = 3.90
17	0.0	1.598		0.0	2.080	70.262		
to		150		0.0	0.0	0.0		
5	-24.38	-0.0159		0.0	2.080	-0.033		Vel = 3.90
5	0.0	1.598		0.0	1.910	70.229		
to		150		0.0	0.0	0.0		
6	-24.38	-0.0162		0.0	1.910	-0.031		Vel = 3.90
6	0.0	1.598		0.0	9.000	70.198		
to		150		0.0	0.0	0.0		
7	-24.38	-0.0160		0.0	9.000	-0.144		Vel = 3.90
7	0.0	1.598		0.0	5.910	70.054		
to		150		0.0	0.0	0.0		
42	-24.38	-0.0159		0.0	5.910	-0.094		Vel = 3.90

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
42	0.0	1.598		0.0	9.080	69.960		
to		150		0.0	0.0	0.0		
43	-24.38	-0.0161		0.0	9.080	-0.146		Vel = 3.90
43	0.0	1.598		0.0	12.000	69.814		
to		150		0.0	0.0	0.0		
44	-24.38	-0.0160		0.0	12.000	-0.192		Vel = 3.90
44	0.0	1.598		0.0	2.750	69.622		
to		150		0.0	0.0	0.0		
41	-24.38	-0.0160		0.0	2.750	-0.044		Vel = 3.90
41	0.0	1.598		0.0	33.910	69.578		
to		150		0.0	0.0	-0.001		
8	-24.38	-0.0160		0.0	33.910	-0.543		Vel = 3.90
8	106.91	1.598	2O	16.0	12.830	69.034		
to		150		0.0	16.000	0.0		
15	82.53	0.1527		0.0	28.830	4.401		Vel = 13.20
15	100.00	2.469	3E	18.0	6.450	73.435		Qa = 100
to		120	1B	7.0	39.000	3.000		* Fixed loss = 3
16	182.53	0.1204	1Fsp	0.0	45.450	5.471		Vel = 12.23
			1S	14.0				
16	0.0	6.065	1E	14.0	31.100	81.906		
to		120		0.0	14.000	8.481		
14B	182.53	0.0015		0.0	45.100	0.069		Vel = 2.03
14B	0.0	6.065	6E	84.0	91.000	90.456		
to		120	2T	60.0	147.000	3.681		
14A	182.53	0.0015	1G	3.0	238.000	0.360		Vel = 2.03
14A	83.28	6.065	2E	28.0	12.000	94.497		
to		120	1T	30.0	93.000	0.0		
TEST	265.81	0.0030	1G	3.0	105.000	0.319		Vel = 2.95
			1S	32.0				
	0.0							
	265.81					94.816		K Factor = 27.30

Water Supply Curve (C)

DEAN & ALLYN, INC.
MMC 2CND FLOOR RICHARDS

Date 110408

City Water Supply:
- C1 - Static Pressure : 170
- C2 - Residual Pressure: 75
- C2 - Residual Flow : 1160

Demand:

D1 - Elevation	:	11.297
D2 - System Flow	:	165.809
D2 - System Pressure	:	94.816
Hose (Adj City)	:	
Hose (Demand)	:	100
D3 - System Demand	:	265.809
Safety Margin	:	68.962