

... Fire Protection by Computer Design

Master Craft Plumbing
887 Brentwood Dr.
Daytona beach, FL 32117
386-252-7047

Job Name : DME - Residential Main Hall Calc #4
Building :
Location :
System :
Contract :
Data File : DME - Calc #4 - 13R Residential Main Hall.WXF

CURTIS ENGINEERING SERVICE, LLC - CA#31561
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ENGINEER OF RECORD

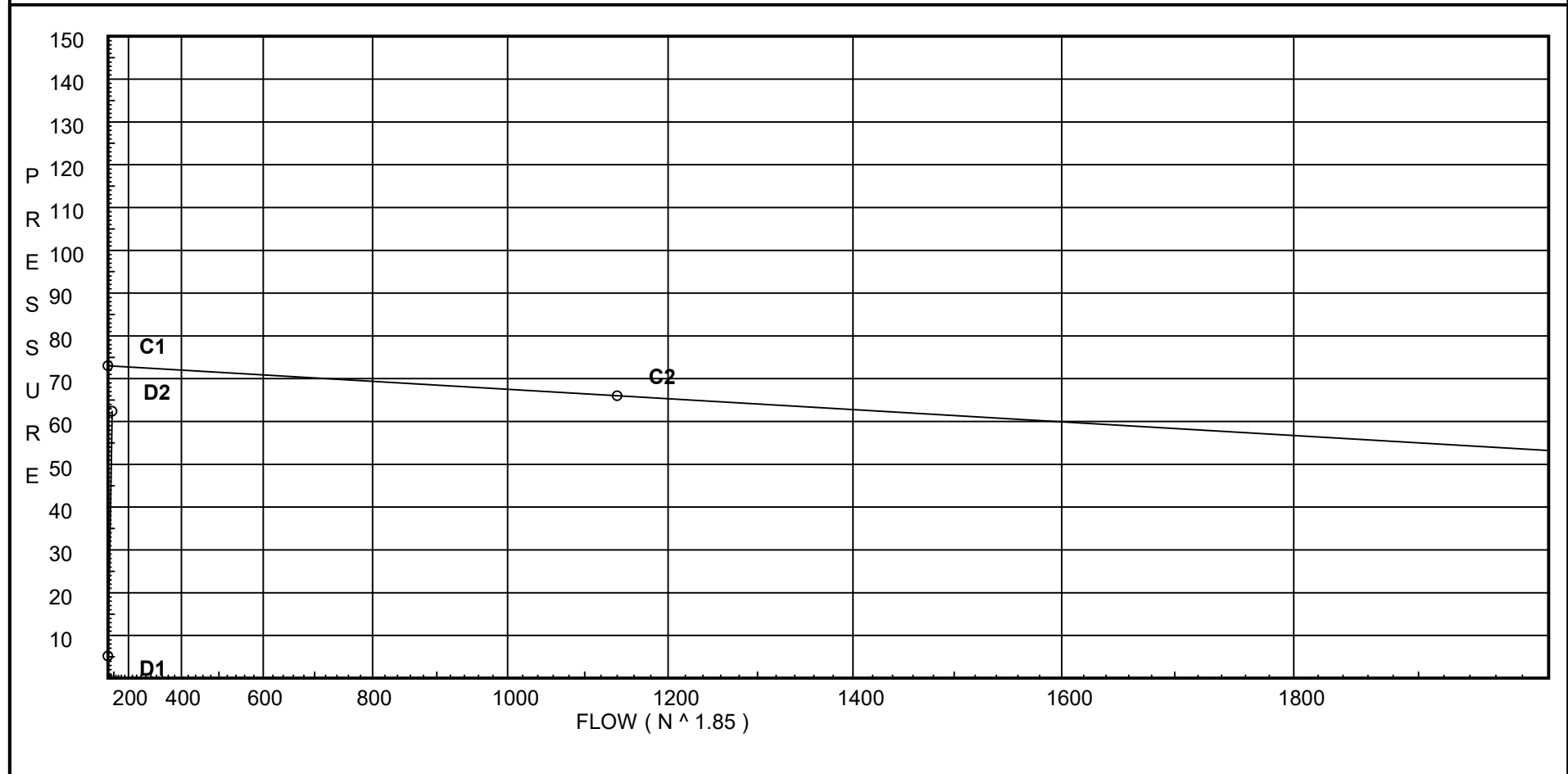
Water Supply Curve C

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City Water Supply:
C1 - Static Pressure : 73
C2 - Residual Pressure: 66
C2 - Residual Flow : 1140

Demand:
D1 - Elevation : 5.197
D2 - System Flow : 83.972
D2 - System Pressure : 62.365
Hose (Demand) : _____
D3 - System Demand : 83.972
Safety Margin : 10.579



Fittings Used Summary

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Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
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
Fhc *	1/2 in FlexHead - 4 Ft Long	0	0	24					0	0	0	0	0	0	0	0	0	0	0	0	0
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
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
Zac	Ames 2000SS	Fitting generates a Fixed Loss Based on Flow																			

Unit 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

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
S41	14.0	4.9	16.7	na	20.02	0.05	400	16.7
S42	14.0	4.9	18.85	na	21.27	0.05	400	16.7
S43	14.0	4.9	17.84	na	20.7	0.05	400	16.7
S44	14.0	4.9	20.12	na	21.98	0.05	400	16.7
41	14.75		20.29	na				
42	14.75		22.9	na				
43	10.75		23.41	na				
44	10.75		26.18	na				
401	10.75		27.99	na				
402	10.75		29.75	na				
403	14.75		36.64	na				
404	14.75		40.32	na				
405	10.75		42.79	na				
406	10.75		45.87	na				
TOR	10.75		47.62	na				
BOR	2.0		56.05	na				
U1	-4.0		58.65	na				
U2	-4.0		58.67	na				
U3	-4.0		58.7	na				
U4	-4.0		58.75	na				
BF1	2.0		56.16	na				
BF2	2.0		60.33	na				
U5	-4.0		62.93	na				
U6	-4.0		62.95	na				
M1	-4.0		62.95	na				
M2	-4.0		64.96	na				
S	2.0		62.36	na				

The maximum velocity is 16.5 and it occurs in the pipe between nodes 402 and 403

Final Calculations - Hazen-Williams - 2007

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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	*****
*SPRINKLER DROP PENDENTS										
S41	20.02	1.049	Fhc	24.0	1.000	16.700			K Factor = 4.90	
to		120.0	T	5.0	29.000	-0.325				
41	20.02	0.1304		0.0	30.000	3.913			Vel = 7.43	
	0.0									
	20.02						20.288		K Factor = 4.44	
S42	21.27	1.049	Fhc	24.0	1.000	18.846			K Factor = 4.90	
to		120.0	T	5.0	29.000	-0.325				
42	21.27	0.1458		0.0	30.000	4.375			Vel = 7.90	
	0.0									
	21.27						22.896		K Factor = 4.45	
S43	20.70	1.049	Fhc	24.0	1.000	17.840			K Factor = 4.90	
to		120.0	T	5.0	29.000	1.408				
43	20.7	0.1386		0.0	30.000	4.158			Vel = 7.68	
	0.0									
	20.70						23.406		K Factor = 4.28	
S44	21.98	1.049	Fhc	24.0	1.000	20.122			K Factor = 4.90	
to		120.0	T	5.0	29.000	1.408				
44	21.98	0.1550		0.0	30.000	4.649			Vel = 8.16	
	0.0									
	21.98						26.179		K Factor = 4.30	
*										
*BRANCHES										
41	20.02	1.049		0.0	20.000		20.288			
to		120.0		0.0	0.0		0.0			
42	20.02	0.1304		0.0	20.000		2.608		Vel = 7.43	
42	21.28	1.049	T	5.0	1.750		22.896			
to		120.0		0.0	5.000		1.732			
401	41.3	0.4978		0.0	6.750		3.360		Vel = 15.33	
	0.0									
	41.30						27.988		K Factor = 7.81	
*										
43	20.70	1.049		0.0	20.000		23.406			
to		120.0		0.0	0.0		0.0			
44	20.7	0.1386		0.0	20.000		2.773		Vel = 7.68	
44	21.98	1.049	T	5.0	1.750		26.179			
to		120.0		0.0	5.000		0.0			
402	42.68	0.5289		0.0	6.750		3.570		Vel = 15.84	
	0.0									
	42.68						29.749		K Factor = 7.83	
*										
*CROSSMAIN										
401	41.30	1.442		0.0	16.667		27.988			
to		120.0		0.0	0.0		0.0			
402	41.3	0.1057		0.0	16.667		1.761		Vel = 8.11	
402	42.67	1.442	E	3.716	18.250		29.749			
to		120.0		0.0	3.716		-1.732			
403	83.97	0.3927		0.0	21.966		8.627		Vel = 16.50	

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftn'g's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 83.97						36.644		K Factor = 13.87	
*										
*FEED MAIN										
403 to 404	83.97	1.682 120.0 0.1856	E	4.95 0.0	14.833 4.950	36.644 0.0			Vel = 12.12	
404 to 405	0.0 83.97	1.682 120.0 0.1858		0.0 0.0	4.000 0.0	40.315 1.732			Vel = 12.12	
405 to 406	0.0 83.97	2.157 120.0 0.0553	2E T	12.307 12.307	31.083 24.614	42.790 0.0			Vel = 7.37	
406 to TOR	0.0 83.97	2.157 120.0 0.0553	E T	6.153 12.307	13.167 18.460	45.868 0.0			Vel = 7.37	
	0.0 83.97						47.616		K Factor = 12.17	
*										
*RISER										
TOR to BOR	83.97	2.157 120.0 0.0553	Fsp B S	0.0 7.384 13.537	8.750 20.921 29.671	47.616 6.790 1.640			* Fixed Loss = 3 Vel = 7.37	
BOR to U1	0.0 83.97	6.16 140.0 0.0002	E	20.084 0.0	16.000 20.084	56.046 2.599			Vel = 0.90	
U1 to U2	0.0 83.97	5.86 150.0 0.0003	E	17.893 0.0	47.250 17.893	58.653 0.0			Vel = 1.00	
U2 to U3	0.0 83.97	5.86 150.0 0.0003	T	38.342 0.0	57.500 38.342	58.672 0.0			Vel = 1.00	
U3 to U4	0.0 83.97	5.86 150.0 0.0003	2E	35.786 0.0	137.667 35.786	58.698 0.0			Vel = 1.00	
U4 to BF1	0.0 83.97	6.16 140.0 0.0003	E	20.084 0.0	6.000 20.084	58.747 -2.599			Vel = 0.90	
BF1 to BF2	0.0 83.97	6.16 140.0 0.0003	E Zac	20.084 0.0	5.000 20.084	56.155 4.168			* Fixed Loss = 4.168 Vel = 0.90	
BF2 to U5	0.0 83.97	6.16 140.0 0.0002	E	20.084 0.0	6.000 20.084	60.330 2.599			Vel = 0.90	
U5 to U6	0.0 83.97	5.86 150.0 0.0003	E T	17.893 38.342	3.500 56.235	62.935 0.0			Vel = 1.00	

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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	*****
U6 to M1	0.0 83.97	5.86 150.0 0.0003		0.0 0.0 7.000	62.952 0.0 0.002		Vel = 1.00		
M1 to M2	0.0 83.97	5.86 150.0 0.0003	2G	7.668 0.0 10.668	62.954 2.000 0.003		* Fixed Loss = 2 Vel = 1.00		
M2 to S	0.0 83.97	7.68 150.0 0.0001	E G T	22.555 5.012 43.857	17.500 71.424 88.924	64.957 -2.599 0.007	Vel = 0.58		
	0.0 83.97				62.365		K Factor = 10.63		