

... Fire Protection by Computer Design

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

Job Name : DME - Ord Haz Grp 1 Kitchen Calc #3
Building :
Location :
System :
Contract :
Data File : DME - Calc #3 - 13R Ord Haz Kitchen.WXF

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ENGINEER OF RECORD

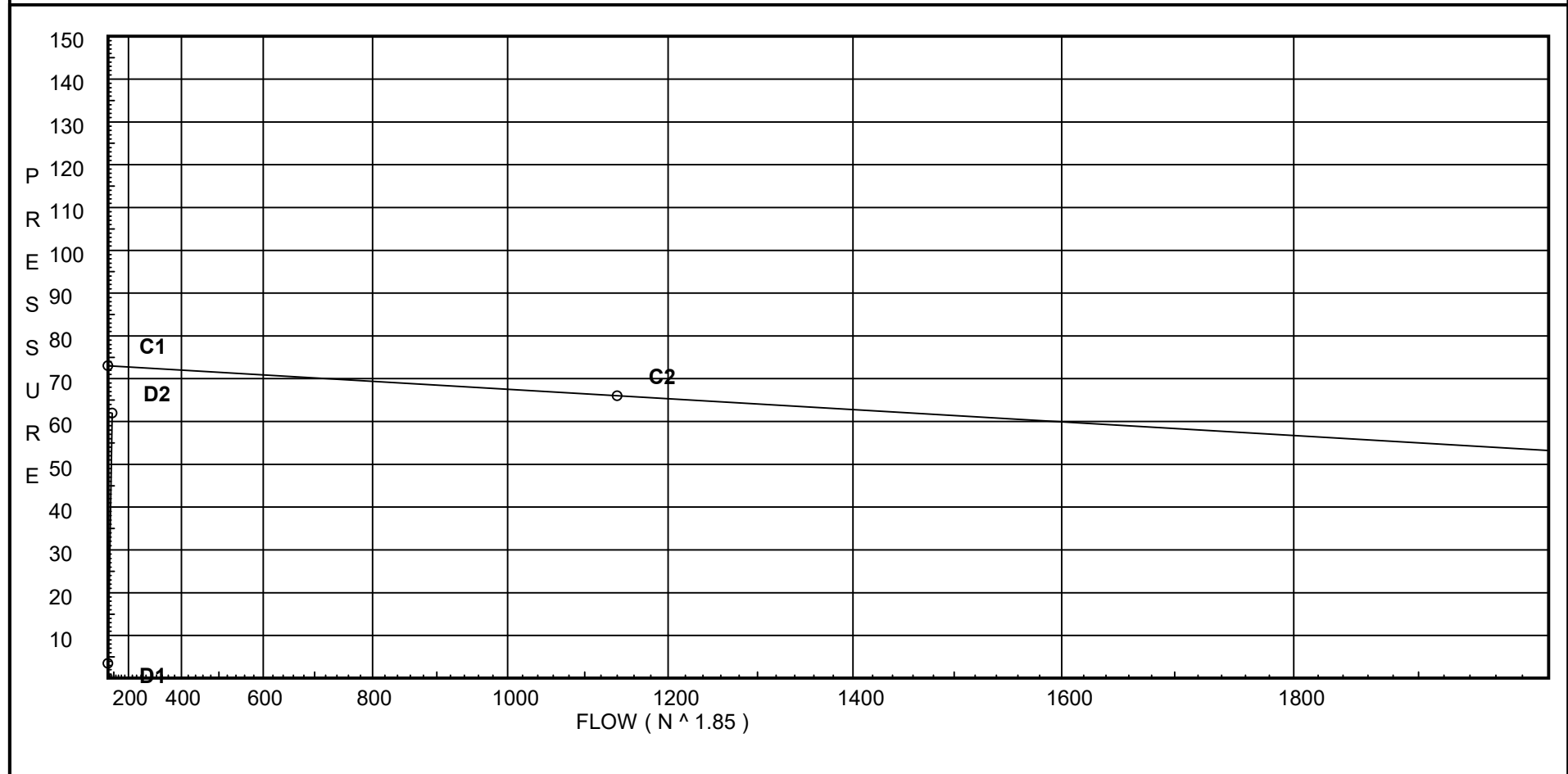
Water Supply Curve C

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

Demand:
D1 - Elevation : 3.465
D2 - System Flow : 86.228
D2 - System Pressure : 61.935
Hose (Demand) : _____
D3 - System Demand : 86.228
Safety Margin : 11.006



Fittings Used Summary

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Fitting Legend		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
Abbrev.	Name																				
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.
S31	10.0	5.6	9.81	na	17.54	0.15	50	7.0
S32	10.0	5.6	9.24	na	17.02	0.15	75	7.0
S33	10.0	5.6	9.39	na	17.16	0.15	90	7.0
S34	10.0	5.6	9.49	na	17.25	0.15	115	7.0
S35	10.0	5.6	9.5	na	17.26	0.15	100	7.0
32	10.75		11.81	na				
33	10.75		12.01	na				
34	10.75		12.13	na				
35	10.75		12.34	na				
31	10.75		12.55	na				
301	10.75		12.61	na				
302	10.75		12.95	na				
303	10.75		18.02	na				
202	10.75		24.14	na				
203	10.75		29.29	na				
204	14.75		29.31	na				
403	14.75		35.66	na				
404	14.75		39.51	na				
405	10.75		42.02	na				
406	10.75		45.26	na				
TOR	10.75		47.09	na				
BOR	2.0		55.6	na				
U1	-4.0		58.21	na				
U2	-4.0		58.23	na				
U3	-4.0		58.26	na				
U4	-4.0		58.31	na				
BF1	2.0		55.72	na				
BF2	2.0		59.9	na				
U5	-4.0		62.5	na				
U6	-4.0		62.52	na				
M1	-4.0		62.52	na				
M2	-4.0		64.53	na				
S	2.0		61.94	na				

The maximum velocity is 12.45 and it occurs in the pipe between nodes 302 and 303

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									
S31	17.54	1.049	Fhc 24.0	1.000	9.810			K Factor = 5.60	
to		120.0	T 5.0	29.000	-0.325				
31	17.54	0.1021	0.0	30.000	3.063			Vel = 6.51	
	0.0								
	17.54					12.548		K Factor = 4.95	
S32	17.02	1.049	Fhc 24.0	1.000	9.237			K Factor = 5.60	
to		120.0	T 5.0	29.000	-0.325				
32	17.02	0.0965	0.0	30.000	2.896			Vel = 6.32	
	0.0								
	17.02					11.808		K Factor = 4.95	
S33	17.16	1.049	Fhc 24.0	1.000	9.393			K Factor = 5.60	
to		120.0	T 5.0	29.000	-0.325				
33	17.16	0.0981	0.0	30.000	2.942			Vel = 6.37	
	0.0								
	17.16					12.010		K Factor = 4.95	
S34	17.25	1.049	Fhc 24.0	1.000	9.489			K Factor = 5.60	
to		120.0	T 5.0	29.000	-0.325				
34	17.25	0.0990	0.0	30.000	2.969			Vel = 6.40	
	0.0								
	17.25					12.133		K Factor = 4.95	
S35	17.26	1.049	Fhc 24.0	3.000	9.495			K Factor = 5.60	
to		120.0	T 5.0	29.000	-0.325				
35	17.26	0.0991	0.0	32.000	3.170			Vel = 6.41	
	0.0								
	17.26					12.340		K Factor = 4.91	
*									
*BRANCHES									
32	17.02	1.442		0.0	9.833	11.808			
to		120.0		0.0	0.0	0.0			
33	17.02	0.0205		0.0	9.833	0.202		Vel = 3.34	
33	17.16	1.442	T	7.432	0.667	12.010			
to		120.0		0.0	7.432	0.0			
301	34.18	0.0745		0.0	8.099	0.603		Vel = 6.71	
	0.0								
	34.18					12.613		K Factor = 9.62	
*									
34	17.25	1.442		0.0	9.833	12.133			
to		120.0		0.0	0.0	0.0			
35	17.25	0.0211		0.0	9.833	0.207		Vel = 3.39	
35	17.26	1.442	T	7.432	0.667	12.340			
to		120.0		0.0	7.432	0.0			
302	34.51	0.0758		0.0	8.099	0.614		Vel = 6.78	
	0.0								
	34.51					12.954		K Factor = 9.59	
*									
*CROSSMAIN									

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	*****
31 to 301	17.54	1.682 120.0 0.0103		6.333 0.0 6.333	12.548 0.0 0.065		Vel = 2.53		
301 to 302	34.18	1.682 120.0 0.0758		4.500 0.0 4.500	12.613 0.0 0.341		Vel = 7.47		
302 to 303	34.51	1.682 120.0 0.1949	2E 9.9 0.0	16.083 9.900 25.983	12.954 0.0 5.064		Vel = 12.45		
303 to 202	0.0	1.682 120.0 0.1949	T 9.9 0.0	21.500 9.900 31.400	18.018 0.0 6.120		Vel = 12.45		
	0.0 86.23				24.138		K Factor = 17.55		
* FEED MAIN									
202 to 203	86.23	1.682 120.0 0.1949	E 4.95 0.0	21.500 4.950 26.450	24.138 0.0 5.155		Vel = 12.45		
203 to 204	0.0	1.682 120.0 0.1949	E 4.95 0.0	4.000 4.950 8.950	29.293 -1.732 1.744		Vel = 12.45		
204 to 403	86.23	1.682 120.0 0.1949		32.583 0.0 32.583	29.305 0.0 6.351		Vel = 12.45		
403 to 404	0.0	1.682 120.0 0.1949	E 4.95 0.0	14.833 4.950 19.783	35.656 0.0 3.856		Vel = 12.45		
404 to 405	0.0	1.682 120.0 0.1950		4.000 0.0 4.000	39.512 1.732 0.780		Vel = 12.45		
405 to 406	0.0	2.157 120.0 0.0580	2E 12.307 T 12.307 0.0	31.083 24.614 55.697	42.024 0.0 3.233		Vel = 7.57		
406 to TOR	0.0	2.157 120.0 0.0581	E 6.153 T 12.307 0.0	13.167 18.460 31.627	45.257 0.0 1.836		Vel = 7.57		
	0.0 86.23				47.093		K Factor = 12.57		
* RISER									
TOR to BOR	86.23	2.157 120.0 0.0580	Fsp 0.0 B 7.384 S 13.537	8.750 20.921 29.671	47.093 6.790 1.721		* Fixed Loss = 3 Vel = 7.57		
BOR to U1	0.0	6.16 140.0 0.0003	E 20.084 0.0	16.000 20.084 36.084	55.604 2.599 0.010		Vel = 0.93		

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	*****
U1	0.0	5.86	E	17.893	47.250	58.213				
to		150.0		0.0	17.893	0.0				
U2	86.23	0.0003		0.0	65.143	0.019		Vel =	1.03	
U2	0.0	5.86	T	38.342	57.500	58.232				
to		150.0		0.0	38.342	0.0				
U3	86.23	0.0003		0.0	95.842	0.028		Vel =	1.03	
U3	0.0	5.86	2E	35.786	137.667	58.260				
to		150.0		0.0	35.786	0.0				
U4	86.23	0.0003		0.0	173.453	0.052		Vel =	1.03	
U4	0.0	6.16	E	20.084	6.000	58.312				
to		140.0		0.0	20.084	-2.599				
BF1	86.23	0.0003		0.0	26.084	0.007		Vel =	0.93	
BF1	0.0	6.16	E	20.084	5.000	55.720				
to		140.0	Zac	0.0	20.084	4.172		* Fixed Loss =	4.172	
BF2	86.23	0.0002		0.0	25.084	0.006		Vel =	0.93	
BF2	0.0	6.16	E	20.084	6.000	59.898				
to		140.0		0.0	20.084	2.599				
U5	86.23	0.0003		0.0	26.084	0.007		Vel =	0.93	
U5	0.0	5.86	E	17.893	3.500	62.504				
to		150.0	T	38.342	56.235	0.0				
U6	86.23	0.0003		0.0	59.735	0.018		Vel =	1.03	
U6	0.0	5.86		0.0	7.000	62.522				
to		150.0		0.0	0.0	0.0				
M1	86.23	0.0003		0.0	7.000	0.002		Vel =	1.03	
M1	0.0	5.86	2G	7.668	3.000	62.524				
to		150.0		0.0	7.668	2.000		* Fixed Loss =	2	
M2	86.23	0.0003		0.0	10.668	0.003		Vel =	1.03	
M2	0.0	7.68	E	22.555	17.500	64.527				
to		150.0	G	5.012	71.424	-2.599				
S	86.23	0.0001	T	43.857	88.924	0.007		Vel =	0.60	
	0.0									
	86.23					61.935		K Factor =	10.96	