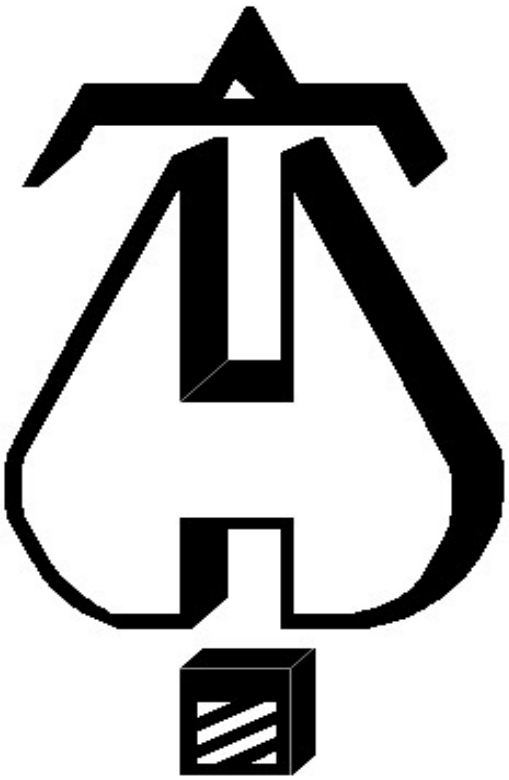


Digitally signed by James Curtis
Date: 2020.04.20 08:05:02 -04'00'

. . . Fire Protection by Computer Design

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

Job Name	:	DME - Light Hazard Computer Lab Calc #5
Building	:	
Location	:	
System	:	
Contract	:	
Data File	:	DME - Calc #5 - 13R Computer Lab-.WXF

CURTIS ENGINEERING SERVICE, LLC - CA#31561
JAMES M. CURTIS, P.E. - PE#37912
29775 BAYHEAD ROAD
DADE CITY, FLORIDA 33523

ENGINEER OF RECORD

Computer Programs by Hydratec Inc. Revision: 50.52.1

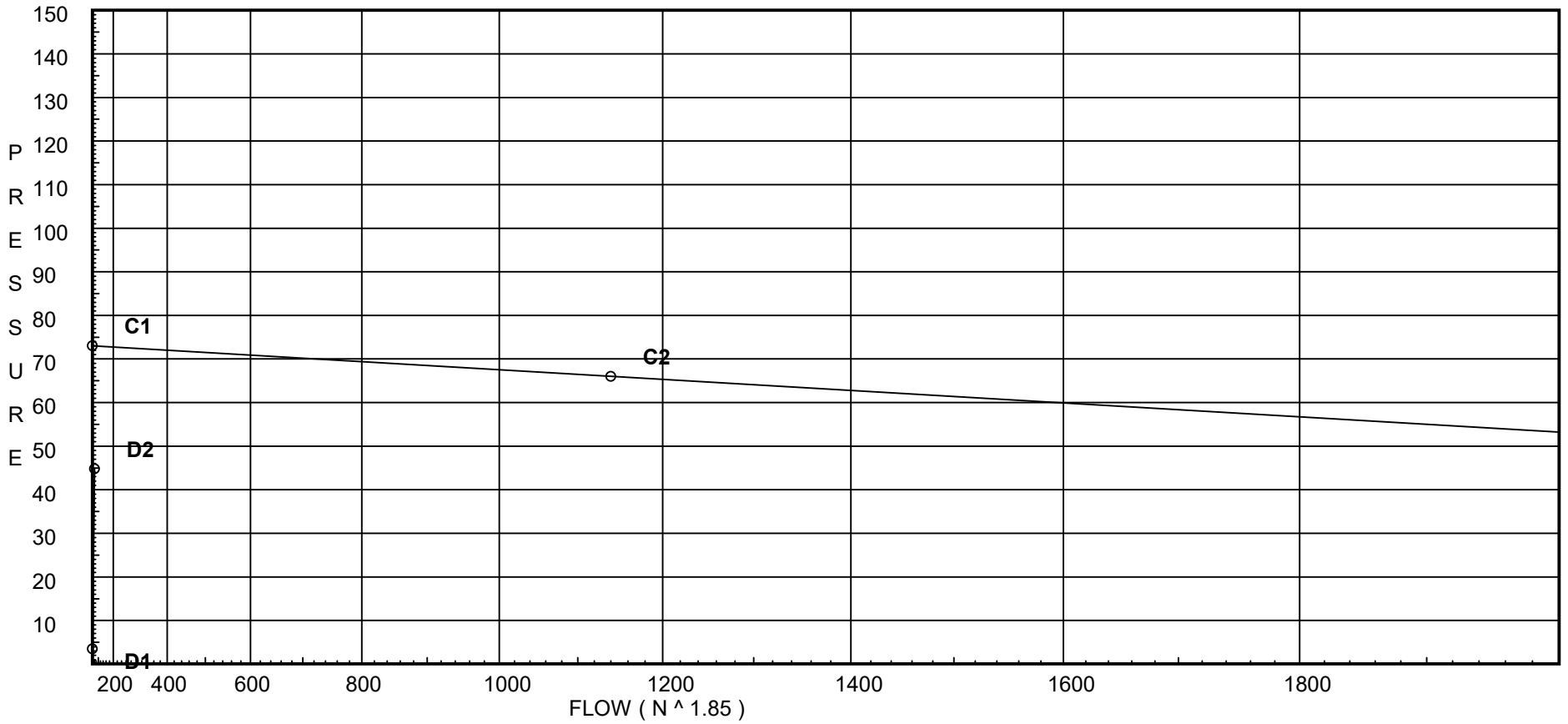
Water Supply Curve C

Master Craft Plumbing
DME - Light Hazard Computer Lab Calc #5

Date 4/15/20

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

Demand:
- D1 - Elevation : 3.465
- D2 - System Flow : 60.393
- D2 - System Pressure : 44.819
- Hose (Demand) : _____
- D3 - System Demand : 60.393
- Safety Margin : 28.150



Fittings Used Summary

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	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 *	½ 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

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
S51	10.0	5.6	7.0	na	14.82	0.1	105	7.0
S52	10.0	5.6	7.41	na	15.25	0.1	105	7.0
S53	10.0	5.6	7.05	na	14.87	0.1	105	7.0
S54	10.0	5.6	7.62	na	15.46	0.1	105	7.0
51	10.75		8.92	na				
52	10.75		9.45	na				
53	10.75		9.43	na				
54	10.75		9.97	na				
501	10.75		13.81	na				
502	10.75		14.4	na				
202	10.75		19.04	na				
203	10.75		21.71	na				
204	14.75		20.88	na				
403	14.75		24.18	na				
404	14.75		26.18	na				
405	10.75		28.31	na				
406	10.75		29.99	na				
TOR	10.75		30.94	na				
BOR	2.0		38.62	na				
U1	-4.0		41.22	na				
U2	-4.0		41.23	na				
U3	-4.0		41.24	na				
U4	-4.0		41.27	na				
BF1	2.0		38.68	na				
BF2	2.0		42.8	na				
U5	-4.0		45.4	na				
U6	-4.0		45.41	na				
M1	-4.0		45.41	na				
M2	-4.0		47.41	na				
S	2.0		44.82	na				

The maximum velocity is 11.86 and it occurs in the pipe between nodes 502 and 202

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								
S51	14.82	1.049	Fhc	24.0	1.000	7.000		K Factor = 5.60
to		120.0	T	5.0	29.000	-0.325		
51	14.82	0.0747		0.0	30.000	2.241		Vel = 5.50
	0.0							
	14.82					8.916		K Factor = 4.96
S52	15.25	1.049	Fhc	24.0	1.000	7.413		K Factor = 5.60
to		120.0	T	5.0	29.000	-0.325		
52	15.25	0.0788		0.0	30.000	2.364		Vel = 5.66
	0.0							
	15.25					9.452		K Factor = 4.96
S53	14.87	1.049	Fhc	24.0	2.000	7.047		K Factor = 5.60
to		120.0	2T	10.0	34.000	-0.325		
53	14.87	0.0752		0.0	36.000	2.707		Vel = 5.52
	0.0							
	14.87					9.429		K Factor = 4.84
S54	15.46	1.049	Fhc	24.0	2.000	7.624		K Factor = 5.60
to		120.0	T	5.0	31.000	-0.325		
54	15.46	0.0809	E	2.0	33.000	2.669		Vel = 5.74
	0.0							
	15.46					9.968		K Factor = 4.90
*								
*BRANCHES								
51	14.82	1.049		0.0	7.167	8.916		
to		120.0		0.0	0.0	0.0		
52	14.82	0.0748		0.0	7.167	0.536		Vel = 5.50
52	15.24	1.049	T	5.0	10.750	9.452		
to		120.0		0.0	5.000	0.0		
501	30.06	0.2766		0.0	15.750	4.356		Vel = 11.16
	0.0							
	30.06					13.808		K Factor = 8.09
*								
53	14.87	1.049		0.0	7.167	9.429		
to		120.0		0.0	0.0	0.0		
54	14.87	0.0752		0.0	7.167	0.539		Vel = 5.52
54	15.46	1.049	T	5.0	10.750	9.968		
to		120.0		0.0	5.000	0.0		
502	30.33	0.2811		0.0	15.750	4.427		Vel = 11.26
	0.0							
	30.33					14.395		K Factor = 7.99
*								
*CROSSMAIN								
501	30.06	1.442		0.0	10.000	13.808		
to		120.0		0.0	0.0	0.0		
502	30.06	0.0587		0.0	10.000	0.587		Vel = 5.91
502	30.33	1.442	T	7.432	14.333	14.395		
to		120.0		0.0	7.432	0.0		
202	60.39	0.2135		0.0	21.765	4.646		Vel = 11.86

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							
	60.39					19.041		K Factor = 13.84
*								
*FEED MAIN								
202	60.39	1.682	E	4.95	21.500	19.041		
to		120.0		0.0	4.950	0.0		
203	60.39	0.1009		0.0	26.450	2.668		Vel = 8.72
203	0.0	1.682	E	4.95	4.000	21.709		
to		120.0		0.0	4.950	-1.732		
204	60.39	0.1008		0.0	8.950	0.902		Vel = 8.72
204	0.0	1.682		0.0	32.750	20.879		
to		120.0		0.0	0.0	0.0		
403	60.39	0.1009		0.0	32.750	3.303		Vel = 8.72
403	0.0	1.682	E	4.95	14.833	24.182		
to		120.0		0.0	4.950	0.0		
404	60.39	0.1009		0.0	19.783	1.996		Vel = 8.72
404	0.0	1.682		0.0	4.000	26.178		
to		120.0		0.0	0.0	1.732		
405	60.39	0.1008		0.0	4.000	0.403		Vel = 8.72
405	0.0	2.157	2E	12.307	31.083	28.313		
to		120.0	T	12.307	24.614	0.0		
406	60.39	0.0300		0.0	55.697	1.673		Vel = 5.30
406	0.0	2.157	E	6.153	13.167	29.986		
to		120.0	T	12.307	18.460	0.0		
TOR	60.39	0.0300		0.0	31.627	0.950		Vel = 5.30
	0.0							
	60.39					30.936		K Factor = 10.86
*								
*RISER								
TOR	60.39	2.157	Fsp	0.0	8.750	30.936		
to		120.0	B	7.384	20.921	6.790		* Fixed Loss = 3
BOR	60.39	0.0300	S	13.537	29.671	0.891		Vel = 5.30
BOR	0.0	6.16	E	20.084	16.000	38.617		
to		140.0		0.0	20.084	2.599		
U1	60.39	0.0001		0.0	36.084	0.004		Vel = 0.65
U1	0.0	5.86	E	17.893	47.250	41.220		
to		150.0		0.0	17.893	0.0		
U2	60.39	0.0002		0.0	65.143	0.010		Vel = 0.72
U2	0.0	5.86	T	38.342	57.500	41.230		
to		150.0		0.0	38.342	0.0		
U3	60.39	0.0002		0.0	95.842	0.015		Vel = 0.72
U3	0.0	5.86	2E	35.786	137.667	41.245		
to		150.0		0.0	35.786	0.0		
U4	60.39	0.0002		0.0	173.453	0.027		Vel = 0.72
U4	0.0	6.16	E	20.084	6.000	41.272		
to		140.0		0.0	20.084	-2.599		
BF1	60.39	0.0001		0.0	26.084	0.003		Vel = 0.65

Final Calculations - Hazen-Williams

Master Craft Plumbing
DME - Light Hazard Computer Lab Calc #5

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
BF1	0.0	6.16	E	20.084	5.000	38.676		
to		140.0	Zac	0.0	20.084	4.120		* Fixed Loss = 4.12
BF2	60.39	0.0002		0.0	25.084	0.004		Vel = 0.65
BF2	0.0	6.16	E	20.084	6.000	42.800		
to		140.0		0.0	20.084	2.599		
U5	60.39	0.0001		0.0	26.084	0.003		Vel = 0.65
U5	0.0	5.86	E	17.893	3.500	45.402		
to		150.0	T	38.342	56.235	0.0		
U6	60.39	0.0002		0.0	59.735	0.009		Vel = 0.72
U6	0.0	5.86		0.0	7.000	45.411		
to		150.0		0.0	0.0	0.0		
M1	60.39	0.0001		0.0	7.000	0.001		Vel = 0.72
M1	0.0	5.86	2G	7.668	3.000	45.412		
to		150.0		0.0	7.668	2.000		* Fixed Loss = 2
M2	60.39	0.0002		0.0	10.668	0.002		Vel = 0.72
M2	0.0	7.68	E	22.555	17.500	47.414		
to		150.0	G	5.012	71.424	-2.599		
S	60.39	0.0	T	43.857	88.924	0.004		Vel = 0.42
	0.0							
	60.39					44.819		K Factor = 9.02