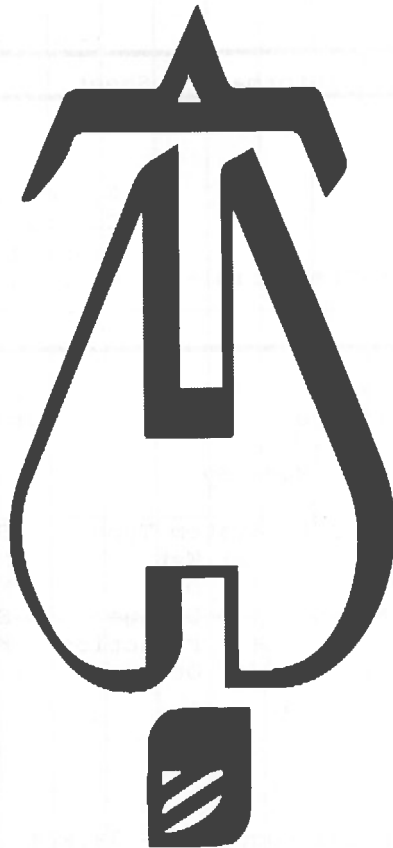




Hydraulic Calculations by HydraCALC

ADVANTAGE FIRE PROTECTION
404B N.W. 11TH ST
BLUE SPRINGS, MO 64015
816-224-3400

Job Name : LOT 1
Drawing : NE MAGUIRE BLVD.
Location : LEE'S SUMMIT, MO
Remote Area : AREA #1
Contract : J-2351
Data File : AREA#1.WXF

Hydraulic Design Information Sheet

Name - LOT 1 Date - 1-4-2024
Location - LEE'S SUMMIT, MO
Building - NE MAGUIRE BLVD.
Contractor -
Calculated By - DANIAL LOGSTON
Construction: () Combustible (X) Non-Combustible
Occupancy - WAREHOUSE

System No. - AREA #1
Contract No. - J-2351
Drawing No. - 2 OF 4
Ceiling Height - 28-0

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

M Area of Sprinkler Operation - 1529.278 System Type Sprinkler/Nozzle
Density - .2 (X) Wet Make VIKING
D Area Per Sprinkler - 126 () Dry Model VK3001
E Elevation at Highest Outlet - 126.958 () Deluge Size 1/2"
S Hose Allowance - Inside - () Preaction K-Factor 5.6
I Rack Sprinkler Allowance - () Other Temp.Rat.200,286
G Hose Allowance - Outside - 250
N

Note

Calculation Flow Required - 613.601 Press Required - 78.864
Summary C-Factor Used: 120 Overhead 140 Underground

W Water Flow Test: Pump Data: Tank or Reservoir:
A Date of Test - 8-10-2023 Cap. -
T Time of Test - 10:20AM Rated Cap.-
E Static Press - 105 @ Press -
R Residual Press - 76 Elev. -
S Flow - 2300 Well
U Elevation - 95 Proof Flow

P Location -
L Source of Information - LS WATER DEPT
Y

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

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

Horizontal Barriers Provided:

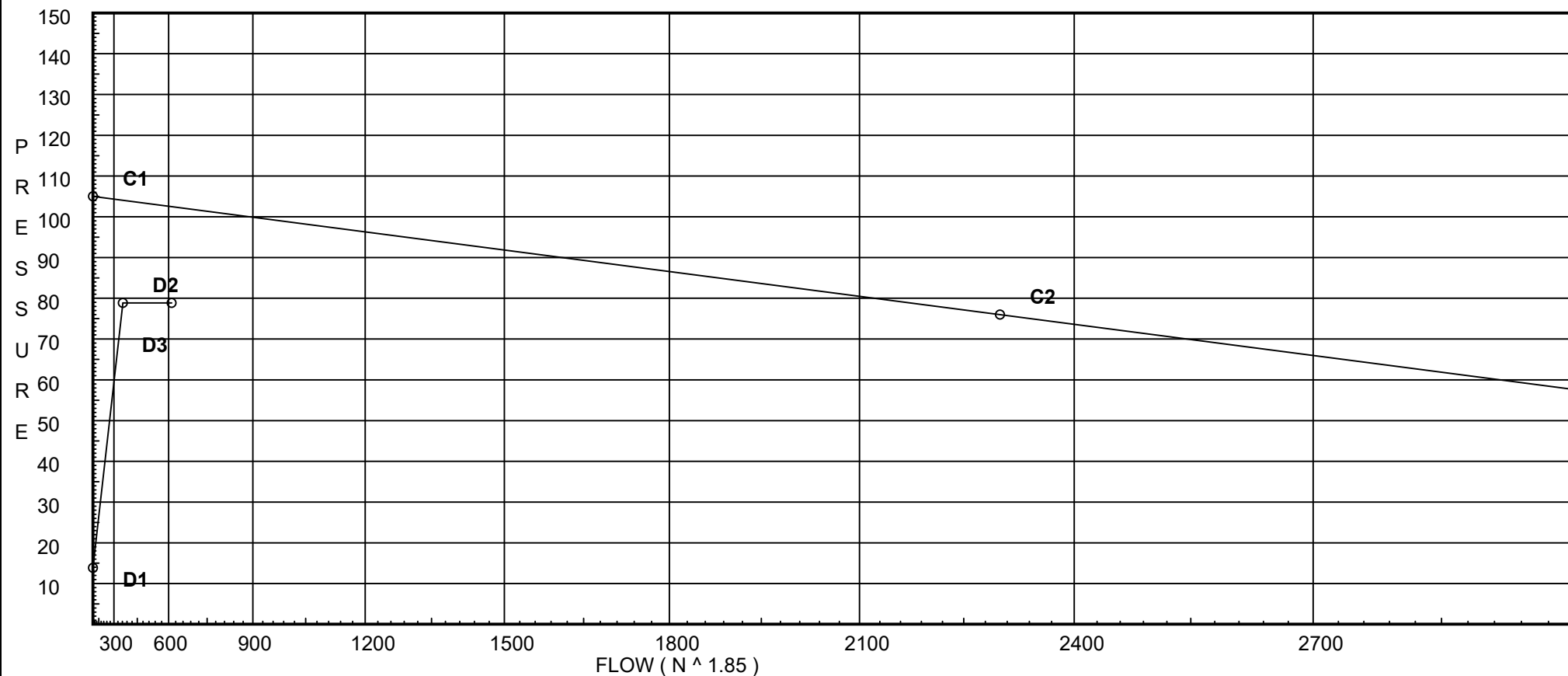
Water Supply Curve

ADVANTAGE FIRE PROTECTION
LOT 1

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City Water Supply:
C1 - Static Pressure : 105
C2 - Residual Pressure: 76
C2 - Residual Flow : 2300

Demand:
D1 - Elevation : 13.841
D2 - System Flow : 363.601
D2 - System Pressure : 78.864
Hose (Demand) : 250
D3 - System Demand : 613.601
Safety Margin : 23.619



Fittings Used Summary

ADVANTAGE FIRE PROTECTION
LOT 1

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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
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
V	90' EII Firelock #001	0	0	0	0	0	3.5	4.3	5	0	6.8	8.5	10	13	4.5	5.1	0	0	0	0	0
Zce	Colt C300 Vert Butt	Fitting generates a Fixed Loss Based on Flow																			

Units 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.

Flow Summary - NFPA

ADVANTAGE FIRE PROTECTION
LOT 1

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SUPPLY ANALYSIS

<i>Node at Source</i>	<i>Static Pressure</i>	<i>Residual Pressure</i>	<i>Flow</i>	<i>Available Pressure</i>	<i>Total Demand</i>	<i>Required Pressure</i>
TEST	105.0	76	2300.0	102.484	613.6	78.864

NODE ANALYSIS

<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>		<i>Notes</i>
1	126.958	5.6	20.25	25.2	0.2	126
2	126.542	5.6	20.61	25.43	0.2	126
3	126.125	5.6	21.46	25.94	0.2	126
4	125.708	5.6	23.08	26.9	0.2	126
5	125.292	5.6	25.76	28.42	0.2	126
6	124.875	5.6	29.86	30.6	0.2	126
7	124.542		40.7			
8	126.958	5.6	20.29	25.23	0.2	126
9	126.542	5.6	20.66	25.45	0.2	126
10	126.125	5.6	21.51	25.97	0.2	126
11	125.708	5.6	23.12	26.93	0.2	126
12	125.292	5.6	25.81	28.45	0.2	126
13	124.875	5.6	29.92	30.63	0.2	126
14	124.542		40.78			
15	124.875	5.6	47.14	38.45	0.2	126
16	124.542		48.02			
A1	122.667		48.92			
A2	122.667		49.01			
A3	122.667		49.35			
A4	122.667		60.09			
TOR	122.667		62.03			
UNG	101.0		73.42			
UNG1	95.0		78.74			
TEST	95.0		78.86	250.0		

Final Calculations : Hazen-Williams

ADVANTAGE FIRE PROTECTION
LOT 1

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
1 to 2	126.958 126.542	5.60	25.20 25.2	1.5 1.682			9.167 9.167	120 0.0201	20.250 0.180 0.184	Vel =	3.64	
2 to 3	126.542 126.125	5.60	25.43 50.63	1.5 1.682			9.167 9.167	120 0.0727	20.614 0.181 0.666	Vel =	7.31	
3 to 4	126.125 125.708	5.60	25.94 76.57	1.5 1.682			9.167 9.167	120 0.1564	21.461 0.181 1.434	Vel =	11.06	
4 to 5	125.708 125.292	5.60	26.90 103.47	1.5 1.682			9.167 9.167	120 0.2732	23.076 0.180 2.504	Vel =	14.94	
5 to 6	125.292 124.875	5.60	28.42 131.89	1.5 1.682			9.167 9.167	120 0.4277	25.760 0.181 3.921	Vel =	19.04	
6 to 7	124.875 124.542	5.60	30.60 162.49	1.5 1.682	T	9.9	7.084 9.900 16.984	120 0.6294	29.862 0.144 10.690	Vel =	23.46	
7 to A1	124.542 122.667		0.0 162.49	1.5 1.682	T	9.9	1.875 9.900 11.775	120 0.6294	40.696 0.812 7.411	Vel =	23.46	
A1			0.0 162.49						48.919	K Factor =	23.23	
8 to 9	126.958 126.542	5.60	25.23 25.23	1.5 1.682			9.167 9.167	120 0.0201	20.293 0.180 0.184	Vel =	3.64	
9 to 10	126.542 126.125	5.60	25.45 50.68	1.5 1.682			9.167 9.167	120 0.0729	20.657 0.181 0.668	Vel =	7.32	
10 to 11	126.125 125.708	5.60	25.97 76.65	1.5 1.682			9.167 9.167	120 0.1566	21.506 0.181 1.436	Vel =	11.07	
11 to 12	125.708 125.292	5.60	26.93 103.58	1.5 1.682			9.167 9.167	120 0.2737	23.123 0.180 2.509	Vel =	14.96	
12 to 13	125.292 124.875	5.60	28.45 132.03	1.5 1.682			9.167 9.167	120 0.4286	25.812 0.181 3.929	Vel =	19.06	
13 to 14	124.875 124.542	5.60	30.63 162.66	1.5 1.682	T	9.9	7.084 9.900 16.984	120 0.6306	29.922 0.144 10.710	Vel =	23.49	
14 to A2	124.542 122.667		0.0 162.66	1.5 1.682	T	9.9	1.875 9.900 11.775	120 0.6306	40.776 0.812 7.425	Vel =	23.49	
A2			0.0 162.66						49.013	K Factor =	23.23	
15 to 16	124.875 124.542	5.60	38.45 38.45	1.5 1.682	T	9.9	7.084 9.900 16.984	120 0.0437	47.137 0.144 0.743	Vel =	5.55	

Final Calculations : Hazen-Williams

ADVANTAGE FIRE PROTECTION
LOT 1

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
16 to A3	124.542 122.667		0.0 38.45	1.5 1.682	T	9.9	1.875 9.900 11.775	120 0.0437	48.024 0.812 0.515			
A3			0.0 38.45						49.351		K Factor = 5.47	
A1 to A2	122.667 122.667		162.49 162.49	4 4.26			13.750 13.750	120 0.0068	48.919 0.0 0.094		Vel = 3.66	
A2 to A3	122.667 122.667		162.66 325.15	4 4.26			13.750 13.750	120 0.0246	49.013 0.0 0.338		Vel = 7.32	
A3 to A4	122.667 122.667		38.45 363.6	4 4.26	V	8.954	346.084 8.954 355.038	120 0.0302	49.351 0.0 10.737		Vel = 8.18	
A4 to TOR	122.667 122.667		0.0 363.6	4 4.26	V	8.954	55.250 8.954 64.204	120 0.0302	60.088 0.0 1.941		Vel = 8.18	
TOR to UNG	122.667 101		0.0 363.6	4 4.26	B S	15.8 28.968	21.667 44.768 66.435	120 0.0302	62.029 9.384 2.009		Vel = 8.18	
UNG to UNG1	101 95		0.0 363.6	6 6.16	Zce E G T	0.0 20.084 4.304 43.037	79.000 67.425 146.425	140 0.0038	73.422 4.763 0.553		* * Fixed Loss = 2.165 Vel = 3.91	
UNG1 to TEST	95 95		0.0 363.6	12 12.34	E G	42.195 9.377	937.000 51.572 988.572	140 0.0001	78.738 0.0 0.126		Vel = 0.98	
TEST			250.00 613.60						78.864		Qa = 250.00 K Factor = 69.09	