ADVANTAGE

FIRE PROTECTION SYSTEMS INC.

"We are your Advantage"

404B N.W. 11th Street
Blue Springs, MO. 64015
Tel. (816) 224-3400

STATE OF MISSOURI
TOM R. HAMPTON
NUMBER
PE-10846
PROFESSIONAL ENGINEER

11/7/26

Advantage Fire Protection
404B NW 11th Street
Blue Springs, MO 64015
816-224-3400

Job Name	:	2FOLD
Drawing	:	600 NE MAGUIRE BLVD
Location	:	LEE'S SUMMIT, MO
Remote Area	:	AREA #1
Contract	:	
Data File	:	2FOLD AREA 1.WXF

Hydraulic Design Information Sheet

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Name - 2FOLD                                     Date - 1/7/26
Location - LEE'S SUMMIT, MO
Building - 600 NE MAGUIRE BLVD              System No. - AREA #1
Contractor -                                Contract No. -
Calculated By -                             Drawing No. - 1 OF 1
Construction: ( ) Combustible  (X) Non-Combustible   Ceiling Height - 10-0
Occupancy - OFFICE
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S   (X) NFPA 13  (X) Lt. Haz.  Ord.Haz.Gp. ( ) 1 ( ) 2 ( ) 3   ( ) Ex.Haz.
Y   ( ) NFPA 231 ( ) NFPA 231C   ( ) Figure            Curve
S   Other
T   Specific Ruling                    Made By              Date
E
M     Area of Sprinkler Operation - 1000     System Type     Sprinkler/Nozzle
      Density                    - .1        (X) Wet         Make VIKING
D     Area Per Sprinkler         - 324       ( ) Dry         Model EC/QREC
E     Elevation at Highest Outlet - 110      ( ) Deluge      Size 3/4"
S     Hose Allowance - Inside    -           ( ) Preaction   K-Factor 11.2
I     Rack Sprinkler Allowance   -           ( ) Other       Temp.Rat.200°
G     Hose Allowance - Outside   - 100
N
      Note
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Calculation  Flow Required - 175.725 Press Required - 84.805   TEST
Summary      C-Factor Used: 150   Overhead          140   Underground
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W   Water Flow Test:              Pump Data:           Tank or Reservoir:
A   Date of Test    -                                  Cap. -
T   Time of Test    -         Rated Cap.-              Elev.-
E   Static Press    - 105     @ Press   -
R   Residual Press  - 76      Elev.     -                   Well
    Flow          - 2300                              Proof Flow
S   Elevation     - 95
U
P   Location -
P
L   Source of Information -
Y
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C   Commodity                     Class        Location
O   Storage Ht.                   Area            Aisle W.
M   Storage Method:   Solid Piled   %   Palletized   %    Rack
M
      ( ) Single Row   ( ) Conven. Pallet   ( ) Auto. Storage   ( ) Encap.
S  R  ( ) Double Row   ( ) Slave Pallet     ( ) Solid Shelf     ( ) Non
T  A  ( ) Mult. Row                         ( ) Open Shelf
O  C
R  K   Flue Spacing                 Clearance:Storage to Ceiling
A      Longitudinal                 Transverse
G
E      Horizontal Barriers Provided:
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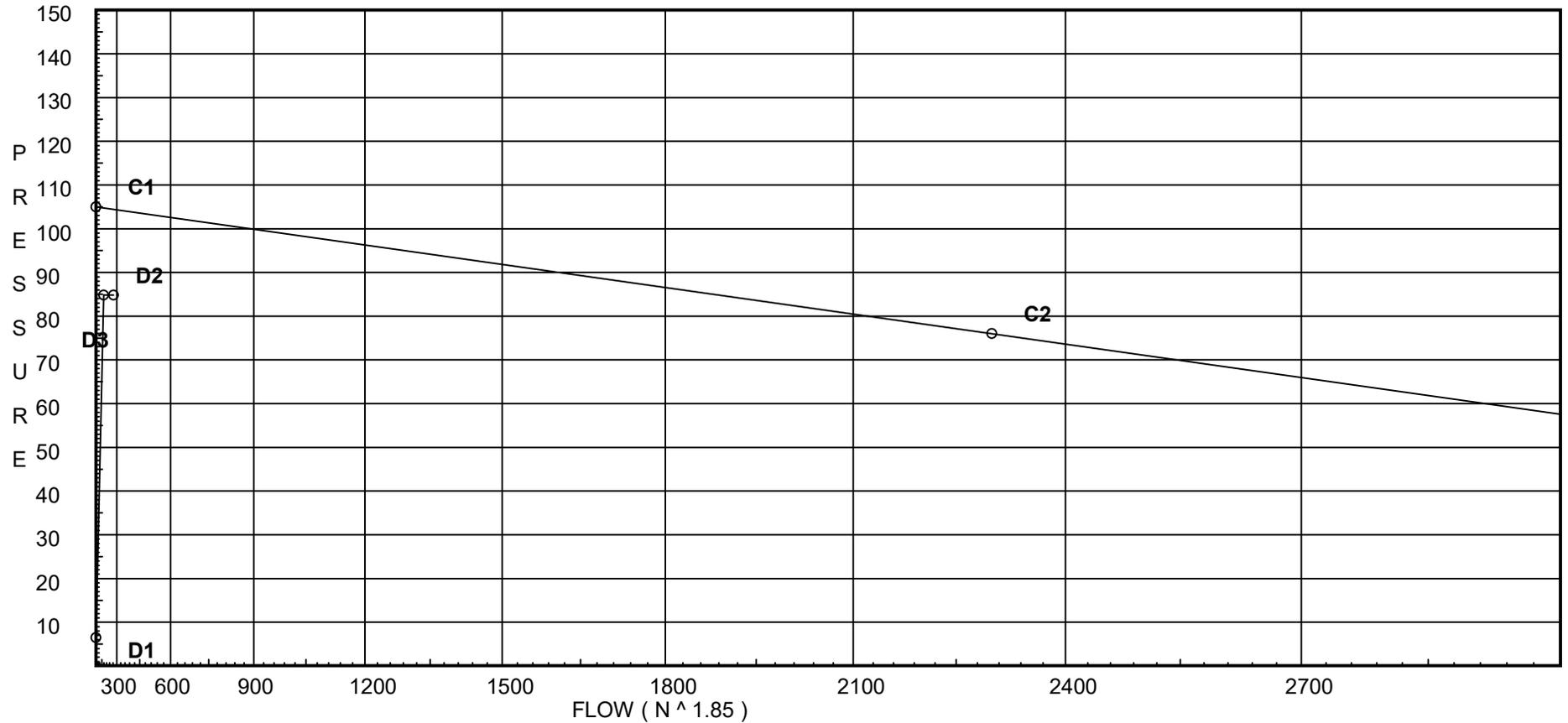
Water Supply Curve

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

Demand:
- D1 - Elevation   : 6.496
- D2 - System Flow   : 175.725
- D2 - System Pressure   : 84.805
- Hose (Demand)   : 100
- D3 - System Demand   : 275.725
- Safety Margin   : 19.622

PRESSURE (vertical axis): 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150

FLOW (N ^ 1.85) (horizontal axis): 300, 600, 900, 1200, 1500, 1800, 2100, 2400, 2700

Points plotted: C1, D2, C2, D3, D1

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
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
N *	CPVC 90' Ell	0	4	5	6	7	9	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O *	CPVC Branch Tee	0	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
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' Ell 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
X	90'Tee-BranchFirelock002	0	0	0	0	0	8.5	10.8	13	0	16	21	25	33	9.3	11	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.

SUPPLY ANALYSIS

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure
TEST	105.0	76	2300.0	104.427	275.73	84.805

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node		Notes
DR1	110.0	5.6	9.58	17.33	0.1	120
DR2	110.0	11.2	8.7	33.04	0.1	324
DR3	110.0	11.2	9.41	34.35	0.1	324
1	110.333		10.01			
2	110.333		10.45			
3	110.333		11.3			
4	110.333		12.15			
DR5	110.0	5.6	11.05	18.61	0.1	120
DR6	110.0	11.2	10.04	35.49	0.1	324
DR7	110.0	11.2	10.85	36.9	0.1	324
5	110.333		11.56			
6	110.333		12.06			
7	110.333		13.03			
8	110.333		14.0			
A1	109.667		14.51			
B1	109.667		16.66			
C1	109.667		30.84			
D1	127.417		47.41			
B2	122.667		65.3			
B4	122.667		68.29			
TOR1	122.667		68.75			
BOR1	101.833		77.85			
BOR2	101.833		77.85			
UNG	101.0		78.27			
UNG1	95.0		84.77			
TEST	95.0		84.8	100.0		

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	******
DR1 to 1	110 110.333	5.60	17.33 17.33	1 1.101	N O	5.0 5.0	1.000 10.000 11.000	150 0.0522	9.582 -0.144 0.574		Vel = 5.84	
1			0.0 17.33						10.012		K Factor = 5.48	
DR2 to 2	110 110.333	11.20	33.04 33.04	1 1.101	N O	5.0 5.0	1.000 10.000 11.000	150 0.1722	8.700 -0.144 1.894		Vel = 11.13	
2			0.0 33.04						10.450		K Factor = 10.22	
DR3 to 3	110 110.333	11.20	34.35 34.35	1 1.101	N O	5.0 5.0	1.000 10.000 11.000	150 0.1851	9.409 -0.144 2.036		Vel = 11.58	
3			0.0 34.35						11.301		K Factor = 10.22	
1 to 2	110.333 110.333		17.33 17.33	1.25 1.394	2N	12.0	14.417 12.000 26.417	150 0.0166	10.012 0.0 0.438		Vel = 3.64	
2 to 4	110.333 110.333		33.04 50.37	1.25 1.394	O	6.0	8.250 6.000 14.250	150 0.1191	10.450 0.0 1.697		Vel = 10.59	
4			0.0 50.37						12.147		K Factor = 14.45	
3 to 4	110.333 110.333		34.35 34.35	1.25 1.394	O	6.0	8.417 6.000 14.417	150 0.0587	11.301 0.0 0.846		Vel = 7.22	
4 to A1	110.333 109.667		50.37 84.72	1.25 1.394	O	6.0	0.667 6.000 6.667	150 0.3117	12.147 0.288 2.078		Vel = 17.81	
A1			0.0 84.72						14.513		K Factor = 22.24	
DR5 to 5	110 110.333	5.60	18.61 18.61	1 1.101	N O	5.0 5.0	1.000 10.000 11.000	150 0.0595	11.049 -0.144 0.655		Vel = 6.27	
5			0.0 18.61						11.560		K Factor = 5.47	
DR6 to 6	110 110.333	11.20	35.49 35.49	1 1.101	N O	5.0 5.0	1.000 10.000 11.000	150 0.1965	10.041 -0.144 2.162		Vel = 11.96	
6			0.0 35.49						12.059		K Factor = 10.22	
DR7 to 7	110 110.333	11.20	36.90 36.9	1 1.101	N O	5.0 5.0	1.000 10.000 11.000	150 0.2112	10.852 -0.144 2.323		Vel = 12.43	
7			0.0 36.90						13.031		K Factor = 10.22	
5 to 6	110.333 110.333		18.61 18.61	1.25 1.394	2N	12.0	14.417 12.000 26.417	150 0.0189	11.560 0.0 0.499		Vel = 3.91	

Final Calculations : Hazen-Williams

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 ******
6 to 8	110.333 110.333		35.49 54.1	1.25 1.394	O	6.0	8.250 6.000 14.250	150 0.1359	12.059 0.0 1.937	Vel = 11.37
8			0.0 54.10						13.996	K Factor = 14.46
7 to 8	110.333 110.333		36.90 36.9	1.25 1.394	O	6.0	8.417 6.000 14.417	150 0.0669	13.031 0.0 0.965	Vel = 7.76
8 to B1	110.333 109.667		54.10 91.0	1.25 1.394	O	6.0	0.667 6.000 6.667	150 0.3558	13.996 0.288 2.372	Vel = 19.13
B1			0.0 91.00						16.656	K Factor = 22.30
A1 to B1	109.667 109.667		84.72 84.72	1.5 1.598			13.375 13.375	150 0.1602	14.513 0.0 2.143	Vel = 13.55
B1 to C1	109.667 109.667		91.00 175.72	1.5 1.598	N	7.0	15.958 7.000 22.958	150 0.6179	16.656 0.0 14.185	Vel = 28.11
C1 to D1	109.667 127.417		0.0 175.72	1.5 1.682	E T	4.95 9.9	18.500 14.850 33.350	120 0.7275	30.841 -7.688 24.262	Vel = 25.37
D1 to B2	127.417 122.667		0.0 175.72	2 2.157	2V X T	8.615 10.461 12.307	41.667 31.383 73.050	120 0.2166	47.415 2.057 15.826	Vel = 15.43
B2			0.0 175.72						65.298	K Factor = 21.75
B2 to B4	122.667 122.667		175.72 175.72	4 4.26	T	26.334	352.958 26.334 379.292	120 0.0079	65.298 0.0 2.987	Vel = 3.96
B4 to TOR1	122.667 122.667		0.0 175.72	4 4.26	V	8.954	50.167 8.954 59.121	120 0.0079	68.285 0.0 0.466	Vel = 3.96
TOR1 to BOR1	122.667 101.833		0.0 175.72	6 6.357	B X	12.573 31.433	20.833 44.006 64.839	120 0.0011	68.751 9.023 0.073	Vel = 1.78
BOR1 to BOR2	101.833 101.833		0.0 175.72	6 6.357			2.500 2.500	120 0.0012	77.847 0.0 0.003	Vel = 1.78
BOR2 to UNG	101.833 101		0.0 175.72	6 6.357	S V	40.235 12.573	3.396 52.808 56.204	120 0.0011	77.850 0.361 0.063	Vel = 1.78
UNG to UNG1	101 95		0.0 175.72	6 6.16	Zce E G T	0.0 20.084 4.304 43.037	79.000 67.425 146.425	140 0.0010	78.274 6.354 0.144	* * Fixed Loss = 3.756 Vel = 1.89
UNG1 to TEST	95 95		0.0 175.72	12 12.34	E G	42.195 9.377	937.000 51.572 988.572	140 0	84.772 0.0 0.033	Vel = 0.47

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	******
			100.00							Qa = 100.00		
TEST			275.72						84.805	K Factor = 29.94		