

Fire Protection Hydraulic Calculations

For

Red Dot TI - Kardex Machines
2504 East Main
Puyallup, WA 98372

For

Poe Construction
1519 W Valley Hwy N, Suite 103
Auburn, WA 98001



SPRINKLER SYSTEM HYDRAULIC ANALYSIS

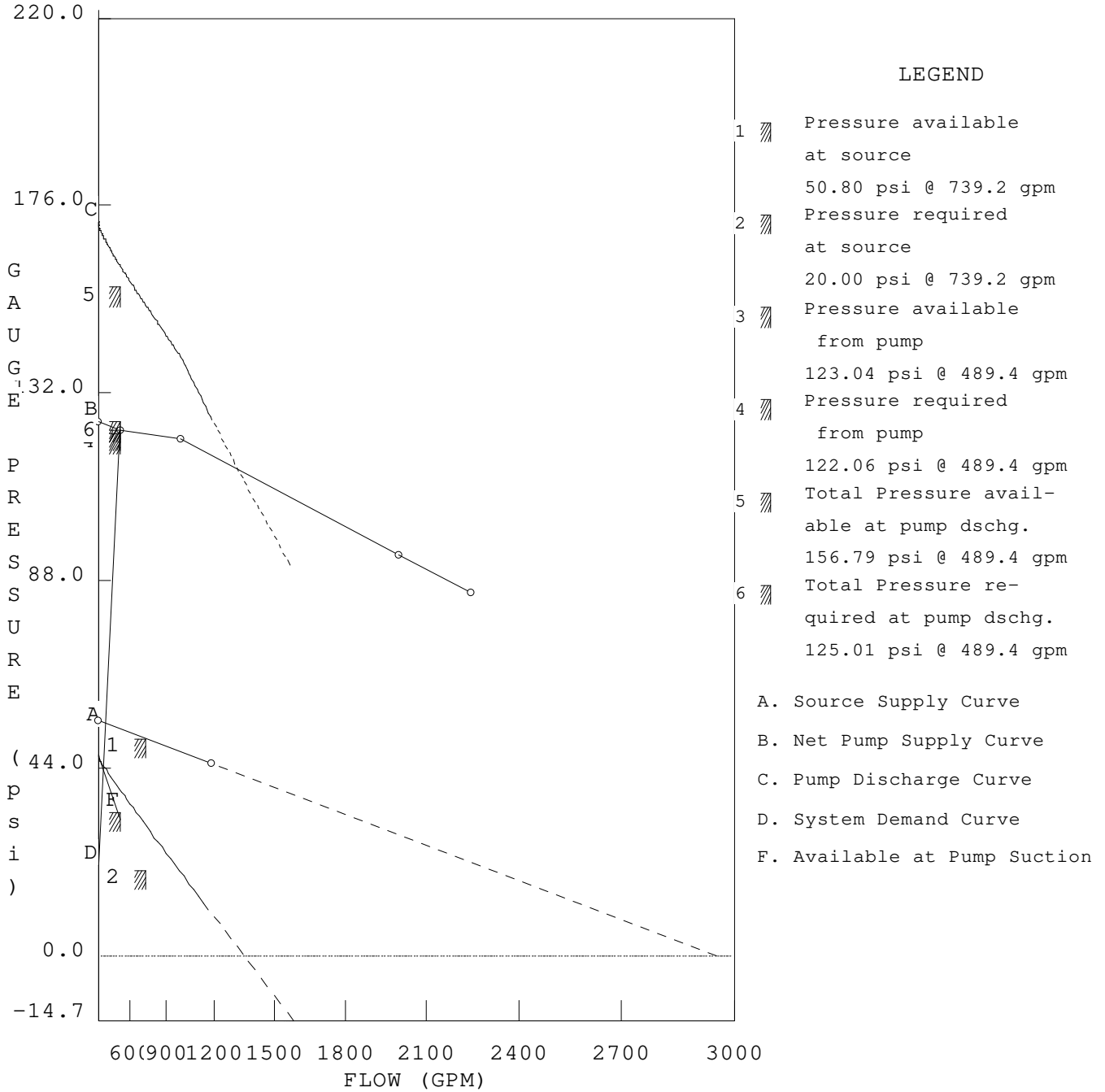
DATE: 10/25/2023

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JOB TITLE: RED DOT TI SYSTEM 3 KARDEX MACHINE

WATER SUPPLY ANALYSIS

Static: 55.00 psi Resid: 45.00 psi Flow: 1182.0 gpm



Note: (1) Dashed Lines indicate extrapolated values from Test Results

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NFPA WATER SUPPLY DATA

SOURCE NODE TAG	STATIC PRESS. (PSI)	RESID. PRESS. (PSI)	FLOW @ (GPM)	AVAIL. PRESS. (PSI)	TOTAL @ DEMAND (GPM)	REQ'D PRESS. (PSI)
SRC	55.0	45.0	1182.0	50.8	739.2	20.0

AGGREGATE FLOW ANALYSIS:

TOTAL FLOW AT SOURCE 739.2 GPM
 TOTAL HOSE STREAM ALLOWANCE AT SOURCE 0.0 GPM
 OTHER HOSE STREAM ALLOWANCES 250.0 GPM
 TOTAL DISCHARGE FROM ACTIVE SPRINKLERS 489.2 GPM

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE (PSI)	DISCHARGE (GPM)
H1	34.0	K=16.80	54.0	123.5
H2	34.0	K=16.80	53.3	122.7
H3	34.0	K=16.80	52.7	121.9
H4	34.0	K=16.80	52.0	121.1
20C	34.8	- - - -	109.6	- - -
21	34.8	- - - -	109.0	- - -
22	34.8	- - - -	109.0	- - -
23	34.8	- - - -	108.9	- - -
24	34.8	- - - -	108.9	- - -
25	34.8	- - - -	108.9	- - -
26	34.8	- - - -	108.9	- - -
31	34.8	- - - -	106.8	- - -
32	34.8	- - - -	106.8	- - -
33	34.8	- - - -	106.8	- - -
34	34.8	- - - -	106.7	- - -
35	34.8	- - - -	106.7	- - -
36	34.8	- - - -	106.7	- - -
RT3	34.8	- - - -	110.2	- - -
RH3	2.0	- - - -	124.7	- - -
PD	2.0	- - - -	125.0	- - -
PS	2.0	- - - -	2.9	- - -
FLG	0.5	- - - -	3.7	- - -
DC1	-4.5	- - - -	15.1	- - -
DC2	-4.5	- - - -	6.1	- - -
UG1	-4.5	HOSE STREAM	15.2	250.0
UG2	-4.5	- - - -	15.3	- - -
UG3	-4.5	- - - -	15.3	- - -
UG4	-4.5	- - - -	15.4	- - -
M1	34.8	- - - -	102.7	- - -
M2	34.8	- - - -	102.8	- - -
B1	34.8	- - - -	75.4	- - -
B2	34.8	- - - -	74.4	- - -

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JOB TITLE: RED DOT TI SYSTEM 3 KARDEX MACHINE

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE (PSI)	DISCHARGE (GPM)
B3	34.8	- - - -	73.6	- - -
B4	34.8	- - - -	72.6	- - -
SRC	-15.0	SOURCE	20.0	739.2

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JOB TITLE: RED DOT TI SYSTEM 3 KARDEX MACHINE

NFPA PIPE DATA 5

Pipe Tag	K-fac	Add Fl	Add Fl To	Fit:	L	C	(Pt)		
Frm Node	El (ft)	PT	(q)	Node/	Nom ID	Eq.Ln.	(Pe)		
To Node	El (ft)	PT	Tot.(Q)	Disch	Act ID	(ft.)	(Pf)		
Pipe: 1	Source	485.7	UG1			85.00	140	4.6	
SRC	-15.0	20.0	253.6	UG3	D12.00	T:98.0	118.00	4.5	
UG4	-4.5	15.4	739.2		12.460	2G:20.0	203.00	0.000	0.1
Pipe: 2	0.0	0.0				620.00	140	0.0	
UG4	-4.5	15.4	253.6	UG2	D12.00	3G:30.0	30.00	-0.0	
UG3	-4.5	15.3	253.6		12.460		650.00	0.000	0.0
Pipe: 3	0.0	0.0				480.00	140	0.0	
UG3	-4.5	15.3	253.6	UG1	D12.00	4F:88.0	88.00	-0.0	
UG2	-4.5	15.3	253.6		12.460		568.00	0.000	0.0
Pipe: 4	H.S.	250.0	Disch			695.00	140	0.0	
UG2	-4.5	15.3	489.2	DC1	D12.00	G:10.0	54.00	-0.0	
UG1	-4.5	15.2	253.6		12.460	2F:44.0	749.00	0.000	0.0
Pipe: 5	H.S.	250.0	Disch			515.00	140	0.1	
UG4	-4.5	15.4	489.2	DC1	D12.00	G:10.0	76.00	-0.0	
UG1	-4.5	15.2	485.7		12.460	3F:66.0	591.00	0.000	0.1
Pipe: 6	0.0	0.0				T:59.0	30.00	140	0.2
UG1	-4.5	15.2	489.2	DC2	D8.000	2G:14.0	88.50	-0.0	
DC1	-4.5	15.1	489.2		8.390	F:15.5	118.50	0.001	0.2
Pipe: 7		0.0	Fixed Pressure Loss Device						
DC1	-4.5	15.1	489.2	FLG		9.0 psi,	489.2 gpm		
DC2	-4.5	6.1	489.2						
Pipe: 8	0.0	0.0				80.00	140	2.3	
DC2	-4.5	6.1	489.2	PS	D8.000	2L:44.0	44.00	2.2	
FLG	0.5	3.7	489.2		8.390		124.00	0.001	0.2
Pipe: 9	0.0	0.0				12.37	120	0.8	
FLG	0.5	3.7	489.2	PD	B8.000	2E:42.0	47.00	0.6	
PS	2.0	2.9	489.2		8.249	G: 5.0	59.37	0.002	0.1
Pipe: 10	0.0	0.0	Fire Pump Rating	Avail.	Req'd.				
PS	2.0	2.9	489.2	RH3	gpm: 1500.0	489.4	489.4		
PD	2.0	125.0	489.2		psi: 105.0	123.0	122.1		

User Defined Five Point Pump Curve:

gpm:	125.0	123.0	121.0	94.0	85.0
psi:	125.0	123.0	121.0	94.0	85.0

Pipe: 11	0.0	0.0		ETCB		18.42	120	0.3	
PD	2.0	125.0	489.2	RT3	B8.000		129.00	-0.0	
RH3	2.0	124.7	489.2		8.249		147.42	0.002	0.3

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Pipe Tag	K-fac	Add Fl	Add Fl To	Fit:	L	C	(Pt)
Frm Node	El (ft)	PT	(q)	Node/	Nom ID	Eq.Ln.	(Pe)
To Node	El (ft)	PT	Tot.(Q)	Disch	Act ID	(ft.)	(Pf)
						T	Pf/ft.
Pipe: 12	0.0	0.0				T:41.0	14.5
RH3	2.0	124.7	489.2	20C	B8.000	C:53.0	14.2
RT3	34.8	110.2	489.2		8.249	B:14.0	0.3
						32.75	120
Pipe: 13	0.0	0.0				42.83	120
RT3	34.8	110.2	489.2	21	B6.000	2E:36.0	-0.0
20C	34.8	109.6	489.2		6.357	F: 9.0	0.7
						45.00	120
Pipe: 14	0.0	54.1		31			0.5
20C	34.8	109.6	435.2	22	B6.000	2E:36.0	-0.0
21	34.8	109.0	489.2		6.357		0.5
						34.12	120
Pipe: 15	0.0	53.4		32			0.1
21	34.8	109.0	381.8	23	B6.000	----	-0.0
22	34.8	109.0	435.2		6.357		0.1
						10.00	120
Pipe: 16	0.0	53.2		33			0.0
22	34.8	109.0	328.5	24	B6.000	----	-0.0
23	34.8	108.9	381.8		6.357		0.0
						10.00	120
Pipe: 17	0.0	136.9		M2			0.0
23	34.8	108.9	191.7	25	B6.000	----	-0.0
24	34.8	108.9	328.5		6.357		0.0
						10.00	120
Pipe: 18	0.0	138.2		M1			0.0
24	34.8	108.9	53.4	26	B6.000	----	-0.0
25	34.8	108.9	191.7		6.357		0.0
						10.00	120
Pipe: 19	0.0	0.0					0.0
25	34.8	108.9	53.4	36	B6.000	----	-0.0
26	34.8	108.9	53.4		6.357		0.0
						10.00	120
Pipe: 20	0.0	107.5		33			0.0
31	34.8	106.8	-53.4		B4.000	----	-0.0
32	34.8	106.8	54.1		4.260		0.0
						10.00	120
Pipe: 21	0.0	160.7		34			0.0
32	34.8	106.8	-53.2		B4.000	----	-0.0
33	34.8	106.8	107.5		4.260		0.0
						10.00	120
Pipe: 22	0.0	106.2		M2			0.1
33	34.8	106.8	54.5	35	B4.000	----	-0.0
34	34.8	106.7	160.7		4.260		0.1
						10.00	120
Pipe: 23	0.0	107.9		M1			0.0
34	34.8	106.7	-53.4		B4.000	----	-0.0
35	34.8	106.7	54.5		4.260		0.0
						10.00	120

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Pipe Tag	K-fac	Add Fl	Add Fl To	Fit:	L	C	(Pt)		
Frm Node	El (ft)	PT	(q)	Node/	Nom ID	Eq.Ln.	(Pe)		
To Node	El (ft)	PT	Tot.(Q)	Disch	Act ID	(ft.)	(Pf)		
						T	Pf/ft.		
Pipe: 24	0.0	107.9	M1			10.00	120	0.0	
36	34.8	106.7	-54.5		B4.000	----	0.00	-0.0	
35	34.8	106.7	53.4		4.260	10.00	0.001	0.0	
Pipe: 25	0.0	0.0			2E:20.4	610.75	120	2.2	
21	34.8	109.0	54.1	32	G3.000	4T:87.4	128.14	-0.0	
31	34.8	106.8	54.1		3.314	4F:20.4	738.89	0.003	2.2
Pipe: 26	0.0	107.5		33	2E:20.4	610.75	120	2.2	
22	34.8	109.0	-54.1		G3.000	4T:87.4	128.14	-0.0	
32	34.8	106.8	53.4		3.314	4F:20.4	738.89	0.003	2.2
Pipe: 27	0.0	160.7		34	2E:20.4	610.75	120	2.2	
23	34.8	108.9	-107.5		G3.000	4T:87.4	128.14	-0.0	
33	34.8	106.8	53.2		3.314	4F:20.4	738.89	0.003	2.2
Pipe: 28	0.0	0.0			2E:20.4	610.75	120	2.2	
26	34.8	108.9	53.4	35	G3.000	4T:87.4	128.14	-0.0	
36	34.8	106.7	53.4		3.314	4F:20.4	738.89	0.003	2.2
Pipe: 29	0.0	246.1	B1		E:10.2	297.00	120	6.2	
25	34.8	108.9	-107.9		G3.000	2T:43.7	64.07	-0.0	
M1	34.8	102.7	138.2		3.314	2F:10.2	361.07	0.017	6.2
Pipe: 30	0.0	246.1	B1		E:10.2	304.71	120	4.0	
35	34.8	106.7	-138.2		G3.000	2T:43.7	64.07	-0.0	
M1	34.8	102.7	107.9		3.314	2F:10.2	368.78	0.011	4.0
Pipe: 31	0.0	123.5	H1			6.00	120	27.3	
M1	34.8	102.7	122.7	B2	G1.500	E: 5.6	16.93	-0.0	
B1	34.8	75.4	246.1		1.728	T:11.3	22.93	1.190	27.3
Pipe: 32	0.0	0.0				2.96	120	1.0	
B1	34.8	75.4	122.7	H2	G1.500	----	0.00	-0.0	
B2	34.8	74.4	122.7		1.728	2.96	0.328	1.0	
Pipe: 33	0.0	243.1	B3		E:10.2	297.00	120	6.1	
24	34.8	108.9	-106.2		G3.000	2T:43.7	64.07	-0.0	
M2	34.8	102.8	136.9		3.314	2F:10.2	361.07	0.017	6.1
Pipe: 34	0.0	243.1	B3		E:10.2	304.71	120	3.9	
34	34.8	106.7	-136.9		G3.000	2T:43.7	64.07	-0.0	
M2	34.8	102.8	106.2		3.314	2F:10.2	368.78	0.011	3.9
Pipe: 35	0.0	121.9	H3			8.21	120	29.2	
M2	34.8	102.8	121.1	B4	G1.500	E: 5.6	16.93	-0.0	
B3	34.8	73.6	243.1		1.728	T:11.3	25.14	1.163	29.2

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Pipe Tag	K-fac	Add Fl	Add Fl To	Fit:	L	C	(Pt)	
Frm Node	El (ft)	PT	(q)	Node/	Nom ID	Eq.Ln.	(Pe)	
To Node	El (ft)	PT	Tot.(Q)	Disch	Act ID	(ft.)	(Pf)	
						T	Pf/ft.	
Pipe: 36	0.0	0.0				2.96	120	0.9
B3	34.8	73.6	121.1	H4	G1.500	----	0.00	-0.0
B4	34.8	72.6	121.1		1.728	2.96	0.321	0.9
Pipe: 37	16.80	123.5	Disch			0.75	120	21.4
B1	34.8	75.4	0.0		1.000	T: 5.0	5.00	-0.3
H1	34.0	54.0	123.5		1.049	5.75	3.775	21.7
Pipe: 38	16.80	122.7	Disch			0.75	120	21.1
B2	34.8	74.4	0.0		1.000	T: 5.0	5.00	-0.3
H2	34.0	53.3	122.7		1.049	5.75	3.729	21.4
Pipe: 39	16.80	121.9	Disch			0.75	120	20.9
B3	34.8	73.6	0.0		1.000	T: 5.0	5.00	-0.3
H3	34.0	52.7	121.9		1.049	5.75	3.689	21.2
Pipe: 40	16.80	121.1	Disch			0.75	120	20.6
B4	34.8	72.6	0.0		1.000	T: 5.0	5.00	-0.3
H4	34.0	52.0	121.1		1.049	5.75	3.644	21.0

NOTES (HASS):

- (1) Calculations were performed by the HASS 2023 D computer program in accordance with NFPA (2020) under license no. 65839843 granted by
 HRS Systems, Inc.
 208 Southside Square
 Petersburg, TN 37144
 (931) 659-9760
- (2) The system has been calculated to provide an average imbalance at each node of 0.008 gpm and a maximum imbalance at any node of 0.131 gpm.
- (3) Total pressure at each node is used in balancing the system. Maximum water velocity is 45.8 ft/sec at pipe 37.
- (4) The Minimum pump suction pressure under maximum calculated demand is 2.94 (psi)
- (5) Items listed in bold print on the cover sheet

 are automatically transferred from the calculation report.
- (6) Available pressure at source node SRC under full flow conditions is 50.08 psi with a flow of 805.31 gpm.

