Hydraulic Design Information Sheet

Name - Brick North East Wing Dry System
Date - 9-10-14
Location -
Building - Brick North East wing
System No. - 1 of 1
Contractor - Residential Fire Protection
Contract No. - C14022
Calculated By - SJC
Drawing No. - 1 of 1
Construction: (X) Combustible ( ) Non-Combustible
Ceiling Height - Varies
Occupancy - Mixed use

SYSTEM DESIGN

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

Area of Sprinkler Operation - 2016
Density - .2
Area Per Sprinkler - 126
Elevation at Highest Outlet - 27
Hose Allowance - Inside -
Rack Sprinkler Allowance -
Hose Allowance - Outside - 250

System Type
(X) Wet
( ) Dry
( ) Deluge
( ) Preaction
( ) Other

Sprinkler/Nozzle
Make Viking
Model VK300
Size 1/2"
K-Factor 5.6
Temp.Rat.155

Note Safety Margin: 8.48

DESIGN

Calculation Summary — Flow Required - 688.781 Press Required - 88.135
C-Factor Used: 100 Overhead 140 Underground

WATER SUPPLY

Water Flow Test:
Date of Test - 9-13-11
Time of Test -
Static Press - 98
Residual Press - 92
Flow - 1519
Elevation - 0

Pump Data:
Rated Cap.-
@ Press -
Elev. -

Tank or Reservoir:
Cap. -
Elev.-

Well
Proof Flow

Location -

Source of Information -

COMMODITY STORAGE

Commodity — Class — Location
Storage Ht. — Area — Aisle W.
Storage Method: Solid Piled % Palletized % Rack

( ) Single Row ( ) Conven. Pallet ( ) Auto. Storage ( ) Encap.
( ) Double Row ( ) Slave Pallet ( ) Solid Shelf ( ) Non
( ) Mult. Row ( ) Open Shelf

Flue Spacing — Clearance:Storage to Ceiling
Longitudinal — Transverse

Horizontal Barriers Provided:

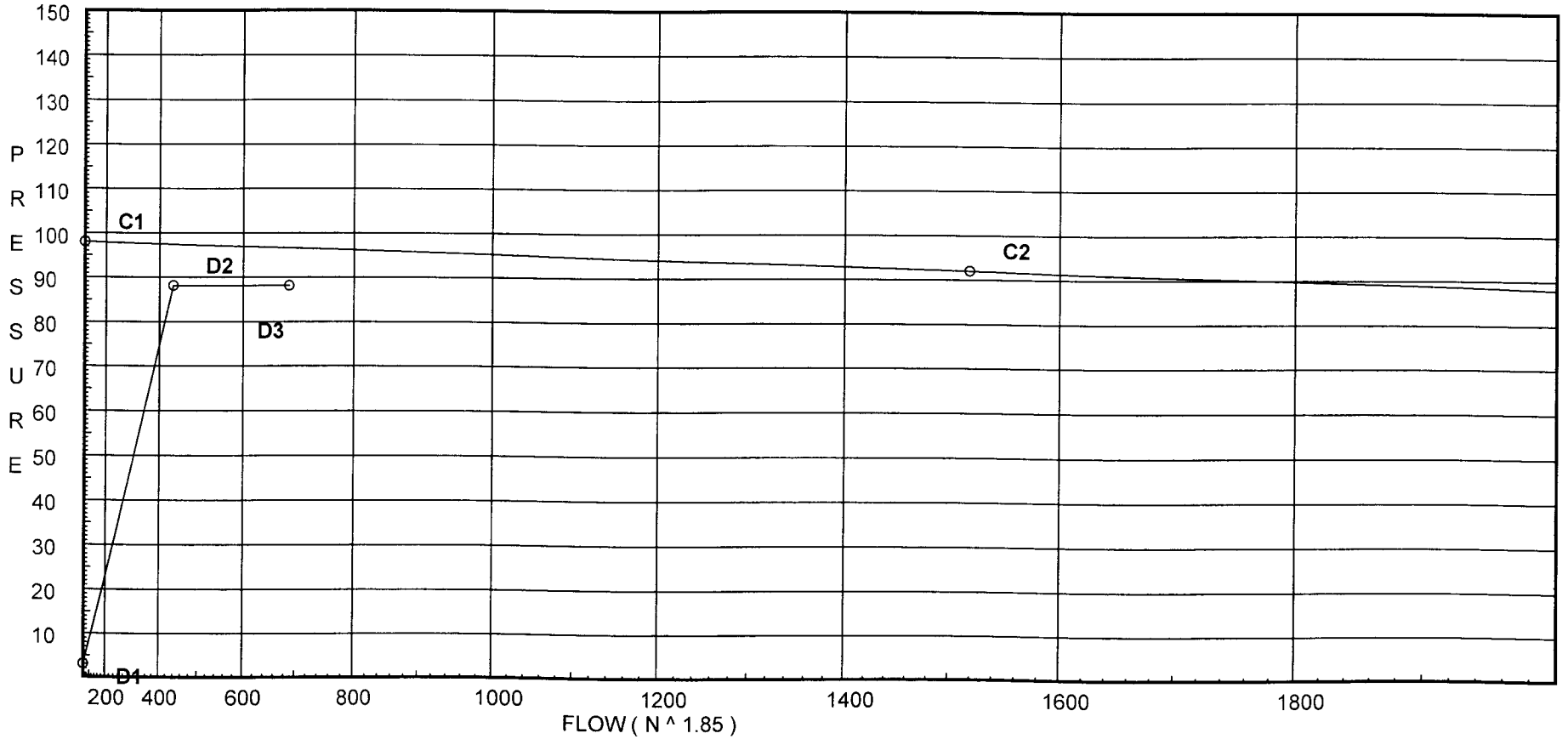
Water Supply Curve (C)

Residential Fire Protection
BRICK NORTH EAST WING

City Water Supply:
- C1 - Static Pressure : 98
- C2 - Residual Pressure: 92
- C2 - Residual Flow : 1519

Demand:

D1 - Elevation	:	3.032
D2 - System Flow	:	438.781
D2 - System Pressure	:	88.134
Hose (Adj City)	:	
Hose (Demand)	:	250
D3 - System Demand	:	688.781
Safety Margin	:	8.476



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
D	Generic Dry Pipe Valve	0	0	0	0	0	0	9.5	17	0	28	0	47	0	0	0	0	0	0	0	0
E	90' Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
G	Generic Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
T	90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Zia	Wilkins 350	Fitting generates a Fixed Loss Based on Flow																			

Pressure / Flow Summary - STANDARD

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
60	27.0	5.6	20.25	na	25.2	0.2	126	7.0
61	27.0	5.6	21.08	na	25.71	0.2	126	7.0
62	27.0	5.6	24.13	na	27.51	0.2	126	7.0
63	27.0	5.6	29.08	na	30.2	0.2	126	7.0
64	27.0	5.6	20.35	na	25.26	0.2	126	7.0
65	27.0	5.6	21.18	na	25.77	0.2	126	7.0
66	27.0	5.6	24.25	na	27.57	0.2	126	7.0
67	27.0	5.6	29.21	na	30.27	0.2	126	7.0
68	27.0	5.6	20.69	na	25.47	0.2	126	7.0
69	27.0	5.6	21.54	na	25.99	0.2	126	7.0
70	27.0	5.6	24.65	na	27.8	0.2	126	7.0
71	27.0	5.6	29.7	na	30.52	0.2	126	7.0
72	27.0	5.6	21.35	na	25.88	0.2	126	7.0
73	27.0	5.6	22.22	na	26.4	0.2	126	7.0
74	27.0	5.6	25.43	na	28.24	0.2	126	7.0
75	27.0	5.6	30.62	na	30.99	0.2	126	7.0
80	27.0		30.1	na				
81	27.0		30.24	na				
82	27.0		30.74	na				
83	27.0		31.69	na				
90	16.0		37.65	na				
91	16.0		37.8	na				
92	16.0		38.34	na				
93	16.0		39.38	na				
94	16.0		62.86	na				
95	16.0		67.66	na				
TRD	9.5		78.72	na				
BR	27.0		81.23	na				
UG1	27.0		81.81	na	250.0			
TEST	20.0		88.13	na				

The maximum velocity is 16.87 and it occurs in the pipe between nodes 93 and 94

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
60	25.20	1.442		0.0	14.000	20.250		K Factor = 5.60
to		100		0.0	0.0	0.0		
61	25.2	0.0594		0.0	14.000	0.831		Vel = 4.95
61	25.71	1.442		0.0	14.000	21.081		K Factor = 5.60
to		100		0.0	0.0	0.0		
62	50.91	0.2181		0.0	14.000	3.053		Vel = 10.00
62	27.51	1.442	1T	5.304	7.000	24.134		K Factor = 5.60
to		100		0.0	5.304	0.0		
80	78.42	0.4850		0.0	12.304	5.967		Vel = 15.41
	0.0							
	78.42					30.101		K Factor = 14.29
63	30.20	1.442	1T	5.304	7.000	29.080		K Factor = 5.60
to		100		0.0	5.304	0.0		
80	30.2	0.0830		0.0	12.304	1.021		Vel = 5.93
	0.0							
	30.20					30.101		K Factor = 5.50
64	25.26	1.442		0.0	14.000	20.345		K Factor = 5.60
to		100		0.0	0.0	0.0		
65	25.26	0.0596		0.0	14.000	0.835		Vel = 4.96
65	25.77	1.442		0.0	14.000	21.180		K Factor = 5.60
to		100		0.0	0.0	0.0		
66	51.03	0.2190		0.0	14.000	3.066		Vel = 10.03
66	27.58	1.442	1T	5.304	7.000	24.246		K Factor = 5.60
to		100		0.0	5.304	0.0		
81	78.61	0.4871		0.0	12.304	5.993		Vel = 15.44
	0.0							
	78.61					30.239		K Factor = 14.30
67	30.27	1.442	1T	5.304	7.000	29.214		K Factor = 5.60
to		100		0.0	5.304	0.0		
81	30.27	0.0833		0.0	12.304	1.025		Vel = 5.95
	0.0							
	30.27					30.239		K Factor = 5.50
68	25.47	1.442		0.0	14.000	20.690		K Factor = 5.60
to		100		0.0	0.0	0.0		
69	25.47	0.0606		0.0	14.000	0.848		Vel = 5.00
69	25.99	1.442		0.0	14.000	21.538		K Factor = 5.60
to		100		0.0	0.0	0.0		
70	51.46	0.2224		0.0	14.000	3.114		Vel = 10.11
70	27.81	1.442	1T	5.304	7.000	24.652		K Factor = 5.60
to		100		0.0	5.304	0.0		
82	79.27	0.4946		0.0	12.304	6.086		Vel = 15.57
	0.0							
	79.27					30.738		K Factor = 14.30
71	30.52	1.442	1T	5.304	7.000	29.697		K Factor = 5.60
to		100		0.0	5.304	0.0		
82	30.52	0.0846		0.0	12.304	1.041		Vel = 6.00
	0.0							
	30.52					30.738		K Factor = 5.50

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
72	25.88	1.442		0.0	14.000	21.350		K Factor = 5.60
to		100		0.0	0.0	0.0		
73	25.88	0.0624		0.0	14.000	0.873		Vel = 5.08
73	26.39	1.442		0.0	14.000	22.223		K Factor = 5.60
to		100		0.0	0.0	0.0		
74	52.27	0.2289		0.0	14.000	3.205		Vel = 10.27
74	28.24	1.442	1T	5.304	7.000	25.428		K Factor = 5.60
to		100		0.0	5.304	0.0		
83	80.51	0.5092		0.0	12.304	6.265		Vel = 15.82
	0.0							
	80.51					31.693		K Factor = 14.30
75	30.99	1.442	1T	5.304	7.000	30.622		K Factor = 5.60
to		100		0.0	5.304	0.0		
83	30.99	0.0870		0.0	12.304	1.071		Vel = 6.09
	0.0							
	30.99					31.693		K Factor = 5.50
80	108.62	2.067	1T	7.137	11.000	30.101		
to		100		0.0	7.137	4.764		
90	108.62	0.1534		0.0	18.137	2.783		Vel = 10.39
	0.0							
	108.62					37.648		K Factor = 17.70
81	108.87	2.067	1T	7.137	11.000	30.239		
to		100		0.0	7.137	4.764		
91	108.87	0.1541		0.0	18.137	2.795		Vel = 10.41
	0.0							
	108.87					37.798		K Factor = 17.71
82	109.78	2.067	1T	7.137	11.000	30.738		
to		100		0.0	7.137	4.764		
92	109.78	0.1565		0.0	18.137	2.838		Vel = 10.50
	0.0							
	109.78					38.340		K Factor = 17.73
83	111.50	2.067	1T	7.137	11.000	31.693		
to		100		0.0	7.137	4.764		
93	111.5	0.1611		0.0	18.137	2.921		Vel = 10.66
	0.0							
	111.50					39.378		K Factor = 17.77
90	108.62	3.26		0.0	9.000	37.648		
to		100		0.0	0.0	0.0		
91	108.62	0.0167		0.0	9.000	0.150		Vel = 4.18
91	108.88	3.26		0.0	9.000	37.798		
to		100		0.0	0.0	0.0		
92	217.5	0.0602		0.0	9.000	0.542		Vel = 8.36
92	109.78	3.26		0.0	8.083	38.340		
to		100		0.0	0.0	0.0		
93	327.28	0.1284		0.0	8.083	1.038		Vel = 12.58
93	111.50	3.26	1E	6.714	99.660	39.378		
to		100		0.0	6.714	0.0		
94	438.78	0.2208		0.0	106.374	23.483		Vel = 16.87

Final Calculations - Standard

Residential Fire Protection
BRICK NORTH EAST WING

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
94	0.0	4.26		0.0	80.000	62.861		
to		100		0.0	0.0	0.0		
95	438.78	0.0600		0.0	80.000	4.799		Vel = 9.88
95	0.0	4.26	5E	46.987	90.500	67.660		
to		100		0.0	46.987	2.815		
TRD	438.78	0.0600		0.0	137.487	8.248		Vel = 9.88
TRD	0.0	4.26	1Zia	0.0	8.000	78.723		
to		100	2T	37.589	85.290	-3.087		* Fixed loss = 4.492
BR	438.78	0.0600	2E	18.795	93.290	5.596		Vel = 9.88
			1D	26.313				
			1G	1.879				
			1Eql	0.94				
BR	0.0	6.16	1E	20.084	40.000	81.232		
to		140	1G	4.304	67.425	0.0		
UG1	438.78	0.0053	1T	43.037	107.425	0.574		Vel = 4.72
UG1	250.00	8.27	2G	12.652	1000.000	81.806		Qa = 250
to		140	2E	56.936	124.942	3.032		
TEST	688.78	0.0029	1T	55.354	1124.942	3.296		Vel = 4.11
	0.0							
	688.78					88.134		K Factor = 73.37