

... Fire Protection by Computer Design

ABL FIRE PROTECTION
RALEIGH, NORTH CAROLINA

Job Name : SOLEIL CENTER: 17TH FLOOR RES
Building : TOWER
Location : 4501 CREEDMOOR DR, RALEIGH, NORTH CAROLINA
System : 17TH FLR
Contract :
Data File : SOLEIL 17TH.WXF

HYDRAULIC DESIGN INFORMATION SHEET

Name - SOLEIL CENTER Date - 11-25-07
 Location - 4501 CREEDMOOR DR, RALEIGH, NORTH CAROLINA
 Building - TOWER System No. - 17TH FLR
 Contractor - Contract No. -
 Calculated By - JSB Drawing No. - FP-45
 Construction: () Combustible (X) Non-Combustible Ceiling Height VARIES
 OCCUPANCY - RESIDENTIAL

S Type of Calculation: (X)NFPA 13 Residential ()NFPA 13R ()NFPA 13D
 Y Number of Sprinklers Flowing: ()1 ()2 (X)4 ()
 S ()Other
 T ()Specific Ruling Made by Date

E
 M Listed Flow at Start Point - 25.6 Gpm System Type
 Listed Pres. at Start Point - 14.5 Psi (X) Wet () Dry
 D MAXIMUM LISTED SPACING 18' x 18' () Deluge () PreAction
 E Domestic Flow Added - 720 Gpm Sprinkler or Nozzle
 S Additional Flow Added - 100 Gpm Make TYCO Model LF-II
 I Elevation at Highest Outlet - 180 Feet Size 1/2 K-Factor 4.9
 G Note: Temperature Rating 155
 N

Calculation Gpm Required 176.91 Psi Required 262.096 AT PUMP DISCHARGE
 Summary C-Factor Used: Overhead 150 Underground 150

W Water Flow Test: Pump Data: Tank or Reservoir:
 A Date of Test - Rated Cap. 1000 Cap.
 T Time of Test - @ Psi 180 Elev.
 E Static (Psi) - 106 Elev. 0
 R Residual (Psi) - 92 Other Well
 Flow (Gpm) - 1470 Proof Flow Gpm
 S Elevation - 0

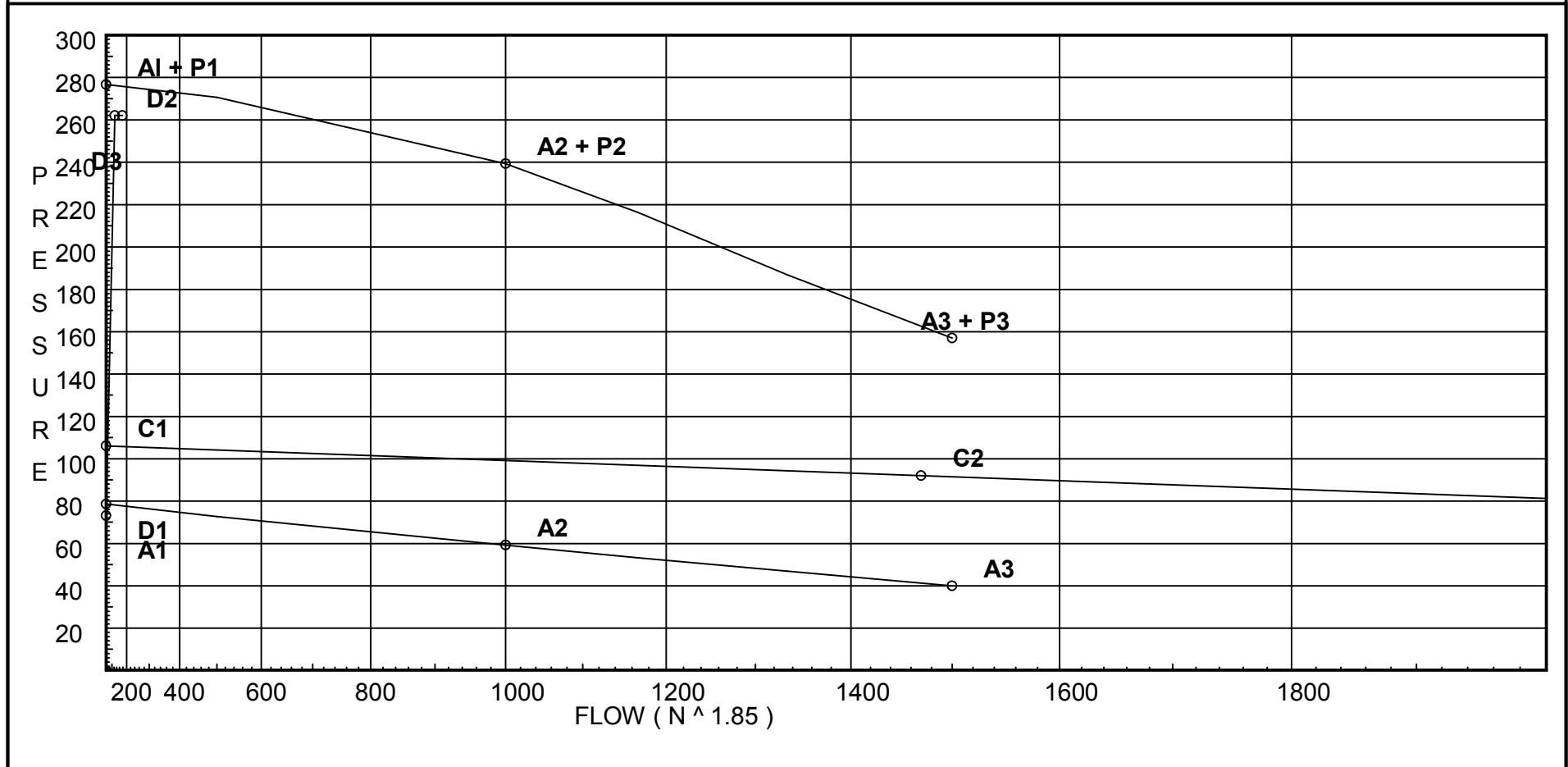
P Location:
 P
 L Source of Information:
 Y

Water Supply Curve (C)

ABL FIRE PROTECTION
SOLEIL CENTER: 17TH FLOOR RES

Page 2
Date

City Water Supply: C1 - Static Pressure : 106 C2 - Residual Pressure: 92 C2 - Residual Flow : 1470 City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow A1 - Adjusted Static: 78.654 A2 - Adj Resid : 59.292 @ 1000 A3 - Adj Resid : 40.022 @ 1500	Pump Data: P1 - Pump Churn Pressure : 198 P2 - Pump Rated Pressure : 180 P2 - Pump Rated Flow : 1000 P3 - Pump Pressure @ Max Flow : 117 P3 - Pump Max Flow : 1500 City Residual Flow @ 0 = 4390.85 City Residual Flow @ 20 = 3921.60 City Water @ 150% of Pump = 91.47	Demand: D1 - Elevation : 73.194 D2 - System Flow : 126.911 D2 - System Pressure : 262.096 Hose (Adj City) : 770 Hose (Demand) : 50 D3 - System Demand : 176.911 Safety Margin : 12.187
--	--	--



Fittings Used Summary

ABL FIRE PROTECTION
SOLEIL CENTER: 17TH FLOOR RES

Page 3
Date

Fitting Legend																					
Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
B	Generic Butterfly Valve	0	0	0	0	0	0	7	10	0	12	9	10	12	19	21	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
F	45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G	Generic Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
Mb	B Ball Milw BB-SC100			2.25	2	2.5	2.25	10													
S	Generic Swing Check Valve	4	5	5	7	9	11	14	16	19	22	27	32	45	55	65	76	87	98	109	130
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
Zaf	Ames 3000SS	Fitting generates a Fixed Loss Based on Flow																			
Zai	Ames 4000SS	Fitting generates a Fixed Loss Based on Flow																			

Pressure / Flow Summary - STANDARD

ABL FIRE PROTECTION
SOLEIL CENTER: 17TH FLOOR RES

Page 4
Date

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
1	170.5	4.2	47.1	na	28.83	0.1	256	14.5
2H	170.0	4.9	43.72	na	32.4	0.1	324	12.0
2	170.5		47.88	na				
4H	170.0	4.9	49.63	na	34.52	0.1	324	12.0
4	170.5		54.72	na				
6	170.5	4.2	55.06	na	31.16	0.1	256	14.5
3	170.5		57.42	na				
5	170.5		58.02	na				
7	170.5		59.63	na				
8	170.5		161.7	na				
9	170.5		170.06	na				
17TH	170.5		185.27	na	50.0			
LZT	24.5		248.91	na				
CON	17.5		252.01	na				
LZD	17.5		262.1	na				
LZS	17.5		76.28	na				
RED	17.5		76.36	na				
MF4	3.0		82.66	na				
DI	1.0		95.84	na				
HDI	-3.0		97.61	na	50.0			
HD2	-3.0		97.68	na	720.0			
POC	1.0		99.79	na				

The maximum velocity is 20.63 and it occurs in the pipe between nodes 2 and 3

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
1	28.83	1.101		5.790	47.104				
to		150		0.0	0.0				
2	28.83	0.1337		5.790	0.774				K Factor = 4.20
	0.0								
	28.83				47.878				Vel = 9.72
2H	32.40	0.874	1T	8.053	0.500	43.722			K Factor = 4.17
to		150		0.0	8.052	-0.217			
2	32.4	0.5113		0.0	8.552	4.373			K Factor = 4.90
2	28.83	1.101	1T	9.563	8.130	47.878			
to		150		0.0	9.562	0.0			
3	61.23	0.5391		0.0	17.692	9.538			Vel = 17.33
	0.0								
	61.23				57.416				K Factor = 8.08
4H	34.52	0.874	2E	8.053	1.170	49.634			K Factor = 4.90
to		150		0.0	8.052	-0.217			
4	34.52	0.5750		0.0	9.222	5.303			Vel = 18.46
4	0.0	1.101	1T	9.563	8.130	54.720			
to		150		0.0	9.562	0.0			
5	34.52	0.1868		0.0	17.692	3.304			Vel = 11.63
	0.0								
	34.52				58.024				K Factor = 4.53
6	31.16	1.101	2E	7.65	12.380	55.058			K Factor = 4.20
to		150	1T	9.563	17.212	0.0			
7	31.16	0.1546		0.0	29.592	4.574			Vel = 10.50
	0.0								
	31.16				59.632				K Factor = 4.04
3	61.23	1.598		0.0	6.920	57.416			
to		150		0.0	0.0	0.0			
5	61.23	0.0879		0.0	6.920	0.608			Vel = 9.79
5	34.52	1.598		0.0	8.000	58.024			
to		150		0.0	0.0	0.0			
7	95.75	0.2010		0.0	8.000	1.608			Vel = 15.32
7	31.16	1.598	6E	34.968	255.000	59.632			
to		150	1T	11.656	46.624	0.0			
8	126.91	0.3384		0.0	301.624	102.068			Vel = 20.30
8	0.0	1.682	2E	9.9	8.000	161.700			
to		120	1Mb	3.094	12.994	0.0			
9	126.91	0.3984		0.0	20.994	8.365			Vel = 18.32
9	0.0	2.635		0.0	4.500	170.065			
to		120		0.0	0.0	15.000			* Fixed loss = 15
17TH	126.91	0.0447		0.0	4.500	0.201			Vel = 7.47

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
17TH to LZT	50.00 176.91	6.357 120 0.0011	4E 70.411 1T 37.72 1B 12.573	241.500 120.704 362.204	185.266 63.233 0.411		Qa = 50		
LZT to CON	0.0 176.91	6.357 120 0.0011	1T 37.72 1B 12.573 0.0	10.000 50.293 60.293	248.910 3.032 0.068		Vel = 1.79		
CON to LZD	0.0 176.91	6.357 120 0.0011	1S 40.235 1E 17.603 1B 12.573	5.000 70.411 75.411	252.010 10.000 0.086		* Fixed loss = 10		
	0.0 176.91				262.096		K Factor = 10.93		
System Demand Pressure					262.096				
Safety Margin					12.187				
Continuation Pressure					274.283				
Pressure @ Pump Outlet					274.283				
Pressure From Pump Curve					-197.999				
Pressure @ Pump Inlet					76.284				
LZS to RED	0.0 176.91	6.357 120 0.0011	1E 17.603 1G 3.772 1T 37.72	5.000 59.095 64.095	76.284 0.0 0.073		Vel = 1.79		
RED to MF4	0.0 176.91	8.249 120 0.0003	1B 14.094 1T 41.108 0.0	12.500 55.202 67.702	76.357 6.280 0.021		Vel = 1.06		
MF4 to DI	0.0 176.91	8.249 120 0.0003	1Zai 0.0 1E 21.141 0.0	1.000 21.141 22.141	82.658 13.174 0.007		* Fixed loss = 12.307		
DI to HDI	0.0 176.91	8.27 140 0.0002	1F 14.234 1G 6.326 1T 55.354 1E 28.468	45.000 104.382 149.382	95.839 1.732 0.036		Vel = 1.06		
HDI to HD2	50.00 226.91	10.28 140 0.0001	2F 33.148 1T 75.336 1G 7.534	420.000 116.018 536.018	97.607 0.0 0.070		Qa = 50		
HD2 to POC	720.00 946.91	10.28 140 0.0018	1F 16.574 2G 15.067 1Zaf 0.0	131.000 31.641 162.641	97.677 1.821 0.297		Qa = 720		
	0.0 946.91				99.795		K Factor = 94.79		