

FHC - Hydraulic Calculation Report

Submitted by FHC user number:

Project: ARNEPLANT VIETNAM COMPANY LIMITED
Project Ref: HHT009
Area Ref: Most Unfavourable
Inst. Number: 1

Tel:
Fax:

Project Data and Design Parameters

Project name :

Area reference : Most Unfavourable

Address / location : .

Project number : HHT009

Installation number(s) : 1

Drawing number(s) : ---

Issue no / date : ---

Designers reference : ---

Project Data File :

Hazard classification : Domestic

Design authority : NFPA 13 : 2016 - Installation of Sprinkler

Insurance company : ---

Specified density of discharge : 18.00 mm/min (l/min/m²)

Assumed maximum area of operation : 360.00 m²

Number of operating sprinkler heads : 30 + 2 hydrant(s)

Maximum area covered per head : 12.00 m²

Highest head / nozzle above source : 12.00 m

Number of pipes in system : 52 from 25 to 125 mm

Pressure loss equation used : Hazen-Williams

Fluid : Water

Pipe Data Table : STD_PIPE.PDT

Maximum fluid velocity : 12.43 m/s in pipe 152 153

Volume of pipework and fittings : 6.16 m³

Elbows are welded for : 65 mm and above

Comment : ---

Checked by & Date :

Source duty = 8807.3 l/min @ 15.271 bar at node no 100

FHC - Hydraulic Calculation Report

Submitted by user number:

Project:

Project Ref

Area Ref:

Inst. Number:

Tel:

Fax:

Operating Sprinkler Heads, Nozzles and Hydrants

Head no	Node no	Size mm	'K' factor	Flow l/min	Area m2	Density Req.d	mm/min Actual	Pressure Min	bar Actual	Heights m	Pipe no
1	153	15.0	115.00	332.5	12.000	18.00	27.71	0.50	8.361	12.000	12
2	154	15.0	115.00	318.1	12.000	18.00	26.51	0.50	7.652	12.000	13
3	155	15.0	115.00	289.0	12.000	18.00	24.08	0.50	6.315	12.000	14
4	156	15.0	115.00	252.8	12.000	18.00	21.07	0.50	4.834	12.000	15
5	157	15.0	115.00	235.2	12.000	18.00	19.60	0.50	4.183	12.000	16
6	158	15.0	115.00	216.5	12.000	18.00	18.04	0.50	3.545	12.000	17
7	160	15.0	115.00	331.9	12.000	18.00	27.66	0.50	8.330	12.000	29
8	161	15.0	115.00	317.5	12.000	18.00	26.46	0.50	7.624	12.000	30
9	162	15.0	115.00	288.5	12.000	18.00	24.04	0.50	6.292	12.000	31
10	163	15.0	115.00	252.4	12.000	18.00	21.03	0.50	4.816	12.000	32
11	164	15.0	115.00	234.8	12.000	18.00	19.56	0.50	4.168	12.000	33
12	165	15.0	115.00	216.1	12.000	18.00	18.01	0.50	3.531	12.000	34
13	167	15.0	115.00	331.8	12.000	18.00	27.65	0.50	8.322	12.000	35
14	168	15.0	115.00	317.4	12.000	18.00	26.45	0.50	7.616	12.000	36
15	169	15.0	115.00	288.3	12.000	18.00	24.03	0.50	6.286	12.000	37
16	170	15.0	115.00	252.2	12.000	18.00	21.02	0.50	4.811	12.000	38
17	171	15.0	115.00	234.7	12.000	18.00	19.55	0.50	4.163	12.000	39
18	172	15.0	115.00	216.0	12.000	18.00	18.00	0.50	3.528	12.000	40
19	174	15.0	115.00	331.8	12.000	18.00	27.65	0.50	8.322	12.000	41
20	175	15.0	115.00	317.4	12.000	18.00	26.45	0.50	7.616	12.000	42
21	176	15.0	115.00	288.3	12.000	18.00	24.03	0.50	6.286	12.000	43
22	177	15.0	115.00	252.2	12.000	18.00	21.02	0.50	4.811	12.000	44
23	178	15.0	115.00	234.7	12.000	18.00	19.55	0.50	4.163	12.000	45
24	179	15.0	115.00	216.0	12.000	18.00	18.00	0.50	3.528	12.000	46
25	181	15.0	115.00	331.9	12.000	18.00	27.66	0.50	8.332	12.000	47
26	182	15.0	115.00	317.5	12.000	18.00	26.46	0.50	7.625	12.000	48
27	183	15.0	115.00	288.5	12.000	18.00	24.04	0.50	6.293	12.000	49
28	184	15.0	115.00	252.4	12.000	18.00	21.03	0.50	4.817	12.000	50
29	185	15.0	115.00	234.8	12.000	18.00	19.57	0.50	4.168	12.000	51
30	186	15.0	115.00	216.1	12.000	18.00	18.01	0.50	3.532	12.000	52
	190			300.0	Hydrant				9.820	12.000	10
	191			300.0	Hydrant				10.087	12.000	23

0 heads are under the required density / minimum pressures

FHC - Hydraulic Calculation Report

Submitted by user number:

Project:

Project Ref

Area Ref:

Inst. Number:

Tel:

Fax:

Hydraulically Significant Pipes in System

NUMBERS Pipe no	Start End	P I P E		F L O W L/min Vel m/s	DIMENSIONS			ANGLE Dir. Slope	VALUES Eq.len mbar/m	HEIGHT M		PRESSURES BARS	
		Size Bore	Type 'C'		Length EL	VJ T	VT			Start End	End	Start End	Frict Static
1	100	125mm	MW	8807.3	1.000			180	1.00	0.000		15.271	-0.075
	101	133.85	120	10.4	0	0		0.0	75.2	0.000		15.196	+0.000
2	101	125mm	MW	4783.4	1.000			180	1.00	0.000		15.196	-0.024
	102	133.85	120	5.7	0	0		0.0	24.3	0.000		15.171	+0.000
3	101	125mm	MW	4023.9	20.000			90	29.40	0.000		15.196	-0.520
	103	133.85	120	4.8	0	1		0.0	17.7	0.000		14.676	+0.000
4	102	125mm	MW	4783.4	20.000			90	23.01	0.000		15.171	-0.560
	104	133.85	120	5.7	1	0		0.0	24.3	0.000		14.612	+0.000
5	104	125mm	MW	4783.4	12.000			Up	15.01	0.000		14.612	-0.365
	147	133.85	120	5.7	1	0		90.0	24.3	12.000		13.071	-1.176
6	103	125mm	MW	4023.9	12.000			Up	24.41	0.000		14.676	-0.431
	148	133.85	120	4.8	1	1		90.0	17.7	12.000		13.069	-1.176
7	148	125mm	MW	4331.0	24.000			0	33.40	12.000		13.069	-0.676
	149	133.85	120	5.1	0	1		0.0	20.2	12.000		12.393	+0.000
8	149	125mm	MW	4331.0	48.000			90	51.01	12.000		12.393	-1.033
	150	133.85	120	5.1	1	0		0.0	20.2	12.000		11.361	+0.000
9	150	125mm	MW	-831.4	41.000			180	69.20	12.000		11.361	+0.066
	151	133.85	120	1.0	0	3		0.0	1.0	12.000		11.427	+0.000
10	150	125mm	MW	5162.4	55.000			90	55.00	12.000		11.361	-1.541
	190	133.85	120	6.1	0	0		0.0	28.0	12.000		9.820	+0.000
11	190	125mm	MW	4862.4	3.000			90	3.00	12.000		9.820	-0.075
	152	133.85	120	5.8	0	0		0.0	25.1	12.000		9.744	+0.000
12	152	50mm	MW	1644.2	1.300			180	4.49	12.000		9.744	-1.383
	153	52.98	120	12.4	0	1		0.0	307.8	12.000		8.361	+0.000
13	153	50mm	MW	1311.7	3.500			180	3.50	12.000		8.361	-0.709
	154	52.98	120	9.9	0	0		0.0	202.6	12.000		7.652	+0.000
14	154	40mm	MW	993.6	3.500			180	3.50	12.000		7.652	-1.337
	155	41.86	120	12.0	0	0		0.0	381.8	12.000		6.315	+0.000
15	155	32mm	MW	704.6	3.500			180	3.50	12.000		6.315	-1.481
	156	35.97	120	11.6	0	0		0.0	423.1	12.000		4.834	+0.000
16	156	32mm	MW	451.7	3.500			180	3.50	12.000		4.834	-0.651
	157	35.97	120	7.4	0	0		0.0	185.9	12.000		4.183	+0.000
17	157	25mm	MW	216.5	3.500			180	3.50	12.000		4.183	-0.638
	158	27.31	120	6.2	0	0		0.0	182.4	12.000		3.545	+0.000
18	152	125mm	MW	3218.2	3.000			90	3.00	12.000		9.744	-0.035
	159	133.85	120	3.8	0	0		0.0	11.7	12.000		9.709	+0.000
19	159	125mm	MW	1577.1	3.000			90	3.00	12.000		9.709	-0.009
	166	133.85	120	1.9	0	0		0.0	3.1	12.000		9.700	+0.000
20	166	125mm	MW	-63.3	3.000			90	3.00	12.000		9.700	+0.000
	173	133.85	120	0.1	0	0		0.0	0.0	12.000		9.700	+0.000
21	173	125mm	MW	-1703.6	3.000			90	3.00	12.000		9.700	+0.011
	180	133.85	120	2.0	0	0		0.0	3.6	12.000		9.711	+0.000
22	180	125mm	MW	-3344.9	2.000			90	2.00	12.000		9.711	+0.025
	187	133.85	120	4.0	0	0		0.0	12.5	12.000		9.736	+0.000
23	187	125mm	MW	-3344.9	25.000			180	28.01	12.000		9.736	+0.352
	191	133.85	120	4.0	1	0		0.0	12.6	12.000		10.087	+0.000
24	191	125mm	MW	-3644.9	16.000			180	16.00	12.000		10.087	+0.235
	188	133.85	120	4.3	0	0		0.0	14.7	12.000		10.323	+0.000
25	188	125mm	MW	-3644.9	72.000			270	75.01	12.000		10.323	+1.104
	151	133.85	120	4.3	1	0		0.0	14.7	12.000		11.427	+0.000
26	147	125mm	MW	307.1	1.000			0	10.40	12.000		13.071	-0.002
	148	133.85	120	0.4	0	1		0.0	0.2	12.000		13.069	+0.000
27	147	125mm	MW	4476.3	16.000			180	25.40	12.000		13.071	-0.547
	189	133.85	120	5.3	0	1		0.0	21.5	12.000		12.524	+0.000
28	189	125mm	MW	4476.3	48.000			90	51.01	12.000		12.524	-1.098
	151	133.85	120	5.3	1	0		0.0	21.5	12.000		11.427	+0.000
29	159	50mm	MW	1641.2	1.300			180	4.49	12.000		9.709	-1.378
	160	52.98	120	12.4	0	1		0.0	306.7	12.000		8.331	+0.000

FHC - Hydraulic Calculation Report

Submitted by user number:

Project: A COMPANY LIMITED

Project Ref: HHT009

Tel:

Area Ref: Most Unfavourable

Fax:

Inst. Number: 1

Hydraulically Significant Pipes in System

NUMBERS		P I P E		F L O W		DIMENSIONS		ANGLE	VALUES	HEIGHT M	PRESSURES BARS	
Pipe no	Start End	Size Bore	Type 'C'	L/min Vel m/s	Length EL T	VJ VT	Dir. Slope	Eq.len mbar/m	Start End	Start End	Frict Static	
30	160	50mm	MW	1309.2	3.500		180	3.50	12.000	8.331	-0.707	
	161	52.98	120	9.9	0 0		0.0	201.9	12.000	7.624	+0.000	
31	161	40mm	MW	991.7	3.500		180	3.50	12.000	7.624	-1.332	
	162	41.86	120	12.0	0 0		0.0	380.5	12.000	6.292	+0.000	
32	162	32mm	MW	703.3	3.500		180	3.50	12.000	6.292	-1.476	
	163	35.97	120	11.5	0 0		0.0	421.6	12.000	4.816	+0.000	
33	163	32mm	MW	450.9	3.500		180	3.50	12.000	4.816	-0.649	
	164	35.97	120	7.4	0 0		0.0	185.2	12.000	4.168	+0.000	
34	164	25mm	MW	216.1	3.500		180	3.50	12.000	4.168	-0.636	
	165	27.31	120	6.1	0 0		0.0	181.7	12.000	3.531	+0.000	
35	166	50mm	MW	1640.3	1.300		180	4.49	12.000	9.700	-1.377	
	167	52.98	120	12.4	0 1		0.0	306.5	12.000	8.323	+0.000	
36	167	50mm	MW	1308.6	3.500		180	3.50	12.000	8.323	-0.706	
	168	52.98	120	9.9	0 0		0.0	201.7	12.000	7.617	+0.000	
37	168	40mm	MW	991.2	3.500		180	3.50	12.000	7.617	-1.331	
	169	41.86	120	12.0	0 0		0.0	380.1	12.000	6.286	+0.000	
38	169	32mm	MW	702.9	3.500		180	3.50	12.000	6.286	-1.475	
	170	35.97	120	11.5	0 0		0.0	421.2	12.000	4.811	+0.000	
39	170	32mm	MW	450.7	3.500		180	3.50	12.000	4.811	-0.648	
	171	35.97	120	7.4	0 0		0.0	185.1	12.000	4.163	+0.000	
40	171	25mm	MW	216.0	3.500		180	3.50	12.000	4.163	-0.636	
	172	27.31	120	6.1	0 0		0.0	181.6	12.000	3.528	+0.000	
41	173	50mm	MW	1640.3	1.300		180	4.49	12.000	9.700	-1.377	
	174	52.98	120	12.4	0 1		0.0	306.5	12.000	8.323	+0.000	
42	174	50mm	MW	1308.6	3.500		180	3.50	12.000	8.323	-0.706	
	175	52.98	120	9.9	0 0		0.0	201.7	12.000	7.617	+0.000	
43	175	40mm	MW	991.2	3.500		180	3.50	12.000	7.617	-1.331	
	176	41.86	120	12.0	0 0		0.0	380.1	12.000	6.286	+0.000	
44	176	32mm	MW	702.9	3.500		180	3.50	12.000	6.286	-1.475	
	177	35.97	120	11.5	0 0		0.0	421.2	12.000	4.811	+0.000	
45	177	32mm	MW	450.7	3.500		180	3.50	12.000	4.811	-0.648	
	178	35.97	120	7.4	0 0		0.0	185.1	12.000	4.163	+0.000	
46	178	25mm	MW	216.0	3.500		180	3.50	12.000	4.163	-0.636	
	179	27.31	120	6.1	0 0		0.0	181.6	12.000	3.528	+0.000	
47	180	50mm	MW	1641.3	1.300		180	4.49	12.000	9.711	-1.378	
	181	52.98	120	12.4	0 1		0.0	306.8	12.000	8.332	+0.000	
48	181	50mm	MW	1309.3	3.500		180	3.50	12.000	8.332	-0.707	
	182	52.98	120	9.9	0 0		0.0	202.0	12.000	7.625	+0.000	
49	182	40mm	MW	991.8	3.500		180	3.50	12.000	7.625	-1.332	
	183	41.86	120	12.0	0 0		0.0	380.5	12.000	6.293	+0.000	
50	183	32mm	MW	703.3	3.500		180	3.50	12.000	6.293	-1.476	
	184	35.97	120	11.5	0 0		0.0	421.6	12.000	4.817	+0.000	
51	184	32mm	MW	450.9	3.500		180	3.50	12.000	4.817	-0.649	
	185	35.97	120	7.4	0 0		0.0	185.3	12.000	4.168	+0.000	
52	185	25mm	MW	216.1	3.500		180	3.50	12.000	4.168	-0.636	
	186	27.31	120	6.1	0 0		0.0	181.8	12.000	3.532	+0.000	

Maximum flow rate error at nodes : 0.00329 L/min

Maximum pressure drop error at nodes : 0.00082 bar

Maximum pressure drop error in loops : 0.00000 bar

Overall head flow balance error : 0.00039 %