

Full Hydraulic Calculations Computer Printout Page No 1

Submitted by user number

Project: ESKOM WAREHOUSE - FIRE PROTECTION
Address: BLOCK C2. ESKOM. MEGAWATT PARK 1 MAXWELL DRIVE
Number: DRG No. WH-ESKM-FP-001
Area ref: FIRE HYDRANT SYSTEM
Hazard: HIGH HAZARD STORAGE
Authority: ASIB 11th Edition (Automatic Sprinkler Inspection Bur
Source: 2409.0 l/min @ 3.737 bar
Printout: 12-July-24 at 05:52

Tel: Fax:

Project Data and Design Parameters

Project name : ESKOM WAREHOUSE - FIRE PROTECTION

Area reference : FIRE HYDRANT SYSTEM

Address / location : BLOCK C2. ESKOM. MEGAWATT PARK 1 MAXWELL DRIVE SUNNING

Project number : DRG No. WH-ESKM-FP-001

Installation number(s) : Control Valve No. 1

Drawing number(s) : DRG No. WH-ESKM-FP-001

Issue no / date : ---

Designers reference : STANFORD MUTARINGE

Project Data File : C:\Users\SKEWAR~1\Desktop\ESKOMW~1.FHC

Hazard classification : HIGH HAZARD STORAGE

Design authority : ASIB 11th Edition (Automatic Sprinkler Inspection Bur

Insurance company : ---

Specified density of discharge : 0.00 mm/min (l/min/m2)

Assumed maximum area of operation : 0.00 m2

Number of operating sprinkler heads : 2

Maximum area covered per head : 0.00 m2

Highest head / nozzle above source : 0.00 m

Number of pipes in system : 52 from 80 to 150 mm

Pressure loss equation used : Hazen-Williams

Fluid : Water

Pipe Data Table : STD_PIPE.PDT

Maximum fluid velocity : 3.94 m/s in pipe 340 390

Volume of pipework and fittings : 11.94 m3

Elbows are welded for : 0 mm and above

Comment : ---

Checked by & Date :

Source duty = 2409.0 l/min @ 3.737 bar at node no 100

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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	390		692.82	1209.0	0.000	0.00	0.00	3.00	3.045	1.000	49
2	281		692.82	1200.0	0.000	0.00	0.00	3.00	3.000	1.000	50

0 heads are under the required density / minimum pressures

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Tel: Fax:

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Hydraulically Significant Pipes in System	
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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	VJ T VT	Dir. Slope	Eq.len mbar/m	Start End	Start End	Frict Static	
1	100	150mm	MW	2409.0	0.300		Up	0.30	0.000	3.737	-0.001	
	110	155.32	120	2.1	0 0		90.0	3.3	0.300	3.706	-0.030	
2	110	150mm	MW	2409.0	0.500		Up	0.50	0.300	3.706	-0.002	
	120	155.32	120	2.1	0 0		90.0	3.3	0.800	3.654	-0.050	
3	120	150mm	MW	2409.0	1.200		Up	1.20	0.800	3.654	-0.004	
	130	155.32	120	2.1	0 0		90.0	3.3	2.000	3.530	-0.120	
4	130	150mm	MW	2409.0	1.500		0	3.50	2.000	3.530	-0.012	
	140	155.32	120	2.1	1 0		0.0	3.3	2.000	3.518	+0.000	
5	140	150mm	MW	2409.0	2.000		Dn	4.00	2.000	3.518	-0.013	
	150	155.32	120	2.1	1 0		-90.0	3.3	0.000	3.705	+0.200	
6	150	150mm	MW	2409.0	4.000		270	6.00	0.000	3.705	-0.020	
	160	155.32	120	2.1	1 0		0.0	3.3	0.000	3.685	+0.000	
7	160	150mm	MW	2409.0	22.370		0	24.37	0.000	3.685	-0.081	
	170	155.32	120	2.1	1 0		0.0	3.3	0.000	3.604	+0.000	
8	170	150mm	MW	2409.0	1.200		270	3.20	0.000	3.604	-0.011	
	180	155.32	120	2.1	1 0		0.0	3.3	0.000	3.594	+0.000	
9	180	150mm	MW	2409.0	4.000		Up	6.00	0.000	3.594	-0.020	
	190	155.32	120	2.1	1 0		90.0	3.3	4.000	3.174	-0.400	
10	190	150mm	MW	2409.0	0.300		270	2.30	4.000	3.174	-0.008	
	290	155.32	120	2.1	1 0		0.0	3.3	4.000	3.166	+0.000	
11	290	150mm	MW	1914.0	28.970		270	28.97	4.000	3.166	-0.063	
	200	155.32	120	1.7	0 0		0.0	2.2	4.000	3.104	+0.000	
12	200	150mm	MW	1541.5	29.375		270	29.37	4.000	3.104	-0.043	
	210	155.32	120	1.4	0 0		0.0	1.5	4.000	3.061	+0.000	
13	210	150mm	MW	1242.6	29.875		270	29.87	4.000	3.061	-0.029	
	220	155.32	120	1.1	0 0		0.0	1.0	4.000	3.032	+0.000	
14	220	150mm	MW	941.3	30.245		270	30.25	4.000	3.032	-0.018	
	230	155.32	120	0.8	0 0		0.0	0.6	4.000	3.014	+0.000	
15	230	150mm	MW	580.0	30.000		270	30.00	4.000	3.014	-0.007	
	240	155.32	120	0.5	0 0		0.0	0.2	4.000	3.007	+0.000	
16	240	100mm	MW	580.0	23.575		0	25.01	4.000	3.007	-0.040	
	250	105.14	120	1.1	1 0		0.0	1.6	4.000	2.967	+0.000	
17	250	100mm	MW	580.0	36.000		0	36.00	4.000	2.967	-0.057	
	260	105.14	120	1.1	0 0		0.0	1.6	4.000	2.910	+0.000	
18	260	100mm	MW	580.0	24.000		0	24.00	4.000	2.910	-0.038	
	270	105.14	120	1.1	0 0		0.0	1.6	4.000	2.872	+0.000	
19	270	100mm	MW	-620.0	23.025		0	23.02	4.000	2.872	+0.041	
	280	105.14	120	1.2	0 0		0.0	1.8	4.000	2.913	+0.000	

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Tel: Fax:	

Hydraulically Significant Pipes in System	
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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	VJ T	Dir. VT	Slope	Eq.len mbar/m	Start End	Start End	Frict Static
20	230	100mm	MW	361.3	23.575			0	29.68	4.000	3.014	-0.020
	241	105.14	120	0.7	0 1			0.0	0.7	4.000	2.995	+0.000
21	241	100mm	MW	361.3	36.000			0	36.00	4.000	2.995	-0.024
	251	105.14	120	0.7	0 0			0.0	0.7	4.000	2.971	+0.000
22	251	100mm	MW	361.3	24.000			0	24.00	4.000	2.971	-0.016
	261	105.14	120	0.7	0 0			0.0	0.7	4.000	2.955	+0.000
23	261	100mm	MW	361.3	23.025			0	29.12	4.000	2.955	-0.019
	271	105.14	120	0.7	0 1			0.0	0.7	4.000	2.935	+0.000
24	220	100mm	MW	301.3	23.575			0	29.68	4.000	3.032	-0.014
	231	105.14	120	0.6	0 1			0.0	0.5	4.000	3.018	+0.000
25	231	100mm	MW	301.3	36.000			0	36.00	4.000	3.018	-0.017
	242	105.14	120	0.6	0 0			0.0	0.5	4.000	3.001	+0.000
26	242	100mm	MW	301.3	24.000			0	24.00	4.000	3.001	-0.011
	252	105.14	120	0.6	0 0			0.0	0.5	4.000	2.989	+0.000
27	252	100mm	MW	301.3	23.025			0	29.12	4.000	2.989	-0.014
	262	105.14	120	0.6	0 1			0.0	0.5	4.000	2.976	+0.000
28	210	100mm	MW	298.8	23.575			0	29.68	4.000	3.061	-0.014
	221	105.14	120	0.6	0 1			0.0	0.5	4.000	3.047	+0.000
29	221	100mm	MW	298.8	36.000			0	36.00	4.000	3.047	-0.017
	232	105.14	120	0.6	0 0			0.0	0.5	4.000	3.030	+0.000
30	232	100mm	MW	298.8	24.000			0	24.00	4.000	3.030	-0.011
	243	105.14	120	0.6	0 0			0.0	0.5	4.000	3.019	+0.000
31	243	100mm	MW	298.8	23.025			0	29.12	4.000	3.019	-0.014
	253	105.14	120	0.6	0 1			0.0	0.5	4.000	3.005	+0.000
32	200	100mm	MW	372.5	23.575			0	29.68	4.000	3.104	-0.021
	211	105.14	120	0.7	0 1			0.0	0.7	4.000	3.083	+0.000
33	211	100mm	MW	372.5	36.000			0	36.00	4.000	3.083	-0.025
	222	105.14	120	0.7	0 0			0.0	0.7	4.000	3.057	+0.000
34	222	100mm	MW	372.5	24.000			0	24.00	4.000	3.057	-0.017
	233	105.14	120	0.7	0 0			0.0	0.7	4.000	3.041	+0.000
35	233	100mm	MW	372.5	23.025			0	29.12	4.000	3.041	-0.020
	244	105.14	120	0.7	0 1			0.0	0.7	4.000	3.020	+0.000
36	290	100mm	MW	494.9	23.575			0	29.68	4.000	3.166	-0.035
	300	105.14	120	1.0	0 1			0.0	1.2	4.000	3.131	+0.000
37	300	100mm	MW	494.9	36.000			0	36.00	4.000	3.131	-0.043
	310	105.14	120	1.0	0 0			0.0	1.2	4.000	3.088	+0.000
38	310	100mm	MW	494.9	24.000			0	24.00	4.000	3.088	-0.028
	320	105.14	120	1.0	0 0			0.0	1.2	4.000	3.060	+0.000

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	Source: 2409.0 l/min @ 3.737 bar										
	Printout: 12-July-24 at 05:52										

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
39	320	100mm	MW	494.9	23.025		0		29.12	4.000	3.060	-0.035
	330	105.14	120	1.0	0 1		0.0		1.2	4.000	3.025	+0.000
40	280	150mm	MW	-620.0	22.130		90		24.13	4.000	2.913	+0.006
	340	155.32	120	0.5	1 0		0.0		0.3	4.000	2.920	+0.000
41	340	150mm	MW	-1829.0	7.870		90		7.87	4.000	2.920	+0.016
	271	155.32	120	1.6	0 0		0.0		2.0	4.000	2.935	+0.000
42	271	150mm	MW	-1467.6	28.130		90		28.13	4.000	2.935	+0.037
	350	155.32	120	1.3	0 0		0.0		1.3	4.000	2.973	+0.000
43	350	150mm	MW	-1467.6	2.115		90		2.12	4.000	2.973	+0.003
	262	155.32	120	1.3	0 0		0.0		1.3	4.000	2.976	+0.000
44	262	150mm	MW	-1166.3	29.050		90		29.05	4.000	2.976	+0.025
	360	155.32	120	1.0	0 0		0.0		0.9	4.000	3.001	+0.000
45	360	100mm	MW	-1166.3	0.825		90		0.82	4.000	3.001	+0.005
	253	105.14	120	2.2	0 0		0.0		5.8	4.000	3.005	+0.000
46	253	150mm	MW	-867.5	29.375		90		29.37	4.000	3.005	+0.015
	244	155.32	120	0.8	0 0		0.0		0.5	4.000	3.020	+0.000
47	244	150mm	MW	-494.9	11.800		90		11.80	4.000	3.020	+0.002
	370	155.32	120	0.4	0 0		0.0		0.2	4.000	3.022	+0.000
48	370	150mm	MW	-494.9	17.170		90		17.17	4.000	3.022	+0.003
	330	155.32	120	0.4	0 0		0.0		0.2	4.000	3.025	+0.000
49	340	80mm	MW	1209.0	3.000		Dn		7.75	4.000	2.920	-0.174
	390	80.68	120	3.9	0 1		-90.0		22.5	1.000	3.046	+0.300
50	270	80mm	MW	1200.0	3.000		Dn		7.75	4.000	2.872	-0.172
	281	80.68	120	3.9	0 1		-90.0		22.2	1.000	3.000	+0.300

Maximum flow rate error at nodes : 0.04809 L/min
Maximum pressure drop error at nodes : 0.00060 bar
Maximum pressure drop error in loops : 0.00000 bar
Overall head flow balance error : 0.00201 %

