

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: 2411.3 l/min @ 4.547 bar
Printout: 12-July-24 at 05:32

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 :

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 : 50 from 80 to 150 mm

Pressure loss equation used : Hazen-Williams

Fluid : Water

Pipe Data Table : STD_PIPE.PDT.TXT

Maximum fluid velocity : 3.95 m/s in pipe 340 390

Volume of pipework and fittings : 8.87 m3

Elbows are welded for : 0 mm and above

Comment : ---

Checked by & Date :

Source duty = 2411.3 l/min @ 4.547 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	1211.4	0.000	0.00	0.00	3.00	3.057	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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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 VT	Dir. Slope	Eq.len mbar/m	Start End	Start End	Frict Static	
1	100	150mm	MW	2411.3	0.300		Up	0.30	0.000	4.547	-0.001	
	110	155.32	120	2.1	0 0		90.0	3.3	0.300	4.516	-0.030	
2	110	150mm	MW	2411.3	0.500		Up	0.50	0.300	4.516	-0.002	
	120	155.32	120	2.1	0 0		90.0	3.3	0.800	4.464	-0.050	
3	120	150mm	MW	2411.3	1.200		Up	1.20	0.800	4.464	-0.004	
	130	155.32	120	2.1	0 0		90.0	3.3	2.000	4.340	-0.120	
4	130	150mm	MW	2411.3	1.500		0	3.50	2.000	4.340	-0.012	
	140	155.32	120	2.1	1 0		0.0	3.3	2.000	4.328	+0.000	
5	140	150mm	MW	2411.3	2.000		Dn	4.00	2.000	4.328	-0.013	
	150	155.32	120	2.1	1 0		-90.0	3.3	0.000	4.515	+0.200	
6	150	150mm	MW	2411.3	4.000		270	6.00	0.000	4.515	-0.020	
	160	155.32	120	2.1	1 0		0.0	3.3	0.000	4.495	+0.000	
7	160	150mm	MW	2411.3	22.370		0	24.37	0.000	4.495	-0.081	
	170	155.32	120	2.1	1 0		0.0	3.3	0.000	4.414	+0.000	
8	170	150mm	MW	2411.3	1.200		270	3.20	0.000	4.414	-0.011	
	180	155.32	120	2.1	1 0		0.0	3.3	0.000	4.404	+0.000	
9	180	150mm	MW	2411.3	4.000		Up	6.00	0.000	4.404	-0.020	
	190	155.32	120	2.1	1 0		90.0	3.3	4.000	3.984	-0.400	
10	190	150mm	MW	2411.3	0.300		270	2.30	4.000	3.984	-0.008	
	290	155.32	120	2.1	1 0		0.0	3.3	4.000	3.976	+0.000	
11	290	100mm	MW	1642.5	28.970		270	28.97	4.000	3.976	-0.316	
	200	105.14	120	3.2	0 0		0.0	10.9	4.000	3.660	+0.000	
12	200	100mm	MW	1310.8	29.375		270	29.37	4.000	3.660	-0.211	
	210	105.14	120	2.5	0 0		0.0	7.2	4.000	3.449	+0.000	
13	210	100mm	MW	1200.0	29.875		270	29.87	4.000	3.449	-0.182	
	220	105.14	120	2.3	0 0		0.0	6.1	4.000	3.266	+0.000	
14	220	100mm	MW	1068.9	30.245		270	30.25	4.000	3.266	-0.149	
	230	105.14	120	2.1	0 0		0.0	4.9	4.000	3.117	+0.000	
15	230	100mm	MW	679.9	30.000		270	30.00	4.000	3.117	-0.064	
	240	105.14	120	1.3	0 0		0.0	2.1	4.000	3.053	+0.000	
16	240	100mm	MW	679.9	23.575		0	25.01	4.000	3.053	-0.053	
	250	105.14	120	1.3	1 0		0.0	2.1	4.000	3.000	+0.000	
17	250	100mm	MW	679.9	36.000		0	36.00	4.000	3.000	-0.077	
	260	105.14	120	1.3	0 0		0.0	2.1	4.000	2.923	+0.000	
18	260	100mm	MW	679.9	24.000		0	24.00	4.000	2.923	-0.051	
	270	105.14	120	1.3	0 0		0.0	2.1	4.000	2.872	+0.000	
19	270	100mm	MW	-520.1	23.025		0	23.02	4.000	2.872	+0.030	
	280	105.14	120	1.0	0 0		0.0	1.3	4.000	2.902	+0.000	

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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	Dir. VT	Slope	Eq.len mbar/m	Start End	Start End	Frict Static
20	230	100mm	MW	388.9	23.575			0	29.68	4.000	3.117	-0.023
	241	105.14	120	0.7	0 1			0.0	0.8	4.000	3.095	+0.000
21	241	100mm	MW	388.9	36.000			0	36.00	4.000	3.095	-0.027
	251	105.14	120	0.7	0 0			0.0	0.8	4.000	3.067	+0.000
22	251	100mm	MW	388.9	24.000			0	24.00	4.000	3.067	-0.018
	261	105.14	120	0.7	0 0			0.0	0.8	4.000	3.049	+0.000
23	261	100mm	MW	388.9	23.025			0	29.12	4.000	3.049	-0.022
	271	105.14	120	0.7	0 1			0.0	0.8	4.000	3.027	+0.000
24	220	100mm	MW	131.1	23.575			0	29.68	4.000	3.266	-0.003
	231	105.14	120	0.3	0 1			0.0	0.1	4.000	3.263	+0.000
25	231	100mm	MW	131.1	36.000			0	36.00	4.000	3.263	-0.004
	242	105.14	120	0.3	0 0			0.0	0.1	4.000	3.260	+0.000
26	242	100mm	MW	131.1	24.000			0	24.00	4.000	3.260	-0.002
	252	105.14	120	0.3	0 0			0.0	0.1	4.000	3.257	+0.000
27	252	100mm	MW	131.1	23.025			0	29.12	4.000	3.257	-0.003
	262	105.14	120	0.3	0 1			0.0	0.1	4.000	3.254	+0.000
28	210	100mm	MW	110.8	23.575			0	29.68	4.000	3.449	-0.002
	221	105.14	120	0.2	0 1			0.0	0.1	4.000	3.447	+0.000
29	221	100mm	MW	110.8	36.000			0	36.00	4.000	3.447	-0.003
	232	105.14	120	0.2	0 0			0.0	0.1	4.000	3.444	+0.000
30	232	100mm	MW	110.8	24.000			0	24.00	4.000	3.444	-0.002
	243	105.14	120	0.2	0 0			0.0	0.1	4.000	3.442	+0.000
31	243	100mm	MW	110.8	23.025			0	29.12	4.000	3.442	-0.002
	253	105.14	120	0.2	0 1			0.0	0.1	4.000	3.440	+0.000
32	200	100mm	MW	331.7	23.575			0	29.68	4.000	3.660	-0.017
	211	105.14	120	0.6	0 1			0.0	0.6	4.000	3.643	+0.000
33	211	100mm	MW	331.7	36.000			0	36.00	4.000	3.643	-0.020
	222	105.14	120	0.6	0 0			0.0	0.6	4.000	3.623	+0.000
34	222	100mm	MW	331.7	24.000			0	24.00	4.000	3.623	-0.014
	233	105.14	120	0.6	0 0			0.0	0.6	4.000	3.609	+0.000
35	233	100mm	MW	331.7	23.025			0	29.12	4.000	3.609	-0.016
	244	105.14	120	0.6	0 1			0.0	0.6	4.000	3.593	+0.000
36	290	100mm	MW	768.8	23.575			0	29.68	4.000	3.976	-0.080
	300	105.14	120	1.5	0 1			0.0	2.7	4.000	3.897	+0.000
37	300	100mm	MW	768.8	36.000			0	36.00	4.000	3.897	-0.096
	310	105.14	120	1.5	0 0			0.0	2.7	4.000	3.800	+0.000
38	310	100mm	MW	768.8	24.000			0	24.00	4.000	3.800	-0.064
	320	105.14	120	1.5	0 0			0.0	2.7	4.000	3.736	+0.000

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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	768.8	23.025		0	24.45	4.000	3.736	-0.066	
	330	105.14	120	1.5	1 0		0.0	2.7	4.000	3.670	+0.000	
40	280	100mm	MW	-520.1	22.130		90	23.56	4.000	2.902	+0.031	
	340	105.14	120	1.0	1 0		0.0	1.3	4.000	2.932	+0.000	
41	340	100mm	MW	-1731.4	7.870		90	7.87	4.000	2.932	+0.095	
	271	105.14	120	3.3	0 0		0.0	12.0	4.000	3.027	+0.000	
42	271	100mm	MW	-1342.4	28.130		90	28.13	4.000	3.027	+0.211	
	350	105.14	120	2.6	0 0		0.0	7.5	4.000	3.238	+0.000	
43	350	100mm	MW	-1342.4	2.115		90	2.12	4.000	3.238	+0.016	
	262	105.14	120	2.6	0 0		0.0	7.5	4.000	3.254	+0.000	
44	262	100mm	MW	-1211.3	29.050		90	29.05	4.000	3.254	+0.180	
	360	105.14	120	2.3	0 0		0.0	6.2	4.000	3.435	+0.000	
45	360	100mm	MW	-1211.3	0.825		90	0.82	4.000	3.435	+0.005	
	253	105.14	120	2.3	0 0		0.0	6.2	4.000	3.440	+0.000	
46	253	100mm	MW	-1100.5	29.375		90	29.37	4.000	3.440	+0.153	
	244	105.14	120	2.1	0 0		0.0	5.2	4.000	3.593	+0.000	
47	244	100mm	MW	-768.8	11.800		90	11.80	4.000	3.593	+0.032	
	370	105.14	120	1.5	0 0		0.0	2.7	4.000	3.624	+0.000	
48	370	100mm	MW	-768.8	17.170		90	17.17	4.000	3.624	+0.046	
	330	105.14	120	1.5	0 0		0.0	2.7	4.000	3.670	+0.000	
49	340	80mm	MW	1211.3	3.000		Dn	7.75	4.000	2.932	-0.175	
	390	80.68	120	3.9	0 1		-90.0	22.6	1.000	3.058	+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 : 0.05847 L/min
Maximum pressure drop error at nodes : 0.00073 bar
Maximum pressure drop error in loops : 0.00010 bar
Overall head flow balance error : 0.00240 %

