

Results presentation from FREESH [09.12.15] for NFPA 13 / 15 Rules submitted by :-  
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Q1 ] Project name/number = A gridded example  
Q2 ] Address/location =  
Q3 ] Contract/client reference =  
Q4 ] Authority having jurisdiction =  
Q5 ] Occupancy/building class =  
Q6 ] System/hazard classification = Ordinary Hazard  
Q7 ] Drawing numbers/refs/dates =  
Q8 ] Remote area reference/number =  
Q9 ] Area of operation (sq. m) = 117  
Q10] Density (mm/min) = 15  
Q11] Max area per head (sq. m) = 9  
Q12] Inside hosestream (L/min) = 0  
Q13] Outside hosestream (L/min) = 0  
Q14] In rack allowance (L/min) = 0  
Q15] Sprinkler head info =  
Q16] Storage information =  
Q17] Plastic storage info =  
Q18] Rack storage info =  
Q19] Designer/department = Alan Ashfield  
Q20] Note about design =  
Q21] Note for AHJ / Reviewer =  
Q22] Height of first node (m) = 0.000  
Q23] Psi/ft (0.433 or 0.434) = 0.433 (0.097946 bar/m)  
Q24] Use velocity pressure (Y/N) = No  
Q25] Max water velocity (m/s) = 10.0  
Q26] Min pipe size (mm) = 25  
Q27] Max pipe size to heads (mm) = 65  
Q28] Max pressure at heads (bar) = 12.0  
Q29] Calculation (Demand/Source) = Demand  
Q30] Static pressure (bar) = 0.0  
Q31] Residual pressure (bar) = 0.0  
Q32] Residual flow rate (L/min) = 0  
Q33] Time/date/reference of test =

Number of pipes = 79  
Node numbers = 100 to 167  
Pipe sizes = 40 to 100 mm  
Flow rates = 0.5 to 1791.1 L/min  
Velocities = 0.01 to 3.63 m/s  
Lengths = 1.000 to 29.000 m  
Node pressures = 1.378 to 3.249 bar  
Pressure drops = 0.000 to 0.562 bar  
Pressure drops per m run = 0.0 to 39.5 mbar/m

Number of operating heads = 13  
"K" factors = 115.00 to 115.00  
Heights above source = 7.000 to 7.000 m  
Flow rates = 135.0 to 159.0 L/min  
Minimum flow margin = 0.00 to 23.97 L/min  
Pressures = 1.378 to 1.911 bar  
Minimum pressure margin = 0.000 to 0.533 bar

Most remotest head node = 164  
Volume of pipework = 1.054 cu. m  
Data file name = D:\freeshp\DemoJob4.DXF

SOURCE DUTY AT NODE 100 = 1791.1 L/min at 3.249 bar

Start Nodes	Start Elev. End	Q L/min K-fact q L/min	Size Nom Bore	Fitting reference Eq. len m	Lengths Fitts m Total m	Type C-fact mbar/m	Ptotal Pel ev Pfrict	Endbar Vel bar Normal	Di rect Slope° m/s
100	0.000	1791.1		Gate	2.000	S40	3.249	3.015	Up
101	2.000		100 mm	Valve	0.610	120	0.196		
			102.26	0.610	2.610	14.7	0.038		3.63
101	2.000	1791.1		Alarm	4.000	S40	3.015	2.511	Up
102	6.000		100 mm	Valve	3.660	120	0.392		
			102.26	3.660	7.660	14.7	0.112		3.63
102	6.000	1791.1		Elbow	1.000	S40	2.511	2.452	North
103	6.000		100 mm	90° std	3.050	120	0.000		
			102.26	3.050	4.050	14.7	0.059		3.63
103	6.000	111.6		Tee	1.000	S40	2.452	2.328	Up
104	7.000		40 mm	turn 90°	2.440	120	0.098		
			40.90	2.440	3.440	7.5	0.026		1.42
104	7.000	111.6		2xElbow	29.000	S40	2.328	2.093	West
105	7.000		40 mm	90° std	2.440	120	0.000		
			40.90	2.440	31.440	7.5	0.235		1.42
105	7.000	111.6		Tee	1.000	S40	2.093	2.165	Down
106	6.000		40 mm	turn 90°	2.440	120	-0.098		
			40.90	2.440	3.440	7.5	0.026		1.42
103	6.000	1679.5			3.000	S40	2.452	2.413	North
107	6.000		100 mm		0.000	120	0.000		
			102.26		3.000	13.0	0.039		3.41
107	6.000	103.3		Tee	1.000	S40	2.413	2.292	Up
108	7.000		40 mm	turn 90°	2.440	120	0.098		
			40.90	2.440	3.440	6.5	0.022		1.31
108	7.000	103.3		2xElbow	29.000	S40	2.292	2.088	West
109	7.000		40 mm	90° std	2.440	120	0.000		
			40.90	2.440	31.440	6.5	0.204		1.31
109	7.000	103.3		Tee	1.000	S40	2.088	2.164	Down
110	6.000		40 mm	turn 90°	2.440	120	-0.098		
			40.90	2.440	3.440	6.5	0.022		1.31
107	6.000	1576.2			3.000	S40	2.413	2.378	North
111	6.000		100 mm		0.000	120	0.000		
			102.26		3.000	11.6	0.035		3.20
111	6.000	96.0		Tee	1.000	S40	2.378	2.260	Up
112	7.000		40 mm	turn 90°	2.440	120	0.098		
			40.90	2.440	3.440	5.7	0.019		1.22
112	7.000	96.0		2xElbow	29.000	S40	2.260	2.082	West
113	7.000		40 mm	90° std	2.440	120	0.000		
			40.90	2.440	31.440	5.7	0.178		1.22
113	7.000	96.0		Tee	1.000	S40	2.082	2.161	Down
114	6.000		40 mm	turn 90°	2.440	120	-0.098		
			40.90	2.440	3.440	5.7	0.019		1.22
111	6.000	1480.2			3.000	S40	2.378	2.347	North
115	6.000		100 mm		0.000	120	0.000		
			102.26		3.000	10.3	0.031		3.00
115	6.000	90.0		Tee	1.000	S40	2.347	2.232	Up
116	7.000		40 mm	turn 90°	2.440	120	0.098		
			40.90	2.440	3.440	5.0	0.017		1.14
116	7.000	90.0		2xElbow	29.000	S40	2.232	2.073	West
117	7.000		40 mm	90° std	2.440	120	0.000		
			40.90	2.440	31.440	5.0	0.158		1.14

Start Nodes	Start Elev. End	Q L/min K-fact q L/min	Size Nom Bore	Fitting reference Eq. len m	Lengths Fitts m Total m	Type C-fact mbar/m	Ptotal Pel ev Pfrict	Endbar Vel bar Normal	Di rect Slope° m/s
117	7.000	90.0		Tee	1.000	S40	2.073	2.154	Down
118	6.000		40 mm 40.90	turn 90° 2.440	2.440 3.440	120 5.0	-0.098 0.017		1.14
115	6.000	1390.2			3.000	S40	2.347	2.319	North
119	6.000		100 mm 102.26		0.000 3.000	120 9.2	0.000 0.028		2.82
119	6.000	85.6		Tee	1.000	S40	2.319	2.206	Up
120	7.000		40 mm 40.90	turn 90° 2.440	2.440 3.440	120 4.6	0.098 0.016		1.09
120	7.000	85.6		2xEl bow	29.000	S40	2.206	2.062	West
121	7.000		40 mm 40.90	90° std 2.440	2.440 31.440	120 4.6	0.000 0.144		1.09
121	7.000	85.6		Tee	1.000	S40	2.062	2.144	Down
122	6.000		40 mm 40.90	turn 90° 2.440	2.440 3.440	120 4.6	-0.098 0.016		1.09
119	6.000	1304.6			3.000	S40	2.319	2.295	North
123	6.000		100 mm 102.26		0.000 3.000	120 8.2	0.000 0.024		2.65
123	6.000	83.0		Tee	1.000	S40	2.295	2.182	Up
124	7.000		40 mm 40.90	turn 90° 2.440	2.440 3.440	120 4.3	0.098 0.015		1.05
124	7.000	83.0		2xEl bow	29.000	S40	2.182	2.046	West
125	7.000		40 mm 40.90	90° std 2.440	2.440 31.440	120 4.3	0.000 0.136		1.05
125	7.000	83.0		Tee	1.000	S40	2.046	2.129	Down
126	6.000		40 mm 40.90	turn 90° 2.440	2.440 3.440	120 4.3	-0.098 0.015		1.05
123	6.000	1221.6			3.000	S40	2.295	2.273	North
127	6.000		100 mm 102.26		0.000 3.000	120 7.2	0.000 0.022		2.48
127	6.000	82.5		Tee	1.000	S40	2.273	2.160	Up
128	7.000		40 mm 40.90	turn 90° 2.440	2.440 3.440	120 4.3	0.098 0.015		1.05
128	7.000	82.5		2xEl bow	29.000	S40	2.160	2.026	West
129	7.000		40 mm 40.90	90° std 2.440	2.440 31.440	120 4.3	0.000 0.135		1.05
129	7.000	82.5		Tee	1.000	S40	2.026	2.109	Down
130	6.000		40 mm 40.90	turn 90° 2.440	2.440 3.440	120 4.3	-0.098 0.015		1.05
127	6.000	1139.1			3.000	S40	2.273	2.254	North
131	6.000		100 mm 102.26		0.000 3.000	120 6.3	0.000 0.019		2.31
131	6.000	84.3		Tee	1.000	S40	2.254	2.141	Up
132	7.000		40 mm 40.90	turn 90° 2.440	2.440 3.440	120 4.5	0.098 0.015		1.07
132	7.000	84.3		2xEl bow	29.000	S40	2.141	2.001	West
133	7.000		40 mm 40.90	90° std 2.440	2.440 31.440	120 4.5	0.000 0.140		1.07
133	7.000	84.3		Tee	1.000	S40	2.001	2.083	Down
134	6.000		40 mm 40.90	turn 90° 2.440	2.440 3.440	120 4.5	-0.098 0.015		1.07

Start Nodes End	Start Elev. End	Q L/min K-fact q L/min	Size Nom Bore	Fitting reference Eq. len m	Lengths Fitts m Total m	Type C-fact mbar/m	Ptotal Pel ev Pfrict	Endbar Vel bar Normal	Di rect Slope° m/s
131	6.000	1054.8			3.000	S40	2.254	2.238	North
135	6.000		100 mm		0.000	120	0.000		
			102.26		3.000	5.5	0.017		2.14
135	6.000	88.3		Tee	1.000	S40	2.238	2.123	Up
			40 mm	turn 90°	2.440	120	0.098		
136	7.000		40.90	2.440	3.440	4.9	0.017		1.12
136	7.000	88.3		2xEl bow	29.000	S40	2.123	1.970	West
			40 mm	90° std	2.440	120	0.000		
137	7.000		40.90	2.440	31.440	4.9	0.153		1.12
137	7.000	88.3		Tee	1.000	S40	1.970	2.052	Down
			40 mm	turn 90°	2.440	120	-0.098		
138	6.000		40.90	2.440	3.440	4.9	0.017		1.12
135	6.000	966.5			3.000	S40	2.238	2.224	North
			100 mm		0.000	120	0.000		
139	6.000		102.26		3.000	4.7	0.014		1.96
139	6.000	145.0		Tee	1.000	S40	2.224	2.084	Up
			40 mm	turn 90°	2.440	120	0.098		
140	7.000		40.90	2.440	3.440	12.2	0.042		1.84
140	7.000	145.0		El bow	13.000	S40	2.084	1.911	West
		115.00	40 mm	90° std	1.220	120	0.000		
141	7.000	159.0	40.90	1.220	14.220	12.2	0.173	1.911	1.84
141	7.000	-13.9		El bow	16.000	S40	1.911	1.914	West
			40 mm	90° std	1.220	120	0.000		
142	7.000		40.90	1.220	17.220	0.2	0.003		0.18
142	7.000	-13.9		Tee	1.000	S40	1.914	2.012	Down
			40 mm	turn 90°	2.440	120	-0.098		
143	6.000		40.90	2.440	3.440	0.2	0.001		0.18
139	6.000	821.5			3.000	S40	2.224	2.213	North
			100 mm		0.000	120	0.000		
144	6.000		102.26		3.000	3.5	0.010		1.67
144	6.000	273.2		Tee	1.000	S40	2.213	1.980	Up
			40 mm	turn 90°	2.440	120	0.098		
145	7.000		40.90	2.440	3.440	39.2	0.135		3.47
145	7.000	273.2		El bow	13.000	S40	1.980	1.422	West
		115.00	40 mm	90° std	1.220	120	0.000		
146	7.000	137.1	40.90	1.220	14.220	39.2	0.558	1.422	3.47
146	7.000	136.1			3.000	S40	1.422	1.390	West
		115.00	40 mm		0.000	120	0.000		
147	7.000	135.6	40.90		3.000	10.8	0.032	1.390	1.73
147	7.000	0.5			3.000	S40	1.390	1.390	West
		115.00	40 mm		0.000	120	0.000		
148	7.000	135.6	40.90		3.000	0.0	0.000	1.390	0.01
148	7.000	-135.0			3.000	S40	1.390	1.422	West
		115.00	40 mm		0.000	120	0.000		
149	7.000	137.1	40.90		3.000	10.7	0.032	1.422	1.71
149	7.000	-272.2		El bow	7.000	S40	1.422	1.742	West
			40 mm	90° std	1.220	120	0.000		
150	7.000		40.90	1.220	8.220	39.0	0.320		3.45
150	7.000	-272.2		Tee	1.000	S40	1.742	1.974	Down
			40 mm	turn 90°	2.440	120	-0.098		
151	6.000		40.90	2.440	3.440	39.0	0.134		3.45

Start Nodes End	Start Elev. End	Q L/min K-fact q L/min	Size Nom Bore	Fitting reference Eq. len m	Lengths Fitts m Total m	Type C-fact mbar/m	Ptotal Pel ev Pfrict	Endbar Vel bar Normal	Di rect Slope° m/s
144	6.000	548.2			3.000	S40	2.213	2.208	North
152	6.000		100 mm		0.000	120	0.000		
			102.26		3.000	1.6	0.005		1.11
152	6.000	274.0		Tee	1.000	S40	2.208	1.975	Up
153	7.000		40 mm	turn 90°	2.440	120	0.098		
			40.90	2.440	3.440	39.5	0.136		3.48
153	7.000	274.0		El bow	13.000	S40	1.975	1.414	West
154	7.000	115.00	40 mm	90° std	1.220	120	0.000		
		136.7	40.90	1.220	14.220	39.5	0.561	1.414	3.48
154	7.000	137.3			3.000	S40	1.414	1.381	West
155	7.000	115.00	40 mm		0.000	120	0.000		
		135.1	40.90		3.000	11.0	0.033	1.381	1.74
155	7.000	2.2			3.000	S40	1.381	1.381	West
156	7.000	115.00	40 mm		0.000	120	0.000		
		135.1	40.90		3.000	0.0	0.000	1.381	0.03
156	7.000	-133.0			3.000	S40	1.381	1.412	West
157	7.000	115.00	40 mm		0.000	120	0.000		
		136.6	40.90		3.000	10.4	0.031	1.412	1.69
157	7.000	-269.6		El bow	7.000	S40	1.412	1.726	West
158	7.000		40 mm	90° std	1.220	120	0.000		
			40.90	1.220	8.220	38.3	0.315		3.42
158	7.000	-269.6		Tee	1.000	S40	1.726	1.956	Down
159	6.000		40 mm	turn 90°	2.440	120	-0.098		
			40.90	2.440	3.440	38.3	0.132		3.42
152	6.000	274.2			3.000	S40	2.208	2.207	North
160	6.000		100 mm		0.000	120	0.000		
			102.26		3.000	0.5	0.001		0.56
160	6.000	274.2		Tee	1.000	S40	2.207	1.973	Up
161	7.000		40 mm	turn 90°	2.440	120	0.098		
			40.90	2.440	3.440	39.5	0.136		3.48
161	7.000	274.2		El bow	13.000	S40	1.973	1.411	West
162	7.000	115.00	40 mm	90° std	1.220	120	0.000		
		136.6	40.90	1.220	14.220	39.5	0.562	1.411	3.48
162	7.000	137.6			3.000	S40	1.411	1.378	West
163	7.000	115.00	40 mm		0.000	120	0.000		
		135.0	40.90		3.000	11.0	0.033	1.378	1.75
163	7.000	2.6			3.000	S40	1.378	1.378	West
164	7.000	115.00	40 mm		0.000	120	0.000		
		135.0	40.90		3.000	0.0	0.000	1.378	0.03
164	7.000	-132.4			3.000	S40	1.378	1.409	West
165	7.000	115.00	40 mm		0.000	120	0.000		
		136.5	40.90		3.000	10.3	0.031	1.409	1.68
165	7.000	-268.9		El bow	7.000	S40	1.409	1.722	West
166	7.000		40 mm	90° std	1.220	120	0.000		
			40.90	1.220	8.220	38.1	0.313		3.41
166	7.000	-268.9		Tee	1.000	S40	1.722	1.951	Down
167	6.000		40 mm	turn 90°	2.440	120	-0.098		
			40.90	2.440	3.440	38.1	0.131		3.41
167	6.000	-268.9			3.000	S40	1.951	1.956	South
159	6.000		80 mm		0.000	120	0.000		
			77.90		3.000	1.7	0.005		0.94

Start Nodes	Start Elev. End	Q L/min K-fact q L/min	Size Nom Bore	Fitting reference Eq. len m	Lengths Fitts m Total m	Type C-fact mbar/m	Ptotal Pel ev Pfriect	Endbar Vel bar Normal	Di rect Slope° m/s
159	6.000	-538.5	80 mm		3.000	S40	1.956	1.974	South
151	6.000		77.90		0.000	120	0.000		1.88
					3.000	6.0	0.018		
151	6.000	-810.6	80 mm		3.000	S40	1.974	2.012	South
143	6.000		77.90		0.000	120	0.000		2.83
					3.000	12.7	0.038		
143	6.000	-824.6	80 mm		3.000	S40	2.012	2.052	South
138	6.000		77.90		0.000	120	0.000		2.88
					3.000	13.1	0.039		
138	6.000	-736.3	80 mm		3.000	S40	2.052	2.083	South
134	6.000		77.90		0.000	120	0.000		2.57
					3.000	10.7	0.032		
134	6.000	-652.0	80 mm		3.000	S40	2.083	2.109	South
130	6.000		77.90		0.000	120	0.000		2.28
					3.000	8.5	0.026		
130	6.000	-569.5	80 mm		3.000	S40	2.109	2.129	South
126	6.000		77.90		0.000	120	0.000		1.99
					3.000	6.6	0.020		
126	6.000	-486.4	80 mm		3.000	S40	2.129	2.144	South
122	6.000		77.90		0.000	120	0.000		1.70
					3.000	4.9	0.015		
122	6.000	-400.9	80 mm		3.000	S40	2.144	2.154	South
118	6.000		77.90		0.000	120	0.000		1.40
					3.000	3.5	0.010		
118	6.000	-310.9	80 mm		3.000	S40	2.154	2.161	South
114	6.000		77.90		0.000	120	0.000		1.09
					3.000	2.2	0.006		
114	6.000	-214.8	80 mm		3.000	S40	2.161	2.164	South
110	6.000		77.90		0.000	120	0.000		0.75
					3.000	1.1	0.003		
110	6.000	-111.6	80 mm		3.000	S40	2.164	2.165	South
106	6.000		77.90		0.000	120	0.000		0.39
					3.000	0.3	0.001		

Pipe quantities in metres for above pipes :-

Type	Description	40	50	65	80	90	100 mm
S40	Schedule 40 steel	403			36		43 m

Results presentation from FREESH [09.12.15] for NFPA 13 / 15 Rules submitted by :-  
 Your name will appear here  
 Your address

Your telephone number  
 Your Fax no or Email address

FREESH is metric units only so not acceptable in America or Burma  
 For more information about all my programs, please visit <https://www.freehc.net>