Grate Drainage Performance Certificate ID: 100 Series Click Drain

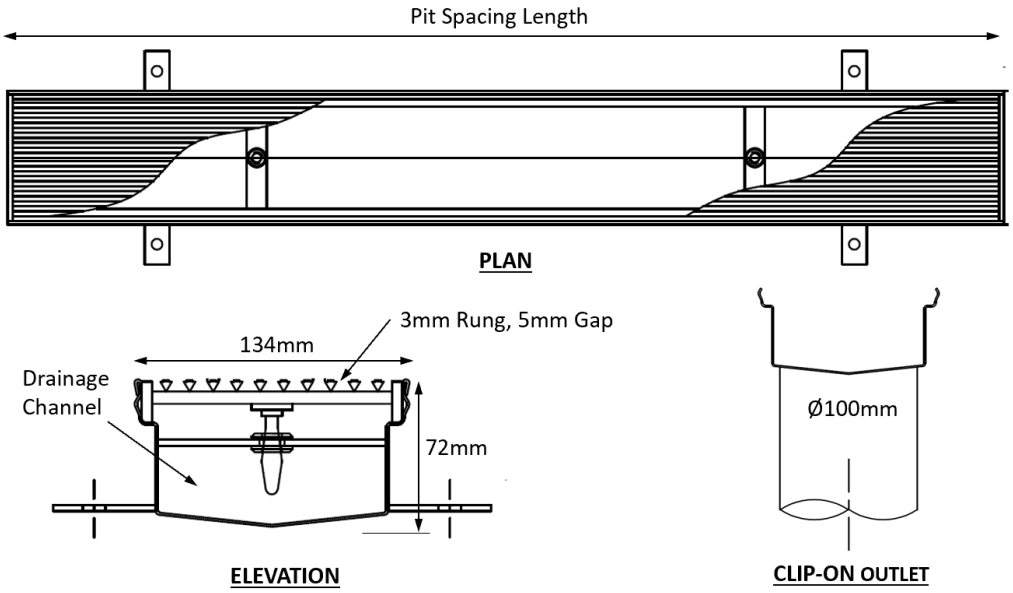
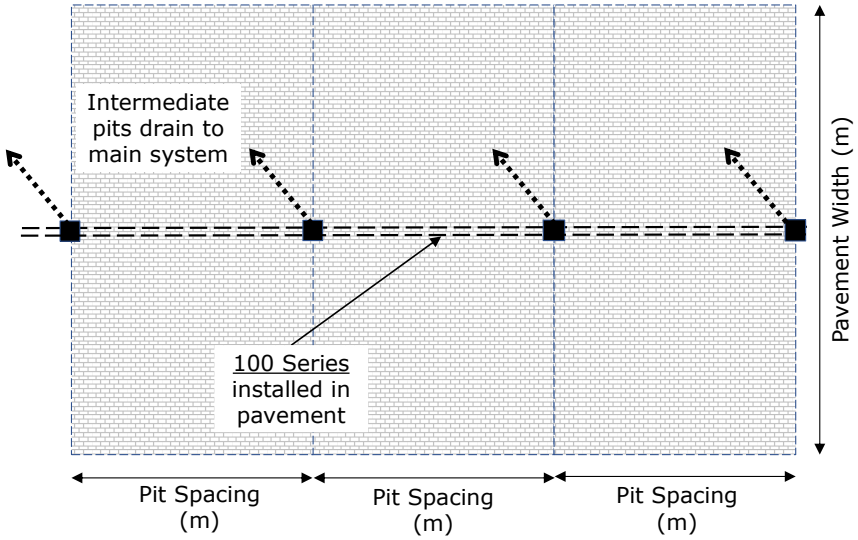
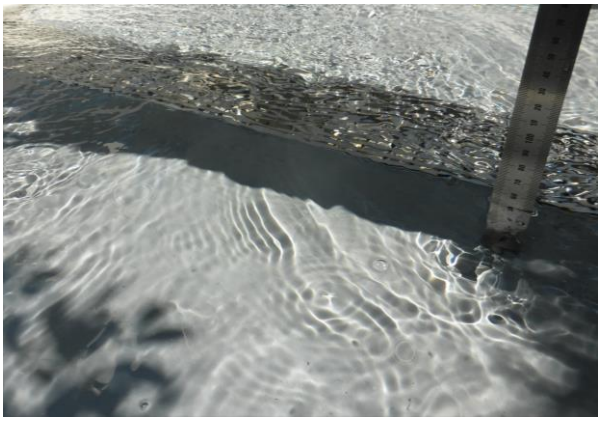
Test Results	ID: 100 Series CD
Description	Paige Stainless 100 Series Click Drain
Drain Type	100mm wide grate – flush mounted to pavement
Model	Paige Stainless - 100 Series CD
Test Date	8/10/2020
Grate Drawing	
Typical Installation	
Test Grate Configuration	A one metre length of the *100 Series CD* was installed flush with test rig base. The maximum drainage capacity of the grate opening, the Ø100mm drainage outlet, and the conveyance capacity of the channel were tested for different water ponding levels (H).

Table 1 - 100 Series CD Maximum Inflowrate (L/s) per lineal metre for pit spacings

Head (mm)	Pit Spacing (m)														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	3.00	1.50	1.00	0.75	0.60	0.50	0.43	0.38	0.33	0.30	0.27	0.25	0.23	0.21	0.20
5	3.30	1.65	1.10	0.83	0.66	0.55	0.47	0.41	0.37	0.33	0.30	0.28	0.25	0.24	0.22
10	3.60	1.80	1.20	0.90	0.72	0.60	0.51	0.45	0.40	0.36	0.33	0.30	0.28	0.26	0.24
20	4.00	2.00	1.33	1.00	0.80	0.67	0.57	0.50	0.44	0.40	0.36	0.33	0.31	0.29	0.27
30	4.40	2.20	1.47	1.10	0.88	0.73	0.63	0.55	0.49	0.44	0.40	0.37	0.34	0.31	0.29
40	4.80	2.40	1.60	1.20	0.96	0.80	0.69	0.60	0.53	0.48	0.44	0.40	0.37	0.34	0.32
50	5.10	2.55	1.70	1.28	1.02	0.85	0.73	0.64	0.57	0.51	0.46	0.43	0.39	0.36	0.34
75	5.80	2.90	1.93	1.45	1.16	0.97	0.83	0.73	0.64	0.58	0.53	0.48	0.45	0.41	0.39
100	6.40	3.20	2.13	1.60	1.28	1.07	0.91	0.80	0.71	0.64	0.58	0.53	0.49	0.46	0.43
125	6.80	3.40	2.27	1.70	1.36	1.13	0.97	0.85	0.76	0.68	0.62	0.57	0.52	0.49	0.45
150	7.60	3.80	2.53	1.90	1.52	1.27	1.09	0.95	0.84	0.76	0.69	0.63	0.58	0.54	0.51



9.7 L/s @ 50 mm Head

8.0 L/s @ 20 mm Head

Observation Comments:

- The *100 Series CD* opening was hydraulically effective and no backing up of flow was observed.
- The drainage capacity of the *100 Series CD* is governed by the conveyance capacity of the drainage channel, rather than the inflow capacity of the grate, or the outflow capacity of the Ø100mm outlet. At 80% blockage, the grate inflow rate was greater than the channel conveyance capacity. Typical grate blockage by debris is therfore unlikely to affect the governing hydraulic capacity of the drainage channel.
- As the drainage channel was completely full during all tests on the 1m long *100 Series CD*, no further conveyance capacity is possible. This means that the maximum inflow rates observed for the 1m long *100 Series CD* must be appropriately reduced for pit spacings greater than 1m.
- See example calculations on following page for more explanation.

I hereby certify that the test results presented on this outlet performance certificate are true and correct and were obtained using recognised AHSCA Gutter Outlet Testing procedures.

Dr Terry Lucke, Chief Researcher:

Date: 8th October 2020

Mark Alexander, AHSCA Foundation Chairman:

Date: 8th October 2020

Example Calculations for 100 Series Click Drain Spacing

Example 1

Design the pit spacing for the 100 Series CD to satisfactorily drain the 5m wide pavement shown below during a 1 in 10-year, 20 min storm in Brisbane ($^{10}I_{20min}$ = 124 mm/h). The maximum allowable ponding level at the slot drain is 50mm.

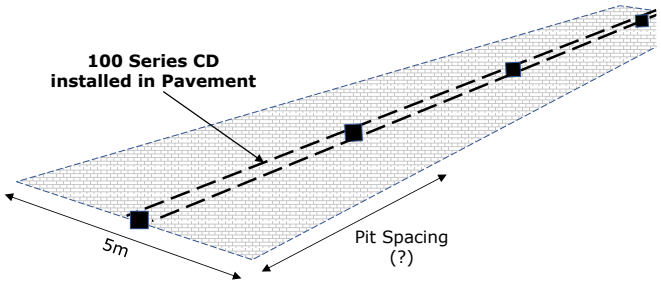


Table 2

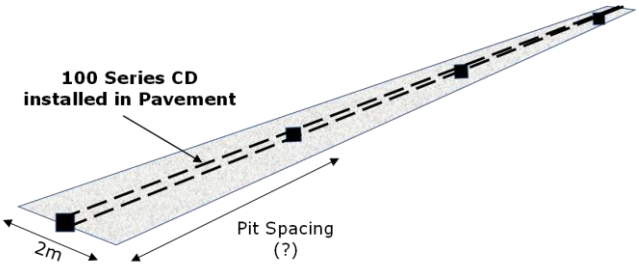
Intensity (mm/h)	runoff (L/s) per m^2
50	0.014
75	0.021
100	0.028
125	0.035
150	0.042
175	0.049
200	0.056
225	0.063
250	0.069
275	0.076
300	0.083
325	0.090
350	0.097
375	0.104
400	0.111
425	0.118
450	0.125
475	0.132
500	0.139

Solution:

- Use Table 2 to find runoff per m^2 (Q_1) for prescribed rainfall event: I = 125mm/h, Q_1 = 0.035L/s/m^2
- Calculate maximum runoff per linear metre (Q_2) of pavement (5m wide): Q_2 = 0.035 x 5 = 0.175L/s/m
- Select a desired pit spacing: start with, say, 5m…
- Calculate total runoff (Q_{Tot}) for selected pit spacing: Q_{Tot} = 5 x 0.175 = 0.875L/s
- Use Table 1 to find maximum flowrate for 50mm head and 8m spacing: Q_{max} = 1.02L/s
- Is $Q_{Tot} \leq Q_{max}$? If yes, then design OK, otherwise try another spacing.
- In this case, 0.875 < 1.02, 5m pit spacing design OK!

Example 2

Design the pit spacing for the 100 Series CD to satisfactorily drain the 5m wide footpath shown below during a 1 in 2-year, 15 min storm in Melbourne ($^{2}I_{15min}$ = 41 mm/h). The maximum allowable ponding level at the slot drain is 30mm.



Solution:

- Use Table 2 to find runoff per m^2 (Q_1) for rainfall event: I = 41mm/h (use 50mm/h), Q_1 = 0.014L/s/m^2
- Calculate maximum runoff per linear metre (Q_2) of pavement (2m wide): Q_2 = 0.014 x 2 = 0.028L/s/m
- Select a desired pit spacing: start with, say, 14m…
- Calculate total runoff (Q_{Tot}) for selected pit spacing: Q_{Tot} = 14 x 0.028 = 0.392L/s
- Use Table 1 to find maximum flowrate for 30mm head and 14m pit spacing: Q_{max} = 0.31L/s
- In this case, 0.392L/s is not less than 0.31L/s, so we have to change spacing.
- From Table 1, 30mm head with 11m pit spacing = 0.40L/s.
- Therefore, use 11m pit spacing for this design.