Stepstone, Inc.
Precast Solutions Since 1963
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FULL-SCALE TEST DESIGNED TO EVALUATE WATER INFILTRATION THROUGH 3/16" PERMEABLE JOINT

Test Method

This test is a modification on ASTM C1781, the standard test method for surface infiltration rate of permeable unit pavement systems. The modification calls for use of a joint between pavers to be filled with 3⁄16 inch aggregate. Water will be concentrated in a plastic container with an 11½ inch inner diameter so the rate can be determined as how many inches of water pass through the joint space in a given time.

Product Description

Two products were used for the test described. The first test was performed on CalArc Pavers while the second test was performed on CalArc Narrow Modular Pavers. All pavers are manufactured by Stepstone, Inc. in Gardena, California. These high quality concrete pavers are manufactured in three standard sizes, utilizing High Early Type-III Portland Cement, resulting in a hard rock concrete with a compressive strength of 5,000 PSI. The pavers can be used in both commercial and residential applications.

Description of Setup Prior to Testing The first layout consisted of four 23⅞" X 23⅞" X 2" pavers with aligned joints. The second layout consisted of eighteen 2⅞" X 8⅞" X 4" pavers in a staggered pattern so that each line of pavers was offset by half of the paver's length. The sub-base material was setup by Smith-Emery Laboratories in conjunction with Interlocking Concrete Pavement Institute (ICPI) guidelines for permeable paving systems. The joints were filled with 3⁄16 inch aggregate to insure the spacing would be consistent and allow for voids for water to flow through. See photos to right.

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Procedure for Test

The plastic containers were placed on the center of each layout and sealed around the rim to make sure that the water was only able to escape through the 3⁄16 inch joint space. As suggested by ASTM C1781, 40 pounds of water was poured into each layout and the amount of time needed for this water to drain was tracked using a stopwatch. See photos below.

Results and Conclusions

As shown in Table #1 and Table #2, the permeability of a particular layout depends greatly on the number of total joints and the overall joint volume. Increasing the number of joints will allow for water to infiltrate faster. It is important to note that the results are consistent for three tests on each layout. Therefore, it can be concluded that as long as the sub-base and base materials are able to contain or reroute the water flow, a clean permeable joint will maintain this infiltration rate.

23 7⁄8" x 23 7⁄8" x 2"			
Test #	Elasped Time (Seconds)	Infiltration Rate	
		Inch/Hour	Inch/Minute
1	43.95	873	15
2	42.38	905	15
3	40.08	957	16

8 7⁄8" x 2 7⁄8" x 4"			
Test #	Elasped Time (Seconds)	Infiltration Rate	
		Inch/Hour	Inch/Minute
1	21.83	1758	29
2	21.96	1747	29
3	22.48	1707	28