OTS
Manufacturing & Supply, Inc.

TECHNICAL BULLETIN #4
RESILIENT PLAYGROUND SURFACING SYSTEMS
Permeability - Drainage Capacity

Sport and recreational surfacing can be constructed with either non-permeable or permeable characteristics. The permeability is altered by choice of materials and installation techniques that are adaptable in the field.

Most Pour-in-place playground surfaces are permeable, allowing rain water to pass through it; this helps to control runoff, to be self cleansing to a certain degree, and to allow the area to be used immediately after a rainfall. Non-permeable surfaces are frequently chosen for water-play areas or food service play courts, where the need for sanitation control by regular cleaning is very high.

The most recognized test for permeability is ASTM F1551-03. This test is directed toward synthetic turf products but is sometimes used to describe the characteristics of bound rubber particles used for play surfaces. While synthetic turf is produced in quality controlled factory conditions, poured-in-place rubber surfaces are field installed and are usually variable in surface texture and porosity. The variables are granule size and sieve distribution, thickness and density of the wearing surface, quantity and type of polyurethane binder used, and the cleanliness of the surface.

The following protocol was set to determine the range of results of a typical playground pour-in-place surfacing system using OTS BTR™ binders and EPDM rubber granules of 1-3.5mm as a wearing surface over a base of SBR buffings.

Test Method: ASTM F1551-03: Standard Test for the Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials. Reference also Din18035, Part 6.

Test Equipment:

Tube: 10.00” ID
Tube Flow Head: 2 Gallons
Tube Index Mark: 15.24cm / 6 inches

Test Sampling:

(6) EPDM Wearing Cap @ 12.5mm thick (½”)
Individual weights noted below
System Thickness 3.75”
Conditioning before test: 70F @ 65% RH

Test Procedure: The Tube was sealed to an 18” x 18” specimen with silicone cement to assure that the water would drain only through the cap. The water filled tube was filled into the tube faster than the specimen could drain until the water level reached the Index point. The elapsed time was measured in seconds from the time the water level reached the index point until it drained to the specimen surface. The procedure was repeated four times, with the first time being the conditioning pass and three times being timed. The test data values represent the drainage rates for the system and do not take into account the type of sub-base on which the surface might be laid (i.e., crushed stone, asphalt, concrete or similar.)

Results:

Specimen #	Weight of Sample	Water flow /sec	Gal/min/sy	Rainfall Capacity
1	2.73# SF	111/115/119//115		
2	2.70# SF	110/116/118//114		
3	2.69# SF	109/112/116//112		
4	2.71# SF	110/116/121//115		
5	2.81# SF	122/124/126//124		
6	2.72# SF	114/119/121//118		
		Average 115	**17**	**52 inches / hr**

Tests Performed by R. D. Wilson, OTS Company.

Comment: The theoretical rainfall capacity of a PIP surface will vary, depending upon the nature of the rubber / PU matrix that creates the open voids through which the water will pass. In field tests of aged surfaces, it is noted that the rainfall capacity of the surface will naturally decline if the voids become filled with silt, sand or debris.

It was concluded that except in extremely unusual conditions and circumstances, a standard industry PIP surface remained very permeable over time, though certainly not to the original tested flow rates. Further, the rainfall capacity of any PIP surface is more related to the capability of the sub-base to carry the surface discharge at a rate equal to the flow of water through the PIP system. These observations are not necessarily based on recorded data, but a combination of field tests and practical observation.

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