PERFORMANCE TEST REPORT

Rendered to:

HANOVER ARCHITECTURAL PRODUCTS

PRODUCT: Various Pavers

Report No.: F2822.01-106-31
Report Date: 03/22/16
Test Record Retention Date: 03/07/20
PERFORMANCE TEST REPORT

Rendered to:

HANOVER ARCHITECTURAL PRODUCTS
5000 Hanover Road
Hanover, Pennsylvania 17331

Report No.: F2822.01-106-31
Test Start Date: 02/17/16
Test Completion Date: 03/07/16
Report Date: 03/22/16
Test Record Retention Date: 03/07/20

Product: Various Pavers

Project Summary: Architectural Testing, Inc., an Intertek company ("Intertek-ATI"), was contracted by Hanover Architectural Products to evaluate the wet surface friction of the Natural Prest Brick, Tudor Prest Brick, Ground Prest Brick, Ground Tudor Asphalt Paver, Ground Asphalt Paver, Tudor Prest Paver, F13 Prest Paver, Ground Prest Paver, and the Diamond Prest Paver. Three, nominally 6 in. square pieces of each paver were received by Intertek-ATI directly from Hanover Architectural Products. The specimens were analyzed for any cracking or other negative effects and then immediately shipped out to Safety Direct America in California to have testing performed.

<table>
<thead>
<tr>
<th>Specimen Identification</th>
<th>Average Wet DCOF</th>
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<tbody>
<tr>
<td>Natural Prest Brick</td>
<td>0.74</td>
</tr>
<tr>
<td>Tudor Prest Brick</td>
<td>0.75</td>
</tr>
<tr>
<td>Ground Prest Brick</td>
<td>0.67</td>
</tr>
<tr>
<td>Ground Tudor Asphalt Paver</td>
<td>0.72</td>
</tr>
<tr>
<td>Ground Asphalt Paver</td>
<td>0.67</td>
</tr>
<tr>
<td>Tudor Prest Paver</td>
<td>0.73</td>
</tr>
<tr>
<td>F13 Prest Paver</td>
<td>0.73</td>
</tr>
<tr>
<td>Ground Prest Paver</td>
<td>0.76</td>
</tr>
<tr>
<td>Diamond Prest Paver</td>
<td>0.70</td>
</tr>
</tbody>
</table>

Reference the Sotter Engineering Corporation Report (Test no: 1603-0222) in Appendix A.
Intertek-ATI will service this report for the entire test record retention period. Test records that are retained such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation will be retained by Intertek-ATI for the entire test record retention period.

Results obtained are tested values and were secured using the designated test methods. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen tested. This report may not be reproduced, except in full, without the written approval of Intertek-ATI.

For INTERTEK-ATI:

Digitally Signed by: Joseph R. Descheemaeker
Joseph R. Descheemaeker
Technician
Components / Materials Testing

Digitally Signed by: Dawn M. Chaney
Dawn M. Chaney
Technician Team Lead
Components / Materials Testing

JRD:dmc/kf

Attachments (pages) This report is complete only when all attachments listed are included.
Appendix A - Sotter Engineering Corporation Test Report (Test no: 1603-0222) (3)
## Revision Log

<table>
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<th>Date</th>
<th>Page(s)</th>
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<td>0</td>
<td>03/22/16</td>
<td>N/A</td>
<td>Original report issue</td>
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This report produced from controlled document template ATI 00233, revised 09/11/15.
APPENDIX A

Sotter Engineering Corporation Test Report
(Test No: 1603-0222)
Flooring Slip Resistance Test Results

Client: Architectural Testing, Inc.  
Report date: 3/2/16

Flooring: Various brick and paver samples – Ref: F2822.01-106-31  
Page 1 of 3  
Test no.: 1603-0222  
Date tested: 3/1/16 & 3/2/16

ANSI A137.1 Dynamic Coefficient of Friction Test

The American National Standards Institute (ANSI) published the A137.1-2012 American National Standard test for measuring dynamic coefficient of friction (DCOF) of common hard-surface indoor level floor materials in 2012. This ANSI standard has been incorporated as a requirement in “Section 2103.6 Ceramic Tile” of the 2012 International Building Code published by the International Code Council. That section states that “Ceramic tile shall be defined in, and shall conform to the requirements of, ANSI A137.1.”

Average Dynamic Coefficient of Friction (DCOF), as received, and tested with BOT-3000E digital tribometer using SBR rubber slider and 0.05% SLS water solution:

**Natural Prest Brick:**

- Sample #1 Wet: 0.76, 0.73, 0.83, 0.77; Avg. = 0.77
- Sample #2 Wet: 0.72, 0.62, 0.77, 0.79; Avg. = 0.73
- Sample #3 Wet: 0.75, 0.62, 0.74, 0.82; Avg. = 0.73

**Overall average: Wet: 0.74**

T = 71 degrees F; Relative humidity = 34%; BOT recalibration due May 5, 2016
BOT-3000E strain gauge verified on day of test. Reference tile before/after results: passed/passed

**Tudor Prest Brick:**

- Sample #1 Wet: 0.83, 0.83, 0.79, 0.76; Avg. = 0.80
- Sample #2 Wet: 0.72, 0.68, 0.76, 0.71; Avg. = 0.72
- Sample #3 Wet: 0.73, 0.77, 0.75, 0.68; Avg. = 0.73

**Overall average: Wet: 0.75**

T = 70 degrees F; Relative humidity = 35%; BOT recalibration due May 5, 2016
BOT-3000E strain gauge verified on day of test. Reference tile before/after results: passed/passed

**Ground Prest Brick:**

- Sample #1 Wet: 0.65, 0.69, 0.67, 0.67; Avg. = 0.67
- Sample #2 Wet: 0.66, 0.66, 0.67, 0.69; Avg. = 0.67
- Sample #3 Wet: 0.64, 0.66, 0.66, 0.69; Avg. = 0.66

**Overall average: Wet: 0.67**

T = 69 degrees F; Relative humidity = 37%; BOT recalibration due May 5, 2016
BOT-3000E strain gauge verified on day of test. Reference tile before/after results: passed/passed

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Average Dynamic Coefficient of Friction (DCOF), as received, and tested with BOT-3000E digital tribometer using SBR rubber slider and 0.05% SLS water solution:

Ground Tudor Asphalt Paver:
Sample #1 Wet: 0.70, 0.71, 0.69, 0.70; Avg. = 0.70
Sample #2 Wet: 0.71, 0.74, 0.71, 0.70; Avg. = 0.72
Sample #3 Wet: 0.74, 0.73, 0.71, 0.72; Avg. = 0.73
Overall average: Wet: 0.72
T = 69 degrees F; Relative humidity = 38%; BOT recalibration due May 5, 2016
BOT-3000E strain gauge verified on day of test. Reference tile before/after results: passed/passed

Ground Asphalt Paver:
Sample #1 Wet: 0.64, 0.64, 0.67, 0.70; Avg. = 0.66
Sample #2 Wet: 0.63, 0.62, 0.68, 0.70; Avg. = 0.66
Sample #3 Wet: 0.67, 0.68, 0.69, 0.68; Avg. = 0.68
Overall average: Wet: 0.67
T = 68 degrees F; Relative humidity = 39%; BOT recalibration due May 5, 2016
BOT-3000E strain gauge verified on day of test. Reference tile before/after results: passed/passed

Tudor Prest Paver:
Sample #1 Wet: 0.74, 0.73, 0.74, 0.72; Avg. = 0.73
Sample #2 Wet: 0.75, 0.72, 0.73, 0.69; Avg. = 0.72
Sample #3 Wet: 0.72, 0.73, 0.73, 0.73; Avg. = 0.73
Overall average: Wet: 0.73
T = 71 degrees F; Relative humidity = 33%; BOT recalibration due May 5, 2016
BOT-3000E strain gauge verified on day of test. Reference tile before/after results: passed/passed

F13 Prest Paver:
Sample #1 Wet: 0.72, 0.72, 0.75, 0.74; Avg. = 0.73
Sample #2 Wet: 0.74, 0.72, 0.71, 0.73; Avg. = 0.73
Sample #3 Wet: 0.72, 0.71, 0.73, 0.72; Avg. = 0.72
Overall average: Wet: 0.73
T = 71 degrees F; Relative humidity = 33%; BOT recalibration due May 5, 2016
BOT-3000E strain gauge verified on day of test. Reference tile before/after results: passed/passed

Ground Prest Paver:
Sample #1 Wet: 0.73, 0.72, 0.75, 0.75; Avg. = 0.74
Sample #2 Wet: 0.78, 0.78, 0.76, 0.75; Avg. = 0.77
Sample #3 Wet: 0.72, 0.73, 0.80, 0.79; Avg. = 0.76
Overall average: Wet: 0.76
T = 71 degrees F; Relative humidity = 32%; BOT recalibration due May 5, 2016
BOT-3000E strain gauge verified on day of test. Reference tile before/after results: passed/passed

Diamond Prest Paver:
Sample #1 Wet: 0.69, 0.68, 0.76, 0.73; Avg. = 0.72
Sample #2 Wet: 0.71, 0.71, 0.70, 0.69; Avg. = 0.70
Sample #3 Wet: 0.68, 0.71, 0.66, 0.66; Avg. = 0.68
Overall average: Wet: 0.70
T = 71 degrees F; Relative humidity = 32%; BOT recalibration due May 5, 2016
BOT-3000E strain gauge verified on day of test. Reference tile before/after results: passed/passed

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High dynamic coefficient of friction values indicate potentially good traction. The ANSI A137.1 standard, Section 6.2.2.1.10, states that

"Unless otherwise specified, tiles suitable for level interior spaces expected to be walked upon wet shall have a wet DCOF of 0.42 or greater when tested using SLS solution as per the procedure in Section 9.6.1. However, tiles with a DCOF of 0.42 or greater are not necessarily suitable for all projects. The specifier shall determine tiles appropriate for specific project conditions, considering by way of example, but not in limitation,

- type of use,
- traffic,
- expected contaminants,
- expected maintenance,
- expected wear, and
- manufacturers’ guidelines and recommendations.

"... The presence on installed tiles of water, oil, grease, and/or any other elements which reduce traction, creates slippery conditions ... Tile installations with exposure to such elements require extra caution in product selection, use, and maintenance. ... When tested using SLS solution as per the procedure in Section 9.6.1, tiles with a wet DCOF of less than 0.42 shall only be installed when the surface will be kept dry when walked upon and proper safety procedures will be followed when cleaning the tiles."

This standard has no recommendations for outdoor floors or for ramps.

Respectfully submitted,
SOTTER ENGINEERING CORPORATION

J. George Sotter, P.E., Ph.D.
President

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