



December 29, 2017

Mr. Clint Shimon
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**Evaluation of Stain Resistance of Ceramic Tile Grout in General Accordance with
CTI-T-72 Stain Test Method
CTLGroup Project No. 391642**

Dear Mr. Shimon:

As requested, stain resistance testing of ceramic tile grout was conducted at CTLGroup in general accordance with CTI-T-72 stain test method¹. The test method is provided by the Ceramic Tile Institute of America, Inc. You submitted one sanded grout product that was used for the stain resistance test. The grout product for evaluation was identified as Hydroment® Vivid™ - Bostik (Bright White). Tile boards were provided by you, and stain testing was performed at CTLGroup on December 26, 2017, under your surveillance and direction.

On November 28, 2017, CTLGroup prepared and applied the grout product to two tile boards as duplicate specimens at CTLGroup according to the manufacturer's recommended instructions and your surveillance. No sealers were applied to the exposed surfaces of the grout. The fabrication procedure is detailed in Table 1.

Table 1. Fabrication Procedure of Test Specimens

Fabrication Procedure	
1.	Weigh liquid and dry component materials.
2.	Add the dry mix to the mixing liquid in a small, clean bucket.
3.	Use drill and paddle to mix thoroughly for approximately two minutes until material is consistent.
4.	Stop mixing and scrape down the sides and bottom of the bucket.
5.	Allow grout mixture to slake for approximately three minutes.
6.	Re-mix the grout briefly with drill and paddle for approximately 30 seconds.
7.	Apply the grout mixture to tile board using a hard rubber float.
8.	Allow tile grout board to set for 20 minutes.
9.	Carefully remove excess grout from the board using a soft wet sponge without disturbing grout lines.
10.	Allow tile grout board to cure in laboratory air [72 °F and 50% RH] for 28 days.

¹ CTI-T-72 is a test method to determine the effectiveness of sealers used on porous tile or stone surfaces. Per the client's request, the test method was modified to evaluate the product's stain resistance. <http://ctioa.org/wp-content/uploads/2016/10/fr91.pdf>


As instructed, liquid stains were applied to the grout surfaces after the grout had cured for 28 days in laboratory air (73±°F and 50% RH). The staining liquids used for this study consisted of cola, coffee, mustard, vegetable oil, Worcestershire sauce, red wine, blue sport's drink, ketchup, and red cough syrup. Each staining liquid was applied to a separate location of the test specimen. The staining liquid remained on the tile surface for 30 minutes.

After 30 minutes, each tile grout specimen was patted dry with a paper towel to remove excess surface staining solutions, and then rinsed under warm water. Next, each sample was cleaned with a white nylon scrub pad and ten (10) scrubs using moderate force (one (1) scrub is back and forth once). The specimen was allowed to dry in ambient conditions for 24 hours before the degree of staining was assessed.

The degree of staining is expressed as a numeric scale from 0 to 5, with 0 indicating no stain and 5 indicating a heavy stain. A legend of the location for each staining product is provided in the figure and table below.

Table 2. Stain Legend

Location	Stain Liquid
1	Cola
2	Coffee
3	Mustard
4	Oil
5	Worcestershire Sauce
6	Red Wine
7	Blue Sport's Drink
8	Ketchup
9	Cough syrup



The degree of staining for the specimens prepared with Hydroment® Vivid™ - Bostik (Bright White) was zero for all staining liquids except for Worcestershire Sauce which had a degree of staining of 1. It is worth noting that the grout was very soft, and a superficial layer of the material came off when scrubbing the grout lines under running water, which could explain why almost no stains were observed. Additionally, the grout presented shrinkage cracks that developed between 24 and 48 hours of curing. Individual results for each sanded grout specimen and photos are provided in APPENDIX A.

We appreciate the opportunity to conduct specialized testing for you. Should you have any questions, please contact us.

Sincerely,



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Table 1. Stain Results for Hydroment® Vivid™ - Bostik (Bright White) after 28 day cure (Specimen 1)

Stain Location	Stain Material	Degree of Staining
1	Cola	0
2	Coffee	0
3	Mustard	0
4	Oil	0
5	Worcestershire Sauce	1
6	Red Wine	0
7	Blue Sports Drink	0
8	Ketchup	0
9	Cough Syrup	0



Figure 1. Specimen 1 of Hydroment® Vivid™ - Bostik (Bright White) before stain application



Figure 2. Specimen 1 of Hydroment® Vivid™ - Bostik (Bright White) during stain application



Figure 3. Specimen 1 of Hydroment® Vivid™ - Bostik (Bright White) after washing

Table 2. Stain Results for Hydroment® Vivid™ - Bostik (Bright White) after 28 day cure (Specimen 2)

Stain Location	Stain Material	Degree of Staining
1	Cola	0
2	Coffee	0
3	Mustard	0
4	Oil	0
5	Worcestershire Sauce	1
6	Red Wine	0
7	Blue Sports Drink	0
8	Ketchup	0
9	Cough Syrup	0



Figure 4. Specimen 2 of Hydroment® Vivid™ - Bostik (Bright White) before stain application



Figure 5. Specimen 2 of Hydroment® Vivid™ - Bostik (Bright White) during stain application

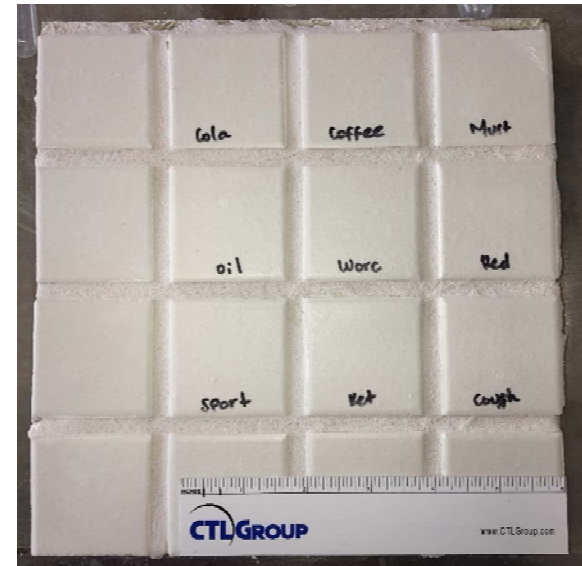


Figure 6. Specimen 2 of Hydroment® Vivid™ - Bostik (Bright White) after washing



Figure 7 Detail of softened grout product after washing with water.