



May 23, 2017

Mr. Clint Shimon
H.B. Fuller Construction Products Inc.
1105 South Frontenac Street.
Aurora, IL 60504
e: clint.shimon@hbfuller.com
p. 630.862.2544

**Evaluation of Stain Resistance of Ceramic Tile Grout in General Accordance with
CTI-T-72 Stain Test Method
CTLGroup Project No. 391502**

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 four different sanded grout products that were used for stain resistance comparisons. The grout products for evaluation were identified as LATICRETE™ PERMACOLOR® Select (Bright White), Mapei™ Ultracolor® Plus FA (Avalanche), Prism® Color Consistent Grout (Bright White), and TEC® Power Grout® (Bright White). Stain testing was performed at CTLGroup on November 21, 2016, and on January 10, 2017 under your surveillance and direction.

CTLGroup prepared test specimens by applying grout products to tile boards provided by you. Each grout product was prepared according to each manufacturer’s recommended instructions. CTLGroup prepared one test specimen for LATICRETE™ PERMACOLOR® Select (Bright White), Mapei™ Ultracolor® Plus FA (Avalanche), and Prism® Color Consistent Grout (Bright White). Three test specimens were prepared for TEC® Power Grout® (Bright White). 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.

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>

- | |
|---|
| 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. |


Per your request, liquid stains were applied to the grout surfaces after the specimens were 28 days old. 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 and remained there 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 Mapei™ Ultracolor® Plus FA (Avalanche) was zero for all staining liquids except for red wine which had a degree of staining of 1. For TEC® Power Grout® (Bright White) the degree of staining was zero for all staining liquids except for oil and red wine which both had a degree of staining of 1.

The specimens prepared with LATICRETE™ PERMACOLOR® Select (Bright White), and Prism® Color Consistent Grout (Bright White) presented degrees of staining from zero to three

for various liquids. Individual results for each sanded grout 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,



Joni L. Jones, PE (IL)
Senior Engineer
Materials Laboratory Services
847-972-3128
JLJones@CTLGroup.com



Catalina Arboleda, EIT
Materials Laboratory Services
847-972-3122
CArboleda@CTLGroup.com

Table 1. Stain Results for LATICRETE™ PERMACOLOR® Select (Bright White) after 24 Hours Drying

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



Stain Results for LATICRETE™ PERMACOLOR® Select (Bright White)

Table 2. Stain Results for Mapei™ Ultracolor® Plus FA (Avalanche) after 24 Hours Drying

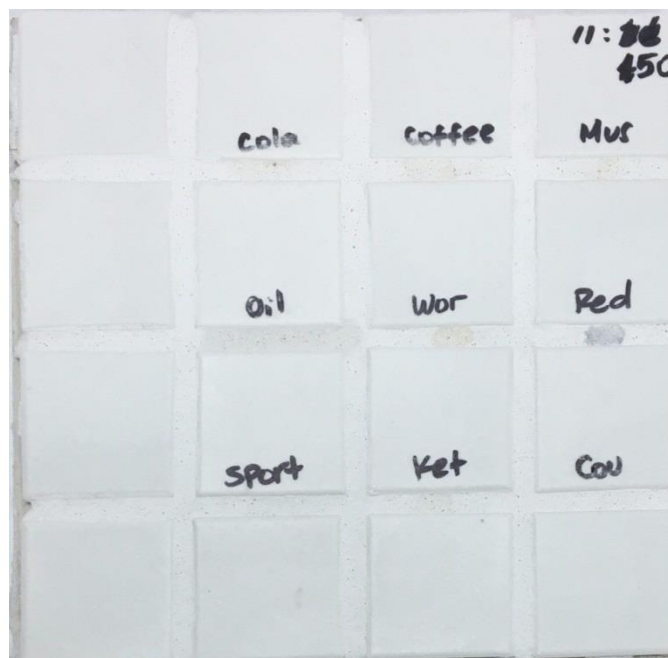
Stain Location	Stain Material	Degree of Staining
1	Cola	0
2	Coffee	0
3	Mustard	0
4	Oil	0
5	Worcestershire Sauce	0
6	Red Wine	1
7	Blue Sports Drink	0
8	Catsup	0
9	Cough Syrup	0



Stain Results for Mapei™ Ultracolor® Plus FA (Avalanche)

Table 3. Stain Results for Prism® Color Consistent Grout (Bright White) after 24 Hours Drying

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



Stain Results for Prism® Color Consistent Grout (Bright White)

Table 4 Stain Results for TEC® specimen before application of staining products after 24 Hours Drying

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



Stain Results for TEC® Power Grout®
 (Bright White) – Sample 1



Stain Results for TEC® Power Grout®
 (Bright White) – Sample 2



Stain Results for TEC® Power Grout®
 (Bright White) – Sample 3