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**Stain Resistance of Mapei Keracolor™ S Grout Using Grout Additives
H.B. Fuller Construction Products Inc. Grout Boost® vs. Mapei Grout Maximizer™
CTLGroup Project No. 401743; Work Request No. 28252
Revision 3**

Dear Mr. Mahmood:

Attached are the final test results of Mapei Keracolor™ S grout stain testing performed at CTLGroup on April 18, 2011 on behalf of H.B. Fuller Construction Products Inc. The objective of this work was to evaluate the stain resistance of Mapei Keracolor™ S grout prepared with H.B. Fuller Construction Products Inc. Grout Boost® additive versus those prepared with Mapei Grout Maximizer™ additive.

On April 8, 2011, two tile grout boards were fabricated at CTLGroup's laboratory in Skokie, Illinois according to the manufacturer's recommended instructions with equipment and materials¹ you provided. One tile grout specimen was fabricated using Mapei Keracolor S Grout with H.B. Fuller Construction Products Inc. Grout Boost additive. The other tile grout specimen was fabricated with Mapei Keracolor S Grout with Mapei Grout Maximizer additive. No sealers were applied to the exposed surfaces of the grout. The fabrication procedure is detailed in Table 1.

Table 1. Fabrication Procedure of Tile Grout Specimens

1. Weigh liquid and dry component materials.
2. Mix components in a small, clean bucket.
3. Use drill and paddle to thoroughly mix for approximately two minutes until material is consistent.
4. Allow grout mixture to slake for approximately ten minutes.
5. Re-mix the grout briefly with drill and paddle.
6. Apply the grout mixture to tile boards using a hard rubber float.
7. Allow tile grout boards to rest for 20-30 minutes.
8. Carefully remove excess grout from tile grout boards using a soft wet sponge without disturbing grout lines.
9. Allow tile grout boards to cure in laboratory air for 10 days.

¹ Mapei Keracolor S grout lot no. J04C1108, Grout Boost lot no. 8201117121, Grout Maximizer lot no. J06G002

As instructed, the tile grout specimens were tested after the specified curing period (10 days) according to a modified CTI T-72 test method². The test method was modified for the evaluation of tile grouts.

The staining materials used for this study consisted of cola, coffee, mustard, soy oil, Worcestershire sauce, red wine, Gatorade®, catsup, and soy sauce. Each staining material was applied to a separate location of the test specimen and remained there for a period of 30 minutes. Each tile grout specimen was then rinsed under warm water and cleaned with a nylon scrubber for up to 5 minutes. Scrubbing with moderate force continued at each stain location until no change in the stain could be observed. The specimens were then allowed to dry in ambient conditions for 24 hours before the degree of staining was assessed.

Test results are presented in Table 1. The degree of staining is reported in terms of a numeric scale from 0 to 5, with 0 indicating no stain and 5 indicating a heavy stain. A legend showing the location of each staining material is given in Figure 1. It was observed that the vegetable oil remained beaded on the grout prepared with Mapei Grout Maximizer up to 30 minutes after application. Similarly, vegetable oil applied to grout prepared with HB Fuller Construction Products, Inc. Grout Boost also remained beaded for the duration of testing. Photographs of the tile grout specimens 5 minutes and 30 minutes after application of staining materials are given in Figures 2 through 5. Photographs after the 24-hour dry period are given in Figures 6 and 7.

Table 2. Stain Results after 24 Hours Drying

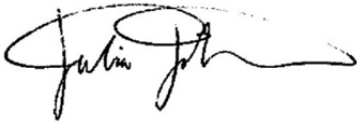
Stain Location	Stain Material	Degree of Staining after 24 Hours	
		Mapei with Grout Boost	Mapei with Grout Maximizer
1	Cola	0	3
2	Coffee	0	5
3	Mustard	0	3
4	Vegetable Oil	0	0
5	Worcestershire Sauce	1	5
6	Red Wine	0	3
7	Gatorade®	0	4
8	Catsup	0	0
9	Soy Sauce	0	1

² <http://www.ctioa.org/reports/fr91.html>

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

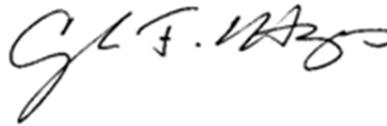
Sincerely,

CTLGroup
An AASHTO Accredited Laboratory – Aggregates, Cement & Concrete



Julia Johnson
Associate II
Materials Laboratory Services

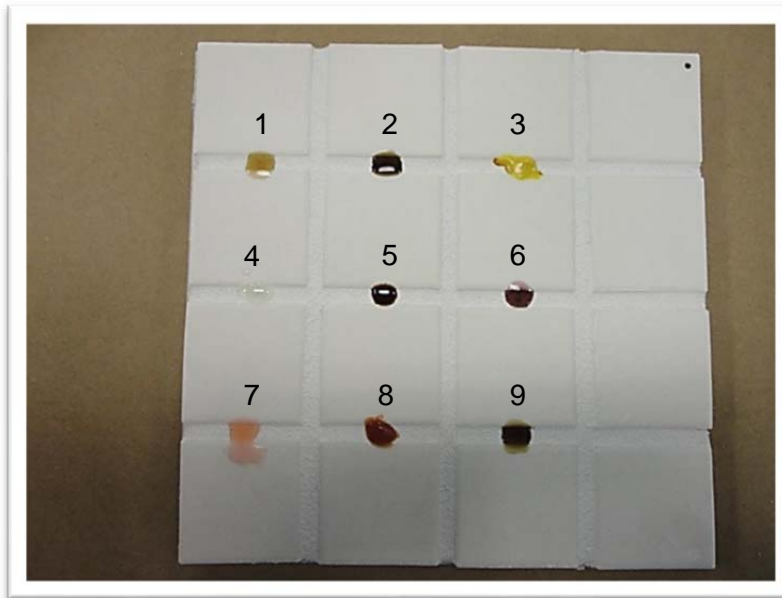
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Attachments



Stain Location	Stain Material
1	Cola
2	Coffee
3	Mustard
4	Vegetable Oil
5	Worcestershire Sauce
6	Red Wine
7	Gatorade®
8	Catsup
9	Soy Sauce

Figure 1. Legend of staining materials



Figure 2. Mapei Keracolor S Grout prepared with Grout Boost 5 minutes after application of staining agents



Figure 3. Mapei Keracolor S Grout prepared with Grout Boost 30 minutes after application of staining agents

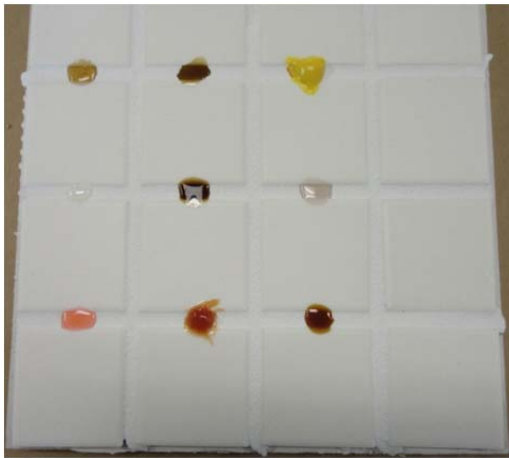


Figure 4. Mapei Keracolor S Grout prepared with Grout Maximizer 5 minutes after application of staining agents

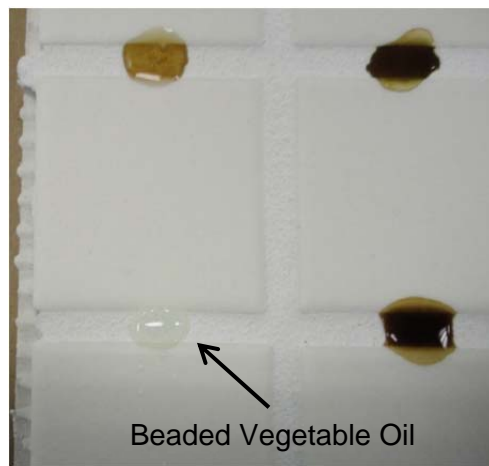


Figure 5. Mapei Keracolor S Grout prepared with Grout Maximizer 30 Minutes after application of staining agents



Figure 6. Appearance of tile board prepared with H.B. Fuller Construction Products Inc. Grout Boost 24 hours after removal of staining agents with warm water



Figure 7. Appearance of tile board prepared with Mapei Grout Maximizer 24 hours after removal of staining agents with warm water