



January 12, 2017

Mr. Clint Shimon
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**Efflorescence Potential of Ceramic Tile Grout.
CTLGroup Project No. 391502**

Dear Mr. Shimon:

Four different sanded grout products were submitted by H.B. Fuller for potential efflorescence comparison tests. The grout products for evaluation were identified as Mapei™ Ultracolor® Plus FA (Mahogany), LATICRETE™ PERMACOLOR® Select (Espresso), Prism® Color Consistent Grout (Sable Brown), and TEC® Power Grout® (Espresso). Visual observations of any presence of efflorescence were recorded at different times of curing: 3 days, 7 days, and 28 days. Fabrication and testing of the specimens were performed at CTLGroup in a controlled environment of 73±3°F and 50±5% RH under your surveillance and direction.

CTLGroup prepared and applied each grout product to the provided tile boards according to the manufacturer's recommended instructions. For each grout product, three specimens were prepared. 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 the 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 the duration of the test.

As requested, a 2-inch square silicone caulk dam was applied around the center of a grout line as shown in Figure 1. After the silicone had hardened, 2 ml. of deionized water were applied to the specimens at a specified age in the center of the tile within the silicone dam as shown in Figure 2. The water was allowed to pond over the specimens, and any presence of efflorescence was assessed after 24 hours.



Figure 1 Grout sample tile with silicone caulk dam around center



Figure 2 Grout sample specimen after 2 ml of deionized water have been applied in the center of grout lines

No efflorescence was observed on all the specimens prepared with TEC[®] Power Grout[®] (Espresso) at any of the test ages. Prism[®] Color Consistent Grout (Sable Brown) showed some efflorescence at 3 and 7 days, but no efflorescence at 28 days. Mapei[™] Ultracolor[®] Plus FA (Mahogany), and LATICRETE[™] PERMACOLOR[®] Select (Espresso), showed efflorescence at all test ages. Photos of the test results for each sanded grout are presented 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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APPENDIX A



Figure 3. Mapei™ Ultracolor® Plus FA (Mahogany) grout sample before efflorescence emittance test



Figure 4 Mapei™ Ultracolor® Plus FA (Mahogany) grout sample at 3 days of curing during efflorescence emittance test

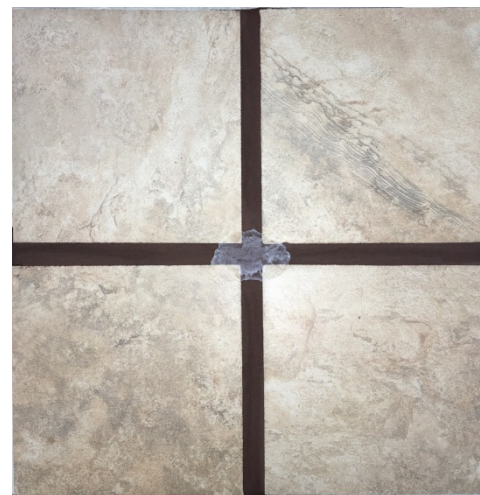


Figure 5 Mapei™ Ultracolor® Plus FA (Mahogany) grout sample at 3 days of curing, 24 hours after application of Deionized Water droplet



Figure 6 Mapei™ Ultracolor® Plus FA (Mahogany) grout sample at 7 days of curing during efflorescence emittance test

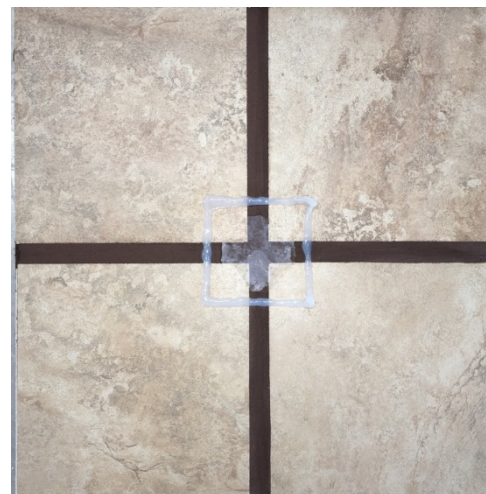


Figure 7 Mapei™ Ultracolor® Plus FA (Mahogany) grout sample at 7 days of curing, 24 hours after application of Deionized Water droplet



Figure 8 Mapei™ Ultracolor® Plus FA (Mahogany) grout sample at 28 days of curing during efflorescence emittance test



Figure 9 Mapei™ Ultracolor® Plus FA (Mahogany) grout sample at 28 days of curing, 24 hours after application of Deionized Water droplet



Figure 10 LATICRETE™ PERMACOLOR® Select (Espresso) grout sample before efflorescence emittance test

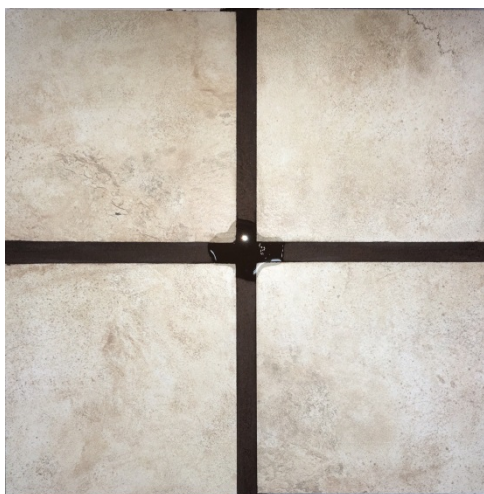


Figure 11 LATICRETE™ PERMACOLOR® Select (Espresso) grout sample at 3 days of curing during efflorescence emittance test



Figure 12 LATICRETE™ PERMACOLOR® Select (Espresso) grout sample at 3 days of curing, 24 hours after application of Deionized Water droplet



Figure 13 LATICRETE™ PERMACOLOR® Select (Espresso) grout sample at 7 days of curing during efflorescence emittance test



Figure 14 LATICRETE™ PERMACOLOR® Select (Espresso) grout sample at 7 days of curing, 24 hours after application of Deionized Water droplet



Figure 15 LATICRETE™ PERMACOLOR® Select (Espresso) grout sample at 28 days of curing during efflorescence emittance test



Figure 16 LATICRETE™ PERMACOLOR® Select (Espresso) grout sample at 28 days of curing, 24 hours after application of Deionized Water droplet

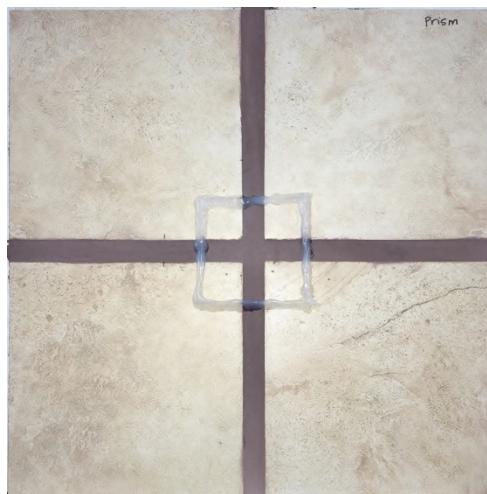


Figure 17 Prism® Color Consistent Grout (Sable Brown) grout sample before efflorescence emittance test



Figure 18 Prism® Color Consistent Grout (Sable Brown) grout sample at 3 days of curing during efflorescence emittance test

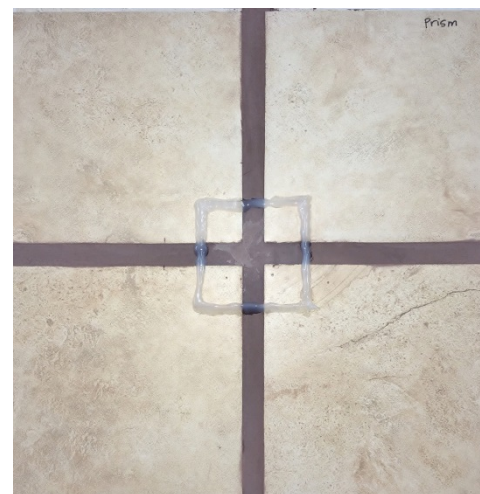


Figure 19 Prism® Color Consistent Grout (Sable Brown) sample at 3 days of curing, 24 hours after application of Deionized Water droplet



Figure 20 Prism® Color Consistent Grout (Sable Brown) grout sample at 7 days of curing during efflorescence emittance test



Figure 21 Prism® Color Consistent Grout (Sable Brown) grout sample at 7 days of curing, 24 hours after application of Deionized Water droplet



Figure 22 Prism® Color Consistent Grout (Sable Brown) grout sample at 28 days of curing during efflorescence emittance test



Figure 23 Prism® Color Consistent Grout (Sable Brown) grout sample at 28 days of curing, 24 hours after application of Deionized Water droplet



Figure 24 TEC® Power Grout® (Espresso) grout sample before efflorescence emittance test



Figure 25 TEC® Power Grout® (Espresso) grout sample at 3 days of curing during efflorescence emittance test



Figure 26 TEC® Power Grout® (Espresso) grout sample at 3 days of curing, 24 hours after application of Deionized Water droplet



Figure 27 TEC® Power Grout® (Espresso) grout sample at 7 days of curing during efflorescence emittance test



Figure 28 TEC® Power Grout® (Espresso) grout sample at 7 days of curing, 24 hours after application of Deionized Water droplet



Figure 25 TEC® Power Grout® (Espresso) grout sample at 28 days of curing during efflorescence emittance test

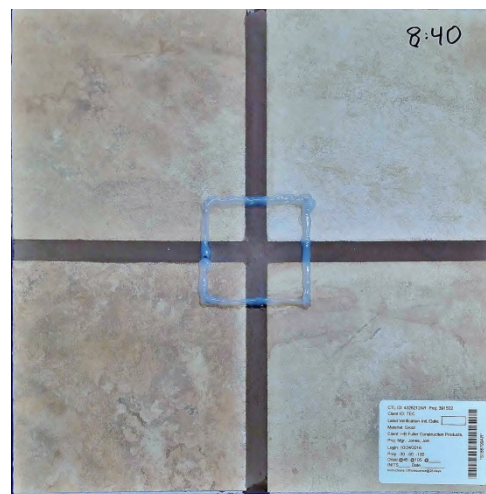


Figure 30 TEC® Power Grout® (Espresso) grout sample at 28 days of curing, 24 hours after application of Deionized Water droplet