



LABORATORY REPORT

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FOR: Bill Reynolds, Product Director, Tate Access Floors
cc: Nick Savage
Guy Mazza
Al Morris

SUBJECT: Tate Access Flooring
Jessup, MD
Visual Color Change, Taber Abrasion, Water Repellency, and Stain Resistance Evaluation

DATE: February 19, 2018
PROJECT: 1801-05 CCV TAB RIL SR

SAMPLES SUBMITTED:

| <u>Sample</u> | <u>Size</u> |
|-------------------------------------|-----------------|
| (8) samples of honed concrete slabs | 12" x 12" x 1¼" |

Submitted by: Bill Reynolds
Product Director
Tate Access Flooring
7510 Montevideo Road
Jessup, MD 20794

PURPOSE OF TEST:

- To determine the effectiveness of Consolideck® LS/CS® in increasing the abrasion resistance of the submitted concrete.
- To determine the effectiveness of appropriate PROSOCO, Inc. treatments in providing water repellency to the submitted concrete.
- To determine if the treatments cause any visual color or sheen enhancement to the submitted concrete.
- To determine the effectiveness of appropriate PROSOCO, Inc. products in preventing food and oil staining on the submitted concrete.

SAMPLE PREPARATION:

Abrasion Resistance

Three of the submitted samples were cut with a wet masonry saw into 4" x 4" x 3/8" test specimen, rinsed, and allowed to dry for 24 hours. Consolideck® LS/CS® was then applied with a microfiber pad in accordance with the PROSOCO, Inc. product data sheet instructions. No buffing or polishing was done on the submitted samples. Taber abrasion testing was conducted approximately 7 days after application of the LS/CS®.

Water Repellency / Stain Resistance / Visual Color or Sheen Enhancement

Two of the submitted samples were each divided into (6) equal sections with a black marker. LS/CS® was then applied to (6) sections in accordance with the product data sheet instructions. One entire sample was left untreated.

The stain and water repellent treatments were applied over the areas treated with LS/CS® one day after application of the LS/CS®. Each stain and water repellent treatment was applied in two applications per the product data sheet instructions. The stain and water repellent treatments were then allowed to cure for at least 3 days prior to testing.

TEST METHODS: Taber Abrasion (ASTM C1803 Standard Guide for Abrasion Resistance of Mortar Surfaces Using a Rotary Platform Abraser)

This test method consists of mounting the test specimen onto a Taber Industries 5135 Abraser and subjecting the specimen to 350 revolutions under H-22 Calibrade abrasive wheels loaded with 1000 gram weights.

The test specimens were weighed to the nearest 0.01 gram before and after the test to determine the weight loss due to abrasion. The weight loss of the treated samples was then compared to the untreated samples to determine if there was any improvement in abrasion resistance imparted by the treatments. The test was performed in laboratory conditions that were approximately 72° F and 34% humidity.

The test was performed on five untreated samples and five treated samples to obtain an average.

TEST RESULTS: Taber Abrasion (ASTM C1803)

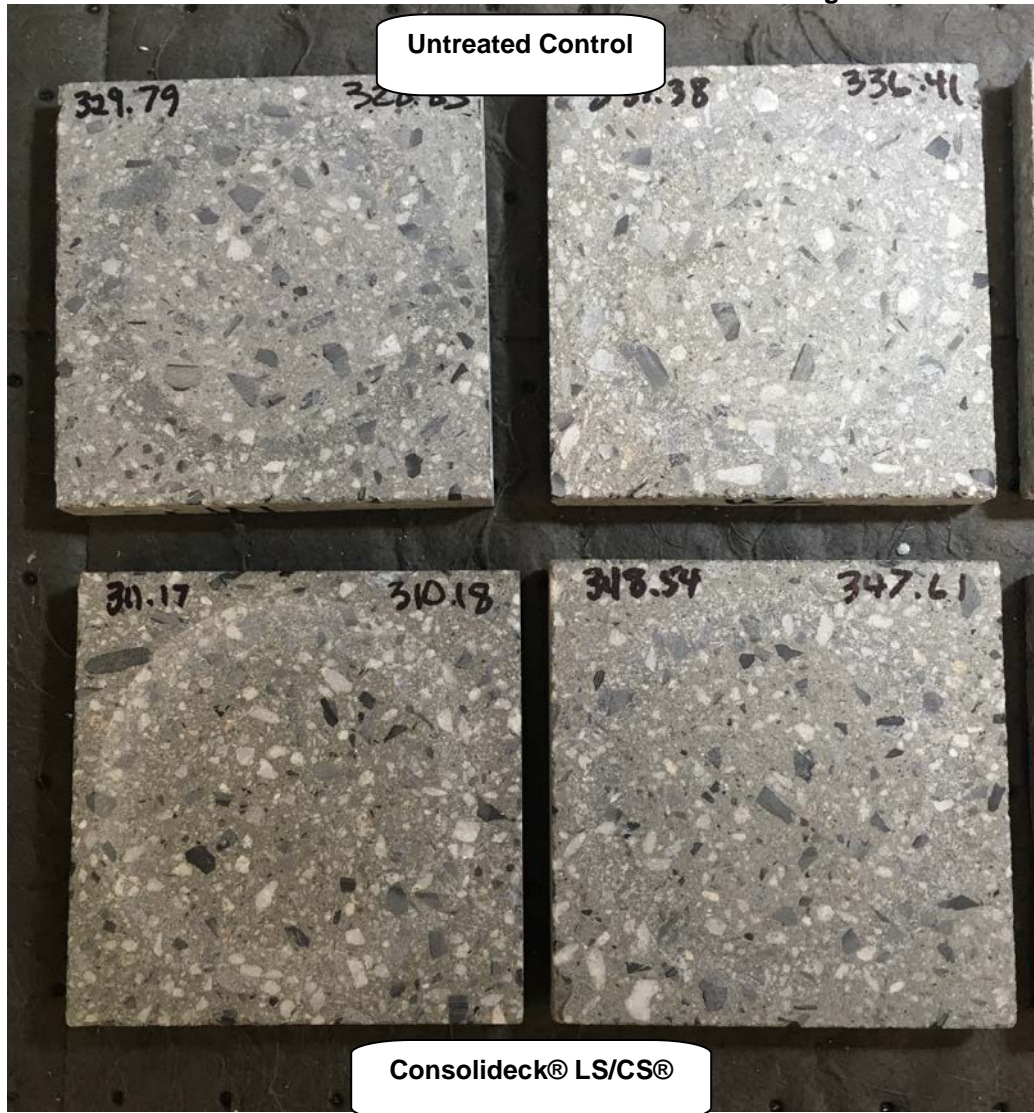
| Sample | Average Grams Lost | % Improvement |
|---------------------|--------------------|---------------|
| Untreated Control | -0.95 g | --- |
| Consolideck® LS/CS® | -1.01 g | Negligible |

TEST CONCLUSIONS: Taber Abrasion (ASTM C1803)

The laboratory test results showed that both the untreated concrete and the concrete treated with LS/CS® lost nearly the same mass during the taber abrasion testing. The testing was likely inconclusive because of the amount and size of the aggregate in the concrete. The abrasion wheels were riding on the aggregate as opposed to the hardened cement paste.

PHOTOGRAPH: Taber Abrasion (ASTM C1803)

Submitted Concrete After Taber Abrasion Testing



Note: This photograph is of two untreated samples and two treated samples; there were ten samples tested for abrasion resistance total.

TEST METHODS: Color / Sheen Enhancement Evaluation

24 hours after application of the treatments, a visual evaluation was made comparing the untreated surfaces to the treated surfaces. The following scale was used to determine the level of color and sheen enhancement the treatments provided:

- Scale:**
- 0** – No Enhancement; Dull
 - 1** – Slight Enhancement
 - 2** – Moderate Enhancement
 - 3** – Significant Enhancement

TEST RESULTS: Color / Sheen Enhancement Evaluation

Submitted Concrete

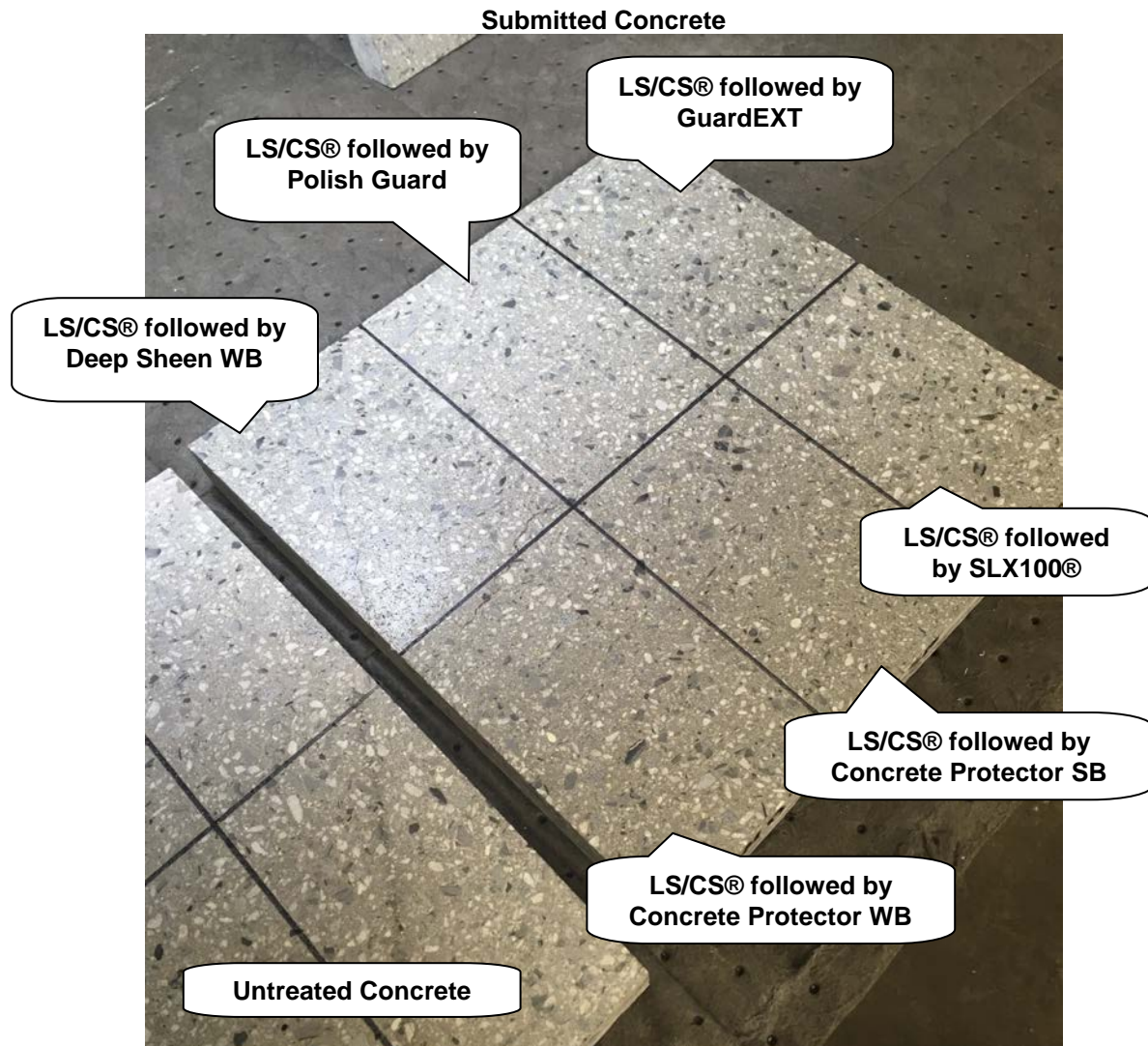
| Treatment | Color Enhancement | Sheen Enhancement |
|--|--------------------------|--------------------------|
| Consolideck® LS/CS® alone | 0 | 0 |
| Consolideck® LS/CS® followed by Consolideck® Concrete Protector WB | 0 | 0 |
| Consolideck® LS/CS® followed by Consolideck® Concrete Protector SB | 0 | 0 |
| Consolideck® LS/CS® followed by Consolideck® GuardEXT | 1 | 2 |
| Consolideck® LS/CS® followed by Consolideck® PolishGuard | 0 | 1 |
| Consolideck® LS/CS® followed by PROSOCO® SLX100® Water & Oil Repellent | 0 | 0 |
| Consolideck® LS/CS® followed by Paver Kare® Deep Sheen WB | 1 | 3 |

CONCLUSIONS: Color / Sheen Enhancement Evaluation

Based on the laboratory tests conducted, Paver Kare® Deep Sheen WB provided the best overall sheen enhancement to the submitted concrete.

The following treatments did not cause any change to the appearance of the concrete: Consolideck® LS/CS® alone, Consolideck® Concrete Protector WB, Consolideck® Concrete Protector SB, and PROSOCO® SLX100® Water & Oil Repellent.

PHOTOGRAPH: Color / Sheen Enhancement Evaluation



Test Methods: Water Repellency

Water Absorption Tube Test: Horizontal RILEM II.4, 5.0 milliliters, 20 minutes

The water absorption tube test simulating wind driven and wind blown rain conditions was performed. Tests were run with 5.0-milliliter head pressures. Filled to 5.0 milliliters, a water absorption tube produces a 104 mph dynamic wind pressure. See RILEM II.4 Tech Note for additional information.

The ranking system used to evaluate the effectiveness of the products applied to each submitted sample is as follows:

AA = "Above Average" correlates to less than or equal to 20% of the maximum untreated absorption.

A = "Average" correlates to less than or equal to 50% of the maximum untreated absorption.

BA = "Below Average" correlates to greater than 50% of the maximum untreated absorption.

EXAMPLE: If RILEM tubes applied to an untreated sample result in loss of 5.0 ml of water or more, then:

A rating of **AA** *Above Average* water repellent performance would be reported for treatments which result in a loss of no more than:

$$5.0 \text{ mL} \times 20\% = \mathbf{1.0 \text{ mL}}$$

A rating of **A** *Average* water repellent performance would be reported for treatments which result in a loss of no more than:

$$5.0 \text{ mL} \times 50\% = \mathbf{2.5 \text{ mL}}$$

A rating of **BA** *Below Average* water repellent performance would be reported for treatments which result in a loss of more than:

$$5.0 \text{ mL} \times 50\% = \mathbf{2.5 \text{ mL}}$$

TEST RESULTS: Water Repellency

Water Absorption Tube Test: Horizontal RILEM II.4, 5.0 milliliters, 20 minutes

AA = Above Average

A = Average

BA = Below Average

Submitted Concrete

| Treatment | Results in mL loss | Ranking |
|---|---------------------------|----------------|
| Untreated Control | -0.2 | -- |
| Consolideck® LS/CS® followed by Consolideck® Concrete Protector WB | -0.1 | <u>A</u> |
| Consolideck® LS/CS® followed by Consolideck® Concrete Protector SB | -0.1 | <u>A</u> |
| Consolideck® LS/CS® followed by Consolideck® GuardEXT | -0.0 | <u>AA</u> |
| Consolideck® LS/CS® followed by Consolideck® PolishGuard | -0.0 | <u>AA</u> |
| Consolideck® LS/CS® followed by PROSOCO® SLX100® Water & Oil Repellent | -0.0 | <u>AA</u> |
| Consolideck® LS/CS® followed by Paver Kare® Deep Sheen WB | -0.0 | <u>AA</u> |

CONCLUSIONS: Water Repellency

Based on the laboratory tests conducted, all of the treatments evaluated provided average to above average water repellent protection.

TEST METHODS: Surface Beading Evaluation

The food and oil products were applied to the test areas by using a dropper creating a bead 0.5 – 1.0 cm in diameter. The beading properties of the oils and liquids were visually evaluated within two minutes after application. The results are reported as a rating based on the angle of contact between the base of the droplet and the substrate. A rating of “1 or 2” indicated the smallest angle of contact ($<90^\circ$) which correlates to “above average” repellency. A rating of “3 or 4” indicates “average” repellency. A rating of “5 or greater” indicated that the oil quickly absorbed into the substrate and correlates to “below average” repellency.

Note: Non-free flowing staining agents such as ketchup and mustard are applied in a blob and not evaluated for their beading properties.

Rating System (1-5)

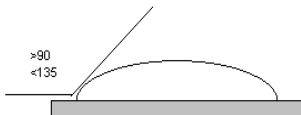
1. No wetting of contact area (no darkening); angle less than 90°



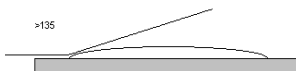
2. Wetting contained to the contact area (slight darkening); angle is less than 90°



3. Wetting contained to the contact area (slight darkening); angle is greater than 90° , but less than 135° .



4. Wetting beyond the contact area (darkening); angle is greater than 135°



5. Wetting beyond the contact area (darkening); angle is flat.



TEST RESULTS: Surface Beading Evaluation

Submitted Concrete

| | Untreated | LS/CS® followed by Concrete Protector WB | LS/CS® followed by Concrete Protector SB | LS/CS® followed by SLX100® |
|-------------------------|-----------|---|---|----------------------------------|
| Coca Cola | 4 | 3 | 3 | 2 |
| Ketchup | N/A | N/A | N/A | N/A |
| Mustard | N/A | N/A | N/A | N/A |
| Red Wine | 5 | 3 | 3 | 3 |
| Balsamic Vinegar | 4 | 3 | 3 | 2 |
| Soy Sauce | 4 | 3 | 3 | 3 |
| Olive Oil | 5 | 3 | 3 | 3 |
| Wesson Oil | 5 | 3 | 3 | 3 |
| Hot Coffee | 4 | 3 | 3 | 3 |

| | LS/CS® followed by Deep Sheen WB | LS/CS® followed by Polish Guard | LS/CS® followed by GuardEXT |
|-------------------------|---|---------------------------------------|-----------------------------------|
| Coca Cola | 4 | 1 | 1 |
| Ketchup | N/A | N/A | N/A |
| Mustard | N/A | N/A | N/A |
| Red Wine | 5 | 1 | 1 |
| Balsamic Vinegar | 5 | 1 | 1 |
| Soy Sauce | 3 | 1 | 1 |
| Olive Oil | 5 | 2 | 2 |
| Wesson Oil | 5 | 2 | 2 |
| Hot Coffee | 2 | 1 | 1 |

N/A – non-free flowing staining agent

TEST METHODS: Stain Resistance Evaluation

The soiling agents were allowed to dwell on the treated and untreated substrate for times of 24 hours, 4 hours, 1 hour, and 10 minutes. The test areas were then cleaned with Enviro Klean® 2010 All Surface Cleaner diluted with ten parts water and scrubbed under a stream of running water. The samples were allowed to dry for 24 hours. Evaluation consisted of a visual examination of the tested areas to determine the percentage of staining removal.

TEST RESULTS: Stain Resistance Evaluation

Submitted Concrete

% Removal

| Untreated Control | | | | | | | | | |
|---|-------------|---------------|--------------|-----------------|-------------------|------------------|------------------|------------------|---------------|
| | Cola | Ketch. | Must. | Red Wine | Bals. Vin. | Soy Sauce | Olive Oil | Wess. Oil | Coffee |
| 24 hour | 50% | 100% | 90% | 30% | 40% | 60% | <1% | <1% | 30% |
| 4 hour | 80% | 100% | 95% | 30% | 40% | 70% | <1% | <1% | 40% |
| 1 hour | 90% | 100% | 98% | 30% | 40% | 90% | 10% | 10% | 80% |
| 10 min. | 90% | 100% | 100% | 30% | 40% | 90% | 10% | 10% | 80% |
| LS/CS® followed by Concrete Protector WB | | | | | | | | | |
| | Cola | Ketch. | Must. | Red Wine | Bals. Vin. | Soy Sauce | Olive O. | Wess. Oil | Coffee |
| 24 hour | 100% | 100% | 98%* | 98% | 99%* | 90% | 60% | 60% | 90% |
| 4 hour | 100% | 100% | 99% | 99% | 100%* | 90% | 70% | 80% | 90% |
| 1 hour | 100% | 100% | 100% | 99% | 100%* | 90% | 80% | 90% | 90% |
| 10 min. | 100% | 100% | 100% | 99% | 100%* | 90% | 90% | 90% | 90% |
| LS/CS® followed by Concrete Protector SB | | | | | | | | | |
| | Cola | Ketch. | Must. | Red Wine | Bals. Vin. | Soy Sauce | Olive O. | Wess. Oil | Coffee |
| 24 hour | 100% | 100% | 100%* | 100%* | 80% | 80% | 90% | 90% | 98% |
| 4 hour | 100% | 100% | 100%* | 100% | 100% | 100% | 100% | 100% | 100% |
| 1 hour | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| 10 min. | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| LS/CS® followed by SLX100® Water & Oil Repellent | | | | | | | | | |
| | Cola | Ketch. | Must. | Red Wine | Bals. Vin. | Soy Sauce | Olive O. | Wess. Oil | Coffee |
| 24 hour | 100% | 100% | 99%* | 90% | 100% | 90% | 90% | 70% | 95% |
| 4 hour | 100% | 100% | 99%* | 90% | 100% | 100% | 70% | 70% | 95% |
| 1 hour | 100% | 100% | 100%* | 90% | 100% | 100% | 80% | 80% | 98% |
| 10 min. | 100% | 100% | 100%* | 90% | 100% | 100% | 80% | 80% | 100% |

% Removal of stain following maintenance cleaning.

* Indicates etching of surface treatment due to the acidic nature of the staining agent.

TEST RESULTS: Stain Resistance Evaluation (cont.)

Submitted Concrete

% Removal

| LS/CS® followed by Deep Sheen WB | | | | | | | | | |
|---|-------------|---------------|--------------|-----------------|-------------------|------------------|------------------|------------------|---------------|
| | Cola | Ketch. | Must. | Red Wine | Bals. Vin. | Soy Sauce | Olive Oil | Wess. Oil | Coffee |
| 24 hour | 100% | 100% | 80%* | 98% | 100% | 100% | 100% | 100% | 100% |
| 4 hour | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| 1 hour | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| 10 min. | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| LS/CS® followed by Polish Guard | | | | | | | | | |
| | Cola | Ketch. | Must. | Red Wine | Bals. Vin. | Soy Sauce | Olive O. | Wess. Oil | Coffee |
| 24 hour | 99% | 100% | 80%* | 70% | 98%* | 99% | 90% | 60% | 30% |
| 4 hour | 100% | 100% | 98% | 80% | 98%* | 99% | 90% | 60% | 90% |
| 1 hour | 100% | 100% | 99% | 90% | 95%* | 99% | 90% | 60% | 90% |
| 10 min. | 100% | 100% | 100% | 90% | 99%* | 99% | 90% | 90% | 90% |
| LS/CS® followed by GuardEXT | | | | | | | | | |
| | Cola | Ketch. | Must. | Red Wine | Bals. Vin. | Soy Sauce | Olive O. | Wess. Oil | Coffee |
| 24 hour | 100% | 99% | 80%* | 100% | 100% | 100% | 100% | 100% | 99% |
| 4 hour | 100% | 99% | 98% | 100% | 100% | 100% | 100% | 100% | 99% |
| 1 hour | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 99% |
| 10 min. | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 99% |

% Removal of stain following maintenance cleaning.

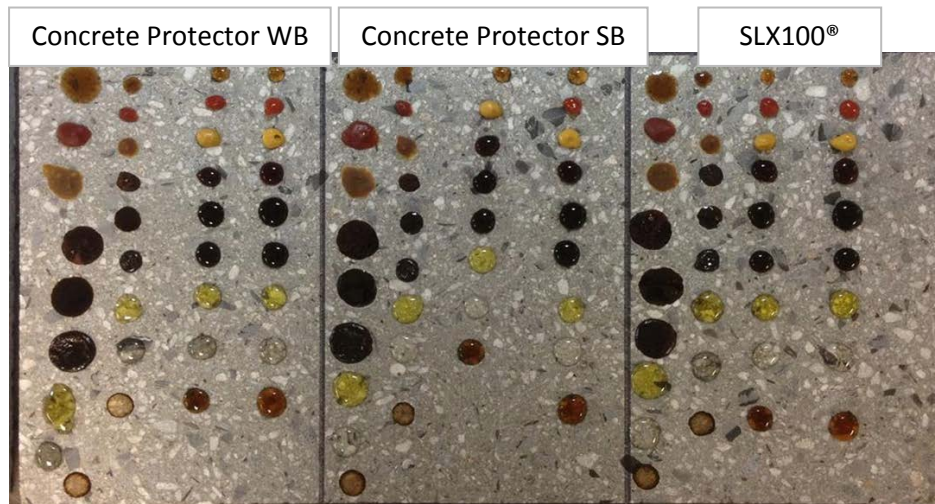
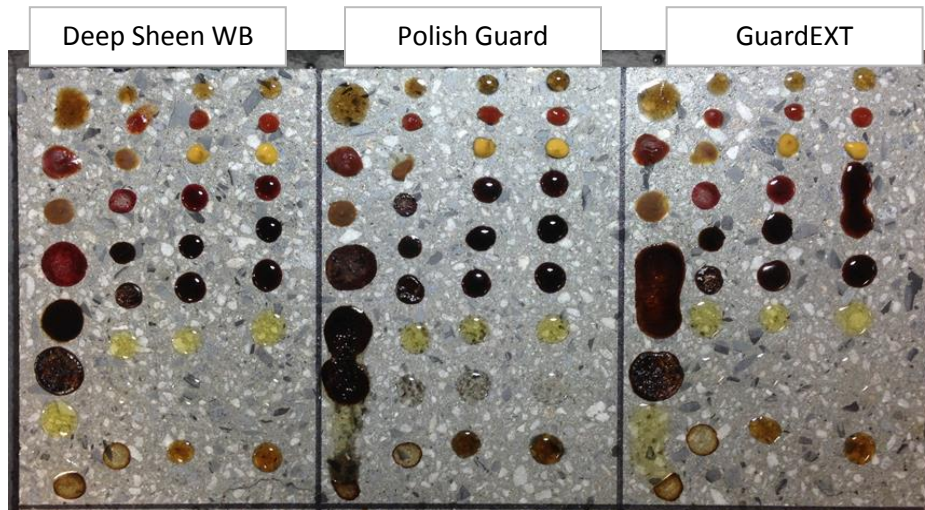
* Indicates etching of surface treatment due to the acidic nature of the staining agent.

CONCLUSIONS: Stain Resistance

In the laboratory tests conducted, all of the treatments evaluated improved the stain resistance of the concrete to the applied stains. LS/CS® followed by Deep Sheen WB provided the best stain resistance of all the treatments evaluated.

PHOTOGRAPHS: Stain Resistance

Concrete With Stains



PHOTOGRAPHS: Stain Resistance (cont.)

Concrete After Stain Testing



RECOMMENDATIONS:

Based on the laboratory tests conducted, Consolideck® LS/CS® is recommended to be applied as an in-plant treatment for dustproofing and densifying the concrete submitted from Tate Access Flooring in Jessup, MD.

Paver Kare® Deep Sheen WB is recommended for sheen enhancement and water/stain resistance. Two applications are recommended for optimal sheen enhancement and stain resistance.

Consolideck® Concrete Protector SB and Consolideck® Concrete Protector WB are recommended for water/stain resistance when no change in appearance to the concrete is desired. Two applications are recommended for optimal stain resistance.

Application procedures from the PROSOCO, Inc. Product Data Sheet instructions must be followed:

Procedure for Consolideck® LS/CS®:

Read “Preparation” and “Safety Information” sections in the Manufacturer’s Product Data Sheet for Consolideck® LS/CS®. Refer to the Product Data Sheet for additional information about application of Consolideck® LS/CS®. Do not dilute or alter.

Application

Calculating Target Coverage Rate

Variations in concrete quality, porosity, job site conditions, temperature and relative humidity will affect coverage rates and drying times. Test a representative section of the prepared surface to calculate the Target Coverage Rate.

1. Prepare the test section in accordance with manufacturer’s published preparation information. Surface must be clean, dry and absorbent. Surfaces should wet uniformly.
2. Pour one gallon of product into a clean pump up sprayer. Lightly apply sufficient product to wet the surface without producing puddles.
3. Use a clean microfiber pad to spread the product and ensure uniform wetting. Scrubbing is not necessary.
4. If surfaces dry immediately, increase your rate of application. Surface should remain wet for 5–10 minutes. Adjust rate of application to eliminate puddles.
5. Repeat steps 2 through 4 as needed to determine the correct rate of application. Measure the test area to establish the Target Coverage Rate per gallon.

Procedure for Paver Kare® Deep Sheen WB:

Before applying, read “Preparation” and “Safety Information” sections in the Manufacturer’s Product Data Sheet for Paver Kare® Deep Sheen WB. Refer to the Product Data Sheet for additional information about application of Deep Sheen WB. Do not dilute or alter. Do not shake. Shaking may entrap air.

Brush or roller

1. Saturate the entire surface. Avoid excessive overlapping.
2. Carefully brush out runs and drips.
3. Reapply, if needed, to produce an even appearance over the entire surface. Allow 30-40 minutes between applications or until first coat is dry. Less material will be needed for the second coat.

Sprayer

1. Apply two or more thin, even coats to a total thickness of 2-4 mils wet. Let first coat dry 15 minutes or until it becomes tacky.
2. Apply two or more additional coats in the same manner to produce an even appearance. Allow 30-40 minutes dry-time between each set of applications, or until the previous application is dry.

Procedure for Consolideck® Concrete Protector SB:

Before applying, read “Preparation” and “Safety Information” sections in the Manufacturer’s Product Data Sheet for Concrete Protector SB. Refer to the Product Data Sheet for additional information about application of Concrete Protector SB.

Dilution

Apply as packaged. Do not dilute or alter material. Stir or mix well before use.

Horizontal Surfaces:

1. Lightly wet a clean microfiber pad with Concrete Protector SB, leaving the pad damp.
2. Use a clean, pump-up sprayer, work from one control joint to another applying a light, fine spray to a small section of the floor.
3. Use the damp microfiber pad and firm downward pressure to immediately spread Concrete Protector SB. Produce a thin, even application. Spread the product as far as possible while maintaining a wet edge.
4. Allow treated surfaces to dry tack-free, typically 60 to 90 minutes.

SPECIFIER NOTE: Best results are achieved when Concrete Protector SB is allowed to dry and cure for at least 4 hours prior to burnishing.

5. Once dry, Concrete Protector SB may be burnished using a high-speed burnisher fitted with a Consolideck® Heat Burnishing Pad or 1500 to 3000 grit diamond polishing pad suitable for use on high-gloss finishes.

SPECIFIER NOTE: in addition to smoothing and polishing the treated surface, high-speed burnishing can help to remove any surface haze from possible over application.

6. Repeat steps 1 through 5 above, as necessary, to provide additional stain protection. Apply up to two coats for maximum protection.



Procedure for Consolideck® Concrete Protector WB:

Before applying, read “Preparation” and “Safety Information” sections in the Manufacturer’s Product Data Sheet for Concrete Protector WB. Refer to the Product Data Sheet for additional information about application of Concrete Protector WB.

Dilution

Use in concentrate. Do not dilute or alter material. Stir or mix well before use.

Horizontal Surfaces:

On most flat surfaces, apply in a single saturating application. Do not atomize product during application. Even out puddles with a microfiber applicator before material has a chance to fully dry.

SPECIFIER NOTE: An additional coat can be applied after material has dried for at least 1 hour. Second coat will require less material.

Porous Surfaces:

For optimum stain repellency on porous surfaces, apply a saturating coat and allow to dry thoroughly before applying a second saturating coat. Less material will be required on the second application. Do not atomize product during application.

SPECIFIER NOTE: Over application may change surface appearance.

Jobsite testing in a small, inconspicuous location must be conducted prior to overall application of any product.

A handwritten signature in black ink that reads 'Courtney A. Murdock'.

Courtney A. Murdock, CDT
Project Testing Director

CAM/

ALL SAMPLES SUPPLIED FOR THE ABOVE EVALUATION WILL BE DISPOSED OF NINETY (90) DAYS AFTER THE ISSUE DATE OF THIS REPORT. IF SAMPLES ARE TO BE RETAINED FOR ADDITIONAL TESTING OR RETURNED TO THE SENDER, PROVIDE WRITTEN INSTRUCTIONS TO THE LABORATORY WITHIN NINETY (90) DAYS OF THE ISSUE DATE OF THIS REPORT.

Recommendations made within this report are based on laboratory test applications and observations. Final determination of the suitability of a product and/or procedure should be made only after thorough job testing on actual surfaces.