



PALLET TAG PROGRAM LABORATORY REPORT



PROSOCO, Inc.

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ATTACHMENTS

- Technical Services TECH Note RILEM Tube Test Procedures
- Product Data literature for all products evaluated



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FOR: Rob Houston
cc: Rob Poitevent
Mike Burdette
Steve Dean
Paul Tessier

SUBJECT: Corbel Stone
Flowery Branch, GA

DATE: December 16, 2002

PROJECT: 0210-12 PTP

SAMPLES SUBMITTED:

| Sample | Color | Size |
|-----------------------|--------------|---|
| (6) Smooth cast stone | White | 15 $\frac{3}{4}$ " x 7 $\frac{3}{4}$ " x 1" |

Submitted by: Mike Burdette



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PURPOSE OF TESTING:

Six identical samples of smooth cast stone were submitted to PROSOCO, Inc.'s Testing Laboratory with a request to determine if application of the products evaluated would produce any surface alteration during new construction cleaning operations. A request was made to determine if PROSOCO, Inc.'s brick cleaners would be compatible on the submitted cast stone, as the cast stone is commonly used as an accent for brick. Additionally, the effectiveness of water repellents, suitable for cast stone, was evaluated.

A. New Construction Cleaning – Sure Klean® Burnished Custom Masonry Cleaner, Sure Klean® Custom Masonry Cleaner, Sure Klean® 600 Detergent, and Sure Klean® Vana Trol® were evaluated at various dilutions for removal of laboratory applied mortar.

To simulate new construction soiling, all tiles are placed on a bench with finished surface facing upward. Hollow cylinders measuring 50 mm in diameter and 75 mm tall are positioned on top of each tile and filled with a wet mixture of Ash Grove® Type N cementitious mortar. The wet, mortar-filled cylinder is allowed to remain in contact with the tile for 10 minutes before removal.

Soiled tiles are allowed to dry before test cleaning.

Heavy deposits of mortar are removed with dry scraping after 24 hours. Prepared cleaning solutions are then evaluated for their effectiveness in removing residual Ash Grove® Type N mortar staining after 7 days, 14 days, and 21 days of curing.

B. Limiting Surface Alterations Testing – Sure Klean® Burnished Custom Masonry Cleaner, Sure Klean® Custom Masonry Cleaner, Sure Klean® 600 Detergent, and Sure Klean® Vana Trol® were tested at various dilutions to determine if a cleaning program implemented to remove excess mortar and related new construction soiling would otherwise alter the appearance of cleaned surfaces. Surface Alteration was evaluated visually based upon perceived discoloration or erosion/etching of the masonry unit.

Aggregate Exposure is the visual examination of the tile comparing aggregate exposure of the untreated control surface to surfaces cleaned with selected product(s) at given dilutions.

Surface Pigment Alteration/Removal is the visual examination of the tile comparing the surface pigmentation of the untreated control to surfaces cleaned with selected product(s) at given dilutions.

Matrix Erosion is the visual examination comparing the untreated control surface to surfaces cleaned with selected products at given dilutions looking for any potential erosion/digestion of the cementitious matrix of the tile.

Staining is the visual examination for changes that are the result of a chemical reaction that leaves a staining precipitate.

The following is the scale used for reporting results of all categories:

| | |
|---------------|---------------|
| 0 – no change | 3 – heavy |
| 1 – slight | 4 – excessive |
| 2 – moderate | |

C. Water Repellent Evaluation – Consolideck® Saltguard WB and Sure Klean® Weather Seal Siloxane PD were evaluated on the submitted samples for their ability to provide water repellency.



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PRODUCTS EVALUATED

CLEANING PRODUCTS AND LIMITING SURFACE ALTERATIONS PRODUCTS EVALUATED

| SAMPLE | PRODUCT | DILUTION |
|------------------|--|----------|
| White cast stone | Sure Klean® Burnished Custom Masonry Cleaner | 1:2, 1:3 |
| | Sure Klean® Custom Masonry Cleaner | 1:4, 1:6 |
| | Sure Klean® 600 Detergent | 1:6, 1:8 |
| | Sure Klean® Vana Trol® | 1:6, 1:8 |

WATER REPELLENT PRODUCTS EVALUATED

| SAMPLE | TREATMENT | DILUTION |
|------------------|--------------------------------------|-------------|
| White cast stone | Consolideck® Saltguard WB | Concentrate |
| | Sure Klean® Weather Seal Siloxane PD | Concentrate |

Dilution ratios refer to mixtures of concentrated product : fresh water.



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SECTION A – NEW CONSTRUCTION CLEANING

DESCRIPTION OF PRODUCTS EVALUATED – New Construction Cleaning

These cleaning trials were conducted to determine the optimal cleaning/cure time combination to most efficiently remove Ash Grove[®] Type N mortar from the submitted cast stone.

Ash Grove[®] Type N cementitious mortar was prepared in compliance with the manufacturers instructions, applied to the cast stone and allowed to cure for 7, 14 and 21 days prior to removal with high pressure water rinse using pressure rinsing equipment and chemical assist. The removal of gray Ash Grove[®] Type N cementitious masonry cement mortar after 7, 14 and 21 days of curing was visually evaluated.

Sure Klean[®] Burnished Custom Masonry Cleaner – A general purpose, nonetching acidic cleaner for custom masonry and colored concrete. Removes rust, mud, oil, atmospheric dirt, and other stains without altering the surface texture. Liquid concentrate for dilution with 2-3 parts water. Apply by brush or low-pressure spray.

Sure Klean[®] Custom Masonry Cleaner – A general purpose, concentrated acidic cleaner for most custom masonry and colored concrete. Removes concrete splashes, excess mortar, mud, heavy efflorescence and surface soiling, leaving the masonry clean and uniform with no acid burning or streaking. Liquid concentrate for dilution with 2-6 parts water. Apply by brush or low-pressure spray.

Sure Klean[®] 600 Detergent – A general purpose, concentrated acidic cleaner for brick, tile, and concrete surfaces. Quickly dissolves mortar smears and construction dirt, leaving the masonry clean and uniform with no acid burning or streaking. Liquid concentrate for dilution with 4-12 parts water. Apply by brush or low-pressure spray.

Sure Klean[®] Vana Trol[®] - A concentrated acidic cleaner for new masonry surfaces that are subject to vanadium, manganese and other metallic stains. Use on: gray, brown, white, and most light-colored brick; natural stone; cast stone. Dissolves mortar smears and construction dirt quickly, leaving the masonry clean and uniform with no acid burning or streaking. Liquid concentrate for dilution with 4-25 parts water. Apply by brush or low-pressure spray.

TEST METHOD – New Construction Cleaning

Dilution ratios refer to mixtures of concentrated cleaner : fresh water. Chemical cleaners were evaluated using the following procedure:

1. Prewet the surface with water.
2. Apply the cleaner.
3. Allow the appropriate dwell time, as specified.
 - Burnished Custom Masonry Cleaner3 minutes
 - Custom Masonry Cleaner3 minutes
 - 600 Detergent3 minutes
 - Vana Trol[®]5 minutes
4. Pressure rinse thoroughly.*

* Pressure rinsing was conducted at approximately 1300 psi with a warm water flow rate of 1.9 gallons per minute.



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TEST RESULTS – New Construction Cleaning

% Removal

White Cast Stone

| | <u>7 day</u> | <u>14 day</u> | <u>21 day</u> |
|--|--------------|---------------|---------------|
| Burnished Custom Masonry Cleaner (1:2) | 100% | 100% | 100% |
| Burnished Custom Masonry Cleaner (1:3) | 100% | 100% | 100% |
| Custom Masonry Cleaner (1:4) | 100% | 100% | 100% |
| Custom Masonry Cleaner (1:6) | 100% | 100% | 100% |
| 600 Detergent (1:6) | 100% | 100% | 100% |
| 600 Detergent (1:8) | 100% | 100% | 100% |
| Vana Trol [®] (1:6) | 100% | 100% | 100% |
| Vana Trol [®] (1:8) | 100% | 100% | 100% |

CONCLUSIONS – New Construction Cleaning

Based on the test results, all cleaners and all dilutions performed well in removing excess mortar smears on the submitted cast stone. The cleaners performed well in removing the mortar soils even after allowing the mortar to remain on the surface of the cast stone for 21 days under ideal curing conditions.

It is also recommended that the selected cleaners always be used in the lowest possible concentration, typically a 1:3 dilution for Sure Klean[®] Burnished Custom Masonry Cleaner, a 1:6 dilution for Sure Klean[®] Custom Masonry Cleaner, and a 1:8 dilution for both Sure Klean[®] 600 Detergent and Sure Klean[®] Vana Trol[®]. To facilitate easier removal of excess mortar and construction dirt while minimizing any potential adverse affect on the cast stone, clean within 7 days of construction.



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RECOMMENDATIONS – New Construction Cleaning

Recommendations for cleaning for the cast stone submitted by Corbel Stone, Flowery Branch, GA are provided in the chart below. Recommendations are based on the optimum dilution for complete removal of mortar.

| Sample | Product |
|------------------|---|
| White cast stone | Sure Klean [®] Burnished Custom Masonry Cleaner 1:3 OR Sure Klean [®] Custom Masonry Cleaner 1:6 OR Sure Klean [®] 600 Detergent 1:8 OR Sure Klean [®] Vana Trol [®] 1:8 |

The most appropriate cleaner and dilution should be determined on the specific job-site, and will be dependent primarily on the nature and severity of soiling present at that location.

Apply all products in accordance with the manufacturer's recommendation provided on container labels and product data sheets. On-site testing should be conducted to determine the most appropriate cleaning product and procedures for a particular project. See product literature for additional application and product information.



SECTION B – LIMITING SURFACE ALTERATIONS

DESCRIPTION OF PRODUCTS EVALUATED – Limiting Surface Alterations

Sure Klean® Burnished Custom Masonry Cleaner – A general purpose, nonetching acidic cleaner for custom masonry and colored concrete. Removes rust, mud, oil, atmospheric dirt, and other stains without altering the surface texture. Liquid concentrate for dilution with 2-3 parts water. Apply by brush or low-pressure spray.

Sure Klean® Custom Masonry Cleaner – A general purpose, concentrated acidic cleaner for most custom masonry and colored concrete. Removes concrete splashes, excess mortar, mud, heavy efflorescence and surface soiling, leaving the masonry clean and uniform with no acid burning or streaking. Liquid concentrate for dilution with 2-6 parts water. Apply by brush or low-pressure spray.

Sure Klean® 600 Detergent – A general purpose, concentrated acidic cleaner for brick, tile, and concrete surfaces. Quickly dissolves mortar smears and construction dirt, leaving the masonry clean and uniform with no acid burning or streaking. Liquid concentrate for dilution with 4-12 parts water. Apply by brush or low-pressure spray.

Sure Klean® Vana Trol® - A concentrated acidic cleaner for new masonry surfaces that are subject to vanadium, manganese and other metallic stains. Use on: gray, brown, white, and most light-colored brick; natural stone; cast stone. Dissolves mortar smears and construction dirt quickly, leaving the masonry clean and uniform with no acid burning or streaking. Liquid concentrate for dilution with 4-25 parts water. Apply by brush or low-pressure spray.

TEST METHOD – Limiting Surface Alterations

Dilution ratios refer to mixtures of concentrated cleaner : fresh water. Chemical cleaners were evaluated using the following procedure:

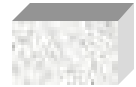
1. Prewet the surface with water.
2. Apply the cleaner.
3. Allow the appropriate dwell time, as specified.

| | |
|--|-----------|
| Burnished Custom Masonry Cleaner | 3 minutes |
| Custom Masonry Cleaner | 3 minutes |
| 600 Detergent | 3 minutes |
| Vana Trol® | 5 minutes |
4. Pressure rinse thoroughly.*

* Pressure rinsing was conducted at approximately 1300 psi with a warm water flow rate of 1.9 gallons per minute.



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TEST RESULTS – Limiting Surface Alterations

| Substrate: Smooth cast stone | | Pigment Color: white | | | |
|----------------------------------|----------|------------------------|-------------------------|--------------|----------|
| Product | Dilution | Surface Finish Removal | Substrate Deterioration | Color Change | Staining |
| Burnished Custom Masonry Cleaner | 1:2 | 0 | 0 | 0 | 0 |
| Burnished Custom Masonry Cleaner | 1:3 | 0 | 0 | 0 | 0 |
| Custom Masonry Cleaner | 1:4 | 0 | 0 | 0 | 0 |
| Custom Masonry Cleaner | 1:6 | 0 | 0 | 0 | 0 |
| 600 Detergent | 1:6 | 0 | 0 | 0 | 0 |
| 600 Detergent | 1:8 | 0 | 0 | 0 | 0 |
| Vana Trol [®] | 1:6 | 0 | 0 | 0 | 0 |
| Vana Trol [®] | 1:8 | 0 | 0 | 0 | 0 |

The following is the scale used for reporting results of all categories:

| | |
|---------------|---------------|
| 0 – no change | 3 – heavy |
| 1 – slight | 4 – excessive |
| 2 – moderate | |

CONCLUSIONS – Limiting Surface Alterations

These tests show that none of the cleaners tested caused any visible surface alterations on the submitted white cast stone.

It is recommended that the selected cleaners always be used in the lowest possible concentration. To facilitate easier removal of excess mortar and construction dirt while minimizing any potential adverse affect on the cast stone, clean within 7 days of construction.



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RECOMMENDATIONS – Limiting Surface Alterations

Recommendations for limiting surface alterations for the submitted cast stone by Corbel Stone, Flowery Branch, GA, are provided in the chart below. Recommendations are based on the optimum dilution for removal of mortar while limiting surface alterations.

| Sample | Product |
|------------------|---|
| White cast stone | Sure Klean [®] Burnished Custom Masonry Cleaner 1:3 OR Sure Klean [®] Custom Masonry Cleaner 1:6 OR Sure Klean [®] 600 Detergent 1:8 OR Sure Klean [®] Vana Trol [®] 1:8 |

The most appropriate cleaner and dilution should be determined on the specific job-site, and will be dependent primarily on the nature and severity of soiling present at that location.

Apply all products in accordance with the manufacturer's recommendation provided on container labels and product data sheets. On-site testing should be conducted to determine the most appropriate cleaning product and procedures for a particular project. See product literature for additional application and product information.



SECTION C – PROTECTIVE WATER REPELLENTS

The testing described below evaluates the suitability of water repellent treatments.

The surface treatments evaluated were selected for their suitability for application based on the following selection criteria:

1. Weatherproofing properties
2. Color change
3. Ease of application

DESCRIPTIONS OF PRODUCTS EVALUATED – Protective Water Repellents

Consolideck® Saltguard WB – A ready-to-use, water-based silane/siloxane water repellent and “chloride screen” for the protection of concrete and masonry surfaces. Penetrates deeply to protect horizontal and vertical surfaces from moisture intrusion and chemical attack of chloride salts. Low odor and alkaline stable, this water repellent is ideal for field or in-plant application.

Sure Klean® Weather Seal Siloxane PD – A ready-to-use, water-based silane/siloxane water repellent for concrete, GFRC, and most masonry and stucco surfaces. Siloxane PD penetrates more deeply than conventional water repellents. It helps masonry resist cracking, spalling, staining, and other damage related to water intrusion. Low odor and alkaline stable, Siloxane PD is ideal for field and in-plant application.

SAMPLE PREPARATION – Protective Water Repellents

The submitted cast stone were cut; oven dried and allowed to reabsorb atmospheric humidity for 24 hours prior to treatment. The treatment method consisted of a wet-on-wet application. Samples were allowed to cure for at least 14 days prior to testing.

TEST METHODS – Protective Water Repellents

Water Absorption Tube Test: RILEM II.4, 60 mph, 20 Minutes

The water absorption tube test simulating wind driven rain conditions was performed. This test simulates 60 mile per hour wind driven rain conditions for a period of 20 minutes. See Technical Services TECHNote RILEM Tube Test Procedures.

TEST RESULTS – Protective Water Repellents

Water Absorption Tube Test: RILEM II.4, 60 mph, 20 Minutes

| RESULTS | |
|-------------------|--------|
| White Cast Stone | |
| Untreated Control | 52 mph |
| Saltguard WB | 57 mph |
| Siloxane PD | 57 mph |



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CONCLUSIONS – Protective Water Repellents

Based upon laboratory evaluations, all of the applied treatments provided excellent water repellency to all of the submitted cast stone samples. None of the applied treatments changed the appearance of the cast stone in any way.

RECOMMENDATIONS – Protective Water Repellents

Based on test results, all of the treatments can be recommended for job-site testing on all of the cast stone submitted by Corbel Stone, Flowery Branch, GA. Recommendations are based on the treatment that proved most effective and can provide water repellency on all types submitted.

| Sample | Water Repellent |
|------------------|---|
| White cast stone | Consolideck [®] Saltguard WB OR Sure Klean [®] Weather Seal Siloxane PD |

Apply all products in accordance with the manufacturer's recommendation provided on container labels and product data sheets. On-site testing should be conducted to determine the most appropriate water-repellent product and procedures for a particular project. See product literature for additional application and product information.

Courtney A. Williams
Project Testing Coordinator

CAW/



Laboratory Report

Pallet Tag Program Evaluation

**Corbel Stone
Flowery Branch, GA**

Project No. 0210-12 PTP

Prepared For:

Rob Houston

**Corbel Stone
5831 Hilltop Drive
Flowery Branch, GA 30542**

Prepared By:



PROSOCO, Inc.

December 2002