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Attachments

 Technical Services TECH Note RILEM Tube Test Procedures

 Product Data literature for all products evaluated

Submitted Information

For: Ursala Dorf, Classic Stone, Inc
cc: Gary Hayes
Jeff Lucas
Brian Koenings

Subject: Classic Stone, Inc.
Northbrook, IL

Date: September 12, 2008

Project: 0807-06 PTP

Samples Submitted: 2 types of marble; 3 types of limestone

Name	Color	Type	Size
"Cappuccino Marble"	Beige	Marble	16" x 16" x 1"
"Shadow Marble"	Dark Grey	Marble	16" x 16" x 1"
"Red Limestone"	Red	Limestone	8" x 8" x 1"
"Yellow Limestone"	Yellow	Limestone	8" x 8" x 1"
"Grey Limestone"	Grey	Limestone	8" x 8" x 1"

Submitted by: Ursala Dorf, Classic Stone, Inc.

Introduction

Architectural Materials Testing (AMT) Laboratories is a Boyer Industries company that provides laboratory testing and consulting services for the construction industry. Laboratory testing includes evaluating chemical cleaning products and protective treatments for a variety of new and existing architectural materials.

This report includes descriptions of the PROSOCO, Inc. products and test methods that were used. Following test results and conclusions, the report provides recommendations for the most effective products and procedures.

Purpose of Testing

Two types of marble and three types of limestone were submitted for testing to AMT Laboratories by PROSOCO, Inc. to determine the optimum concentration of cleaner for complete removal of mortar and related new construction soiling. The effectiveness of protective water repellents, color and sheen enhancers, and stain repellents suitable for natural stone were also evaluated.

New Construction Cleaning – Sure Klean® Vana Trol® and Enviro Klean® Safety Klean were tested at various dilutions to determine the optimum cleaner/cure time combination for complete removal of laboratory applied Type N mortar from the submitted natural stone while limiting surface alterations. The surface alteration evaluation was visually determined based upon perceived discoloration or erosion/etching of the samples.

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

Heavy deposits of mortar were removed with dry scraping after 24 hours. Prepared cleaning solutions were then evaluated for their effectiveness in removing residual Type N mortar after 7, 14, and 21 days of curing. A visual examination was also made to determine if the tested cleaners caused any surface alterations to the submitted samples based on the following:

Surface Finish Removal is the visual examination of the sample comparing the surface finish of the untreated control surface to the surface finish cleaned with selected product(s) at given dilutions.

Substrate Deterioration is the visual examination of the sample comparing the surface of the untreated control to surfaces cleaned with selected product(s) at given dilutions looking for any potential erosion/digestion of the sample.

Color Change is the visual examination comparing the color of the untreated control surface to color of surfaces cleaned with selected products at given dilutions.

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

Protective Water Repellents – Stand Off® Color Enhancer WB, Consolideck® Saltguard® WB, Stand Off® Stone, Tile & Masonry Protector (STMP), and Stand Off® Limestone & Marble Protector were evaluated for their ability to provide water repellency to the submitted samples.

Color and Sheen Enhancement – Stand Off® Color Enhancer WB, Consolideck® Saltguard® WB, Stand Off® Stone, Tile & Masonry Protector (STMP), and Stand Off® Limestone & Marble Protector were evaluated for their ability to provide color and sheen enhancement to the submitted samples.

Stain Repellency – Stand Off® Stone, Tile & Masonry Protector (STMP) and Stand Off® Limestone & Marble Protector were evaluated for their ability to repel stains from the submitted samples.

Products Evaluated**New Construction Cleaning Products Evaluated**

Sample	Product	Dilution
All Natural Stone Samples	Sure Klean® Vana Trol®	1:6, 1:8
	Enviro Klean® Safety Klean	1:2, 1:3

Protective Water Repellent and Color/Sheen Enhancement Products Evaluated

Sample	Product	Dilution
All Natural Stone Samples	Stand Off® Color Enhancer WB	Concentrate
	Consolideck® Saltguard® WB	Concentrate
	Stand Off® Stone, Tile & Masonry Protector (STMP)	Concentrate
	Stand Off® Limestone & Marble Protector	Concentrate

Stain Repellency Products Evaluated

Sample	Product	Dilution
All Natural Stone Samples	Stand Off® Stone, Tile & Masonry Protector (STMP)	Concentrate
	Stand Off® Limestone & Masonry Protector	Concentrate

New Construction Cleaning

These cleaning trials were conducted to determine the optimal cleaning/cure time combination to most efficiently remove Type N mortar from the submitted samples while limiting surface alterations to the decorative finish.

Description of Products Evaluated – New Construction Cleaning

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 4-10 parts water. Apply by brush or low-pressure spray.

Enviro Klean® Safety Klean – An effective, safe, alternative to acidic compounds for cleaning brick, tile, and concrete surfaces. Safety Klean rids new masonry construction of excess mortar, dirt and other common job site soiling. It’s ideal for projects where traditional acidic cleaners are not allowed. Non-fuming Safety Klean contains no hydrochloric or other traditional inorganic acids and is safe for use on and around most metal surfaces. Always test. Additionally, it is up to 70 percent more effective than citric and glycolic acids and 50 percent more effective than phosphoric acid.

Sample Preparation – New Construction Cleaning

Type N mortar was prepared in compliance with the manufacturer’s instructions, applied to the samples and allowed to cure for 7, 14, and 21 days. Mortar removal was accomplished using chemical assistance and a high-pressure water rinse with pressure rinsing equipment. The removal of Type N masonry mortar was visually evaluated after 7, 14, and 21 days of curing. A visual examination was also made to determine the optimal dilution of the tested cleaners that best limit surface alterations when compared with the untreated surface.

Test Method – New Construction Cleaning

Chemical cleaners were evaluated using the following procedure:

1. Pre-wet the surface with water.
2. Apply at the appropriate dilutions.
3. Allow appropriate dwell time, as specified.
 - Sure Klean® Vana Trol®3-5 minutes
 - Enviro Klean® Safety Klean.....3-5 minutes
4. Reapply the product and moderately agitate with a brush.
5. Pressure rinse thoroughly.*
6. Allow the sample to dry for at least 18 hours and visually examine.
7. Visually evaluate any surface alterations to the decorative finish.

***Pressure Rinsing Equipment** – Masonry washing equipment generating approximately 700-800 psi with a water flow rate of 8 gallons per minute delivered through a 45 degree fan spray tip was used for rinsing.

Test Results – New Construction Cleaning**Cleaning Effectiveness (% Type N Mortar Removal)**

“Cappuccino Marble”				
Product	Dilution	7 day	14 day	21 day
Sure Klean® Vana Trol®	1:6	100 %	100 %	100 %
Sure Klean® Vana Trol®	1:8	100 %	100 %	100 %
Enviro Klean® Safety Klean	1:2	100 %	100 %	100 %
Enviro Klean® Safety Klean	1:3	100 %	100 %	100 %
“Shadow Marble”				
Product	Dilution	7 day	14 day	21 day
Sure Klean® Vana Trol®	1:6	100 %	100 %	100 %
Sure Klean® Vana Trol®	1:8	100 %	100 %	100 %
Enviro Klean® Safety Klean	1:2	100 %	100 %	100 %
Enviro Klean® Safety Klean	1:3	100 %	100 %	100 %
“Red Limestone”				
Product	Dilution	7 day	14 day	21 day
Sure Klean® Vana Trol®	1:6	100 %	100 %	100 %
Sure Klean® Vana Trol®	1:8	100 %	100 %	100 %
Enviro Klean® Safety Klean	1:2	100 %	100 %	100 %
Enviro Klean® Safety Klean	1:3	100 %	100 %	100 %
“Yellow Limestone”				
Product	Dilution	7 day	14 day	21 day
Sure Klean® Vana Trol®	1:6	100 %	100 %	100 %
Sure Klean® Vana Trol®	1:8	100 %	100 %	100 %
Enviro Klean® Safety Klean	1:2	100 %	100 %	95 %
Enviro Klean® Safety Klean	1:3	100 %	100 %	97 %
“Grey Limestone”				
Product	Dilution	7 day	14 day	21 day
Sure Klean® Vana Trol®	1:6	100 %	100 %	99 %
Sure Klean® Vana Trol®	1:8	100 %	100 %	99 %
Enviro Klean® Safety Klean	1:2	100 %	100 %	96 %
Enviro Klean® Safety Klean	1:3	100 %	100 %	100 %

Test Results – Limiting Surface Alterations

Substrate: Marble		Pigment Color: “Cappuccino Marble”			
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
Sure Klean® Vana Trol®	1:6	0	0	0	0
	1:8	0	0	0	0
Enviro Klean® Safety Klean	1:2	0	0	0	0
	1:3	0	0	0	0
Substrate: Marble		Pigment Color: “Shadow Marble”			
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
Sure Klean® Vana Trol®	1:6	0	0	0	0
	1:8	0	0	0	0
Enviro Klean® Safety Klean	1:2	0	0	0	0
	1:3	0	0	0	0
Substrate: Limestone		Pigment Color: “Red Limestone”			
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
Sure Klean® Vana Trol®	1:6	0	0	2	0
	1:8	0	0	2	0
Enviro Klean® Safety Klean	1:2	0	0	0	0
	1:3	0	0	0	0
Substrate: Limestone		Pigment Color: “Yellow Limestone”			
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
Sure Klean® Vana Trol®	1:6	0	0	1	0
	1:8	0	0	1	0
Enviro Klean® Safety Klean	1:2	0	0	0	0
	1:3	0	0	0	0
Substrate: Limestone		Pigment Color: “Grey Limestone”			
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
Sure Klean® Vana Trol®	1:6	0	0	1	0
	1:8	0	0	1	0
Enviro Klean® Safety Klean	1:2	0	0	0	0
	1:3	0	0	0	0

0 – No Change 3 – Change – Heavy
1 – Change – Slight 4 – Change – Excessive
2 – Change – Moderate

Photographs-New Construction Cleaning

“Grey Limestone” Type N Mortar; 7 Day Cleaning



Sure Klean® Vana Trol® (1:6)	Enviro Klean® Safety Klean (1:2)	Uncleaned Control
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Sure Klean® Vana Trol® (1:8)	Enviro Klean® Safety Klean (1:3)	Uncleaned Control
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Photographs-New Construction Cleaning

“Grey Limestone” Type N Mortar; 14 Day Cleaning



Sure Klean® Vana Trol® (1:6)	Enviro Klean® Safety Klean (1:2)	Uncleaned Control
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Sure Klean® Vana Trol® (1:8)	Enviro Klean® Safety Klean (1:3)	Uncleaned Control
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Photographs-New Construction Cleaning

“Grey Limestone” Type N Mortar; 21 Day Cleaning



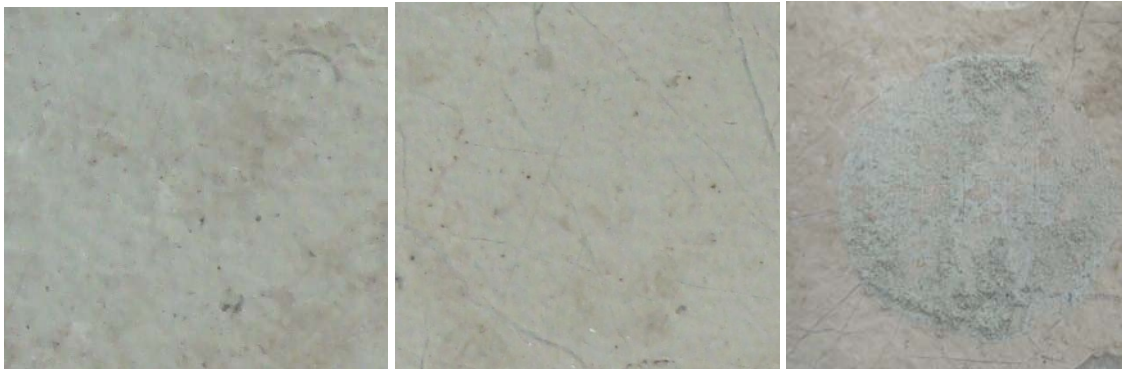
Sure Klean® Vana Trol® (1:6)	Enviro Klean® Safety Klean (1:2)	Uncleaned Control
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Sure Klean® Vana Trol® (1:8)	Enviro Klean® Safety Klean (1:3)	Uncleaned Control
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Photographs-New Construction Cleaning

“Cappuccino Marble” Type N Mortar; 7 Day Cleaning



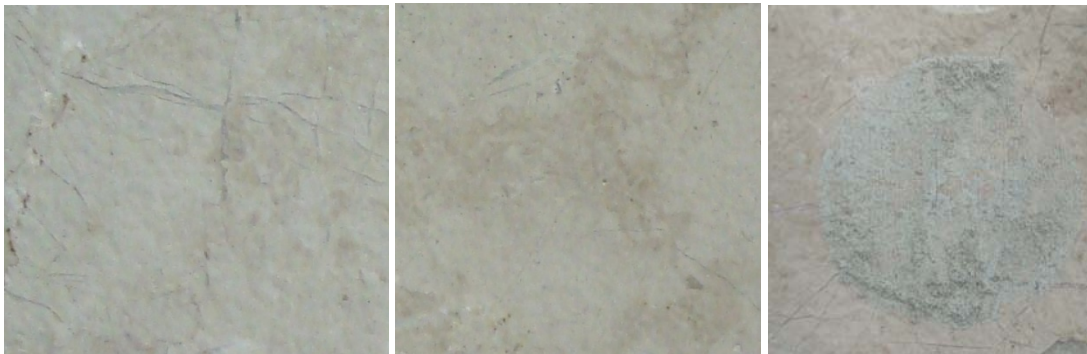
Sure Klean® Vana Trol® (1:6)	Enviro Klean® Safety Klean (1:2)	Uncleaned Control
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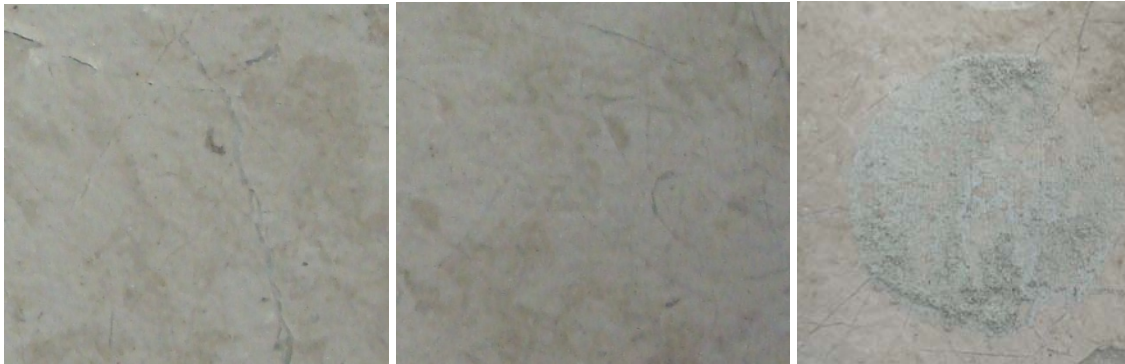
Sure Klean® Vana Trol® (1:8)	Enviro Klean® Safety Klean (1:3)	Uncleaned Control
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Photographs-New Construction Cleaning

“Cappuccino Marble” Type N Mortar; 14 Day Cleaning



Sure Klean® Vana Trol® (1:6)	Enviro Klean® Safety Klean (1:2)	Uncleaned Control
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Sure Klean® Vana Trol® (1:8)	Enviro Klean® Safety Klean (1:3)	Uncleaned Control
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Photographs-New Construction Cleaning

“Cappuccino Marble” Type N Mortar; 21 Day Cleaning



Sure Klean [®] Vana Trol [®] (1:6)	Enviro Klean [®] Safety Klean [®] (1:2)	Uncleaned Control
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Sure Klean [®] Vana Trol [®] (1:8)	Enviro Klean [®] Safety Klean [®] (1:3)	Uncleaned Control
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Photographs-Limiting Surface Alterations

“Red Limestone” Limiting Surface Alterations



Sure Klean® Vana Trol® (1:6)	Enviro Klean® Safety Klean (1:2)	Uncleaned Control
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Sure Klean® Vana Trol® (1:8)	Enviro Klean® Safety Klean (1:3)	Uncleaned Control
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Conclusions – New Construction Cleaning

Based on the test data, all of the submitted samples were efficiently cleaned with Sure Klean® Vana Trol® and Enviro Klean® Safety Klean. There were no limiting surface alterations to the samples when cleaned with Enviro Klean® Safety Klean. Sure Klean® Vana Trol®, in both dilutions evaluated, exhibited a slight to moderate color change when applied to the red limestone samples.

Recommendations – New Construction Cleaning

Recommendations for cleaning for each type of natural stone submitted by Classic Stone, Inc., Northbrook, IL are provided in the chart below. Recommendations are based on the optimum dilution for complete removal of mortar while limiting surface alterations of the submitted samples.

Sample	New Construction Cleaning (Type N mortar, 21 day cleaning)
“Cappuccino Marble” “Shadow Marble” “Grey Limestone” “Yellow Limestone”	Sure Klean® Vana Trol® (1:8) or Enviro Klean® Safety Klean (1:3)
“Red Limestone”	Enviro Klean® Safety Klean (1:3)

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.

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
-

Description of Products Evaluated – Protective Water Repellents

Stand Off® Color Enhancer WB – Enhances the natural color and richness of porous natural stone, colored concrete and tile surfaces. Treated stone repels water and the dirt, salt and contaminants water carries. Surfaces look better, last longer, and are easier to clean. Color Enhancer WB is also effective for protecting and improving the appearance of concrete, clay and natural stone pavers, as well as integrally colored concrete paving, indoors or out. It won't alter the natural texture of treated surfaces.

Consolideck® Saltguard® WB – A ready-to-use water-based, VOC compliant silane/siloxane water repellent and "chloride screen" for the protection of concrete and masonry surfaces. Saltguard® WB penetrates more deeply than conventional water- or solvent-based water repellents. Low odor and alkaline stable, Saltguard® WB is ideal for field or in-plant application to concrete and most masonry surfaces. Saltguard® WB protects horizontal and vertical surfaces from moisture intrusion and chemical attack of chloride salts.

Stand Off® Stone, Tile & Masonry Protector (STMP) – A penetrating water, oil and stain repellent. This easy-to-use, low-odor protective treatment improves stain resistance and simplifies maintenance cleaning of interior and exterior stone, quarry tile, concrete and masonry surfaces. Surfaces treated with STMP resist staining from oil, food and waterborne matter while retaining their natural color, texture, and breathability.

Stand Off® Limestone & Marble Protector – A clear, penetrating water and oil repellent suitable for use on interior or exterior calcareous surfaces such as limestone, marble and travertine. It's also suitable for many other types of masonry surfaces. Limestone & Marble Protector penetrates deeply to provide surface and subsurface protection without forming a glossy surface film. Treated surfaces retain their natural color, texture and appearance.

Sample Preparation – Protective Water Repellents

The submitted samples were scored and allowed to dry for 24 hours prior to treatment. Each of the products was applied by brush in accordance with the current PROSOCO, Inc. Product Data Sheet application instructions. All treatments were allowed to cure for at least 14 days prior to testing.

Test Methods – Protective Water Repellents**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 horizontal 5.0-milliliter head pressures. Filled to 5.0 milliliters, a water absorption tube produces a 103 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:

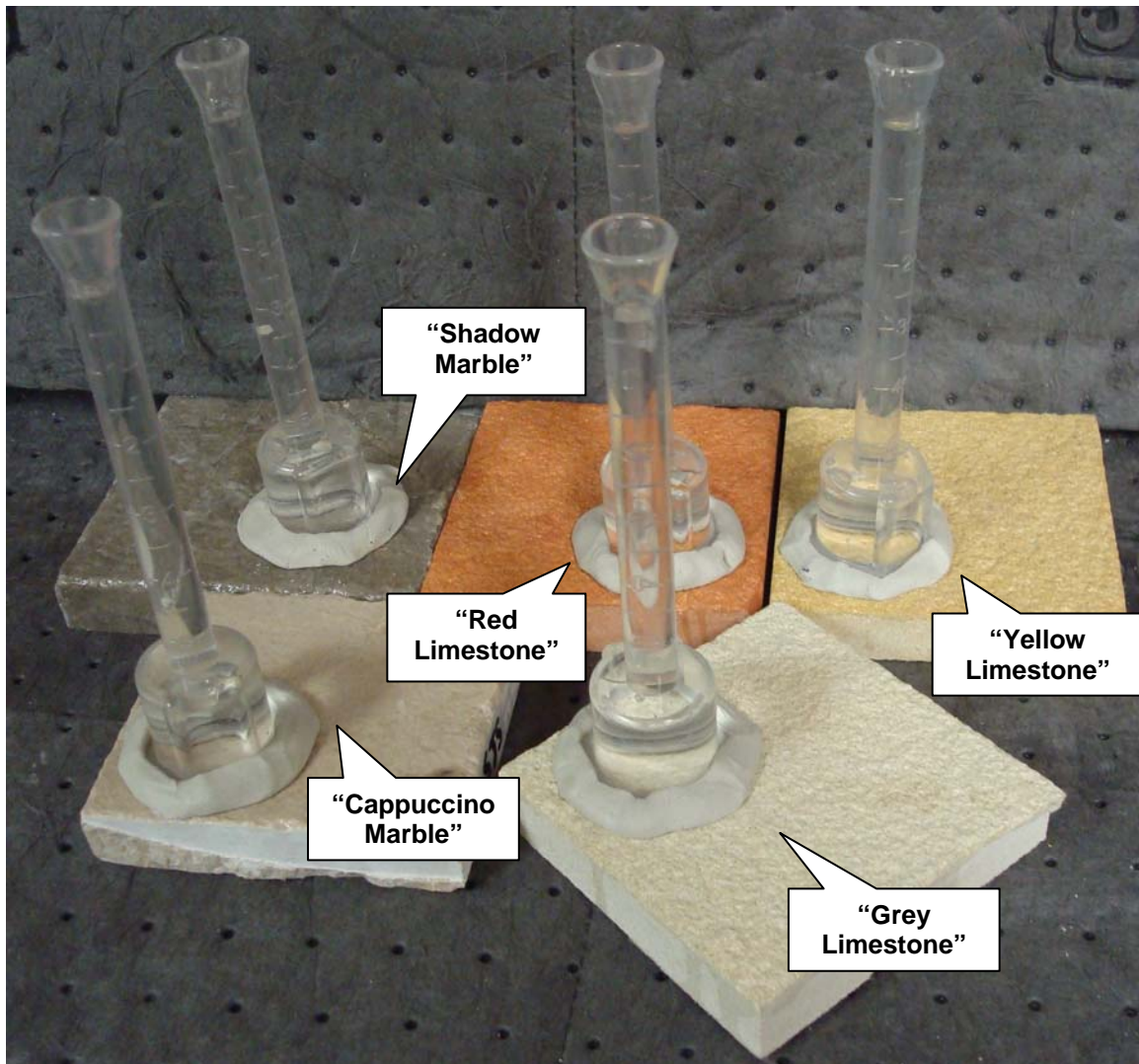
$$5.0 \text{ mL} \times 50\% = \mathbf{2.5 \text{ mL}}$$

Test Results – Protective Water Repellents**Water Absorption Tube Test: Horizontal RILEM II.4, 5.0 milliliters, 20 minutes****AA = Above Average****A = Average****BA = Below Average**

“Cappucino Marble”	Results in mL loss	Ranking
Untreated Control	-0.02	--
Stand Off® Color Enhancer WB	-0.00	<u>AA</u>
Consolideck® Saltguard® WB	-0.00	<u>AA</u>
Stand Off® Stone, Tile & Masonry Protector (STMP)	-0.00	<u>AA</u>
Stand Off® Limestone & Marble Protector	-0.01	<u>A</u>
“Shadow Marble”	Results in mL loss	Ranking
Untreated Control	-0.02	--
Stand Off® Color Enhancer WB	-0.01	<u>A</u>
Consolideck® Saltguard® WB	-0.0	<u>AA</u>
Stand Off® Stone, Tile & Masonry Protector (STMP)	-0.0	<u>AA</u>
Stand Off® Limestone & Marble Protector	-0.0	<u>AA</u>
“Red Limestone”	Results in mL loss	Ranking
Untreated Control	-0.50	--
Stand Off® Color Enhancer WB	-0.00	<u>AA</u>
Consolideck® Saltguard® WB	-0.25	<u>A</u>
Stand Off® Stone, Tile & Masonry Protector (STMP)	-0.50	<u>BA</u>
Stand Off® Limestone & Marble Protector	-0.10	<u>AA</u>
“Yellow Limestone”	Results in mL loss	Ranking
Untreated Control	-0.40	--
Stand Off® Color Enhancer WB	-0.30	<u>BA</u>
Consolideck® Saltguard® WB	-0.10	<u>A</u>
Stand Off® Stone, Tile & Masonry Protector (STMP)	-0.35	<u>BA</u>
Stand Off® Limestone & Marble Protector	-0.10	<u>A</u>
“Grey Limestone”	Results in mL loss	Ranking
Untreated Control	-0.30	--
Stand Off® Color Enhancer WB	-0.02	<u>AA</u>
Consolideck® Saltguard® WB	-0.00	<u>AA</u>
Stand Off® Stone, Tile & Masonry Protector (STMP)	-0.30	<u>BA</u>
Stand Off® Limestone & Marble Protector	-0.30	<u>BA</u>

Photographs – Protective Water Repellents

Horizontal RILEM II.4, 5.0 milliliters 20 Minutes



Conclusions – Protective Water Repellents

Based upon laboratory evaluations, Consolideck® Saltguard® WB provided good water repellency to all of the submitted samples. All treatments provided slight to significant color enhancement in the appearance of the submitted samples.

Recommendations – Protective Water Repellents

Recommendations for water repellency for each sample submitted by Classic Stone, Inc, Northbrook, IL are provided in the chart below. Recommendations are based on the treatment that proved most effective at providing water repellency on the submitted samples.

Sample	Protective Water Repellents
“Cappuccino Marble” “Shadow Marble”	Stand Off® Color Enhancer WB or Consolideck® Saltguard® WB or Stand Off® Stone, Tile & Masonry Protector (STMP) or * Stand Off® Limestone & Marble Protector
“Red Limestone”	Stand Off® Color Enhancer WB or Consolideck® Saltguard® WB or * Stand Off® Limestone & Marble Protector
“Yellow Limestone”	Consolideck® Saltguard® WB or * Stand Off® Limestone & Marble Protector
“Grey Limestone”	Stand Off® Color Enhancer WB or Consolideck® Saltguard® WB

* **NOTE:** Stand Off® Limestone & Marble Protector is manufactured and marketed in compliance with VOC regulations. This product may not be suitable for sale in states and districts with more restrictive regulations.

Color and Sheen Enhancement

This evaluation compares the effectiveness of the evaluated products in providing color and sheen enhancement to the submitted samples.

Description of Products Evaluated – Color and Sheen Enhancement

Stand Off® Color Enhancer WB – Enhances the natural color and richness of porous natural stone, colored concrete and tile surfaces. Treated stone repels water and the dirt, salt and contaminants water carries. Surfaces look better, last longer, and are easier to clean. Color Enhancer WB is also effective for protecting and improving the appearance of concrete, clay and natural stone pavers, as well as integrally colored concrete paving, indoors or out. It won't alter the natural texture of treated surfaces.

Consolideck® Saltguard® WB – A ready-to-use water-based, VOC compliant silane/siloxane water repellent and “chloride screen” for the protection of concrete and masonry surfaces. Saltguard® WB penetrates more deeply than conventional water- or solvent-based water repellents. Low odor and alkaline stable, Saltguard® WB is ideal for field or in-plant application to concrete and most masonry surfaces. Saltguard® WB protects horizontal and vertical surfaces from moisture intrusion and chemical attack of chloride salts.

Stand Off® Stone, Tile & Masonry Protector (STMP) – A penetrating water, oil and stain repellent. This easy-to-use, low-odor protective treatment improves stain resistance and simplifies maintenance cleaning of interior and exterior stone, quarry tile, concrete and masonry surfaces. Surfaces treated with STMP resist staining from oil, food and waterborne matter while retaining their natural color, texture, and breathability.

Stand Off® Limestone & Marble Protector – A clear, penetrating water and oil repellent suitable for use on interior or exterior calcareous surfaces such as limestone, marble and travertine. It's also suitable for many other types of masonry surfaces. Limestone & Marble Protector penetrates deeply to provide surface and subsurface protection without forming a glossy surface film. Treated surfaces retain their natural color, texture and appearance.

Test Method – Color and Sheen Enhancement

The treatments were applied by brush in accordance with the application instructions in the current PROSOCO, Inc. Product Data Sheet. After 24 hours, a visual evaluation was conducted to determine the level of color and sheen enhancement the treatments provided as compared to the untreated control.

Test Results – Color and Sheen Enhancement

“Cappuccino Marble”		
Product	Color Enhancement	Sheen Enhancement
Untreated Control	--	--
Stand Off® Color Enhancer WB	2	2
Consolideck® Saltguard® WB	3	2
Stand Off® Stone, Tile & Masonry Protector (STMP)	1	1
Stand Off® Limestone & Marble Protector	1	1
“Shadow Marble”		
Product	Color Enhancement	Sheen Enhancement
Untreated Control	--	--
Stand Off® Color Enhancer WB	3	3
Consolideck® Saltguard® WB	3	3
Stand Off® Stone, Tile & Masonry Protector (STMP)	3	0
Stand Off® Limestone & Marble Protector	1	3
“Red Limestone”		
Product	Color Enhancement	Sheen Enhancement
Untreated Control	--	--
Stand Off® Color Enhancer WB	3	0
Consolideck® Saltguard® WB	2	0
Stand Off® Stone, Tile & Masonry Protector (STMP)	1	0
Stand Off® Limestone & Marble Protector	1	0
“Yellow Limestone”		
Product	Color Enhancement	Sheen Enhancement
Untreated Control	--	--
Stand Off® Color Enhancer WB	3	0
Consolideck® Saltguard® WB	3	0
Stand Off® Stone, Tile & Masonry Protector (STMP)	1	0
Stand Off® Limestone & Marble Protector	2	0
“Grey Limestone”		
Product	Color Enhancement	Sheen Enhancement
Untreated Control	--	--
Stand Off® Color Enhancer WB	1	0
Consolideck® Saltguard® WB	1	0
Stand Off® Stone, Tile & Masonry Protector (STMP)	3	0
Stand Off® Limestone & Marble Protector	3	0

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

Photographs – Color and Sheen Enhancement

“Cappuccino Marble” Treatment Applied



Consolideck® Saltguard® WB	Untreated Control	Stand Off® Color Enhancer WB
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Stand Off® Stone, Tile & Masonry Protector (STMP)	Untreated Control	Stand Off® Limestone & Marble Protector
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Photographs – Color and Sheen Enhancement

“Red Limestone” Treatment Applied



Consolideck® Saltguard® WB	Untreated Control	Stand Off® Color Enhancer WB
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Stand Off® Stone, Tile & Masonry Protector (STMP)	Untreated Control	Stand Off® Limestone & Marble Protector
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Recommendations – Color and Sheen Enhancement

Recommendations for color and sheen enhancement for the samples submitted by Classic Stone, Inc., Northbrook, IL are provided in the chart below. Recommendations are based on the treatment that proved most effective in providing color and sheen enhancement to the submitted samples.

Sample	Color Enhancement	Sheen Enhancement
"Cappuccino Marble"	Stand Off® Color Enhancer WB or Consolideck® Saltguard® WB	Stand Off® Color Enhancer WB or Consolideck® Saltguard® WB
"Shadow Marble"	Stand Off® Color Enhancer WB or Consolideck® Saltguard® WB or Stand Off® Stone, Tile & Masonry Protector (STMP)	Stand Off® Color Enhancer WB or Consolideck® Saltguard® WB or Stand Off® Limestone & Marble Protector
"Red Limestone"	Stand Off® Color Enhancer WB or Consolideck® Saltguard® WB	No Recommendations
"Yellow Limestone"	Stand Off® Color Enhancer WB or Consolideck® Saltguard® WB or Stand Off® Limestone & Marble Protector	No Recommendations
"Grey Limestone"	Stand Off® Stone, Tile & Masonry Protector (STMP) or Stand Off® Limestone & Marble Protector	No Recommendations

Note: Stand Off® Limestone & Marble Protector are manufactured and marketed in compliance with VOC regulations. These products may not be suitable for sale in states and districts with more restrictive regulations.

Stain Repellency

These trials were conducted to determine the effectiveness of treatments in preventing food and oil staining on the submitted samples.

Description of Products Evaluated – Stain Repellency

Stain Repellent Treatments

Stand Off® Stone, Tile & Masonry Protector (STMP) – A penetrating oil and stain repellent that is an easy-to-use, low-VOC, low-odor protective treatment improves the stain resistance and simplifies maintenance cleaning of interior and exterior stone, quarry tile, concrete and masonry surfaces.

Stand Off® Limestone & Marble Protector – A clear, penetrating water and oil repellent suitable for use on interior or exterior calcareous surfaces such as limestone, marble and travertine. It's also suitable for many other types of masonry surfaces. Limestone & Marble Protector penetrates deeply to provide surface and subsurface protection without forming a glossy surface film. Treated surfaces retain their natural color, texture and appearance. Limestone & Marble Protector combines high quality siloxane resins with “oleophobic” resins to produce a penetrating water and oil repellent ideal for long-term protection against food, oil and waterborne staining. Unlike conventional penetrating oil repellent products, Limestone & Marble Protector has been modified to ensure effectiveness on limestone, marble and other calcareous or neutral pH surfaces.

Maintenance Cleaner

Enviro Klean® 2010 All Surface Cleaner – A “next-generation” product for cleaning and degreasing light-to-heavily soiled stone, tile, masonry and much more. Powerful enough for industrial use, flexible enough for jobs around the home, space-saving EK 2010 replaces a host of individual cleaning agents. It is suitable for home-use on windows, bathroom tub and tile, counter tops and more when diluted with water. It's concentrated enough for the toughest industrial cleaning jobs on concrete, metal and many other plant and warehouse surfaces. EK 2010 also removes Paver Kare® Weather Seal Siloxane PD overspray from windows.

Staining Agents Evaluated

<u>Products</u>	<u>Temperature</u>
Coca Cola	ambient (~70°F)
Ketchup	ambient (~70°F)
Mustard	ambient (~70°F)
Red Wine	ambient (~70°F)
Balsamic Vinegar	ambient (~70°F)
Soy Sauce	ambient (~70°F)
Olive Oil	ambient (~70°F)
Wesson Oil	(~250°F)
Coffee	(~120°F)

Sample Preparation – Stain Repellency

Both products were applied by brush in accordance with the current PROSOCO, Inc. Product Data Sheet instructions and allowed to cure for at least 72 hours.

Test Method – Stain Repellency

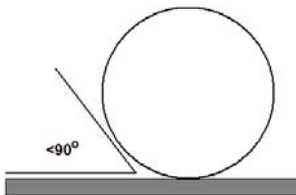
Surface Beading Evaluation

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.

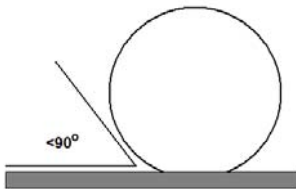
Note: Non-free flowing staining agents such as ketchup and mustard are applied in a globular fashion and therefore are not evaluated for their beading properties.

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.



Stain Removal Evaluation

The soiling agents were allowed to dwell on the treated and untreated substrates 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 1 part concentrate to 10 parts fresh water and scrubbed under a stream of running water from a faucet. 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 – Surface Beading

“Cappuccino Marble”									
Treatment	Coco-Cola	Mustard	Ketchup	Red Wine	Balsamic Vinegar	Soy Sauce	Olive Oil	Wesson Oil	Hot Coffee
Untreated Control	4	*	*	5	5	5	5	5	5
Stand Off® Stone, Tile & Masonry Protector (STMP)	2	*	*	4	3	4	4	3	3
Stand Off® Limestone & Marble Protector	3	*	*	4	3	4	5	5	5
“Shadow Marble”									
Treatment	Coco-Cola	Mustard	Ketchup	Red Wine	Balsamic Vinegar	Soy Sauce	Olive Oil	Wesson Oil	Hot Coffee
Untreated Control	4	*	*	5	5	5	5	5	4
Stand Off® Stone, Tile & Masonry Protector (STMP)	2	*	*	5	3	3	4	2	3
Stand Off® Limestone & Marble Protector	3	*	*	5	3	3	2	3	3
“Red Limestone”									
Treatment	Coco-Cola	Mustard	Ketchup	Red Wine	Balsamic Vinegar	Soy Sauce	Olive Oil	Wesson Oil	Hot Coffee
Untreated Control	5	*	*	5	5	5	5	5	5
Stand Off® Stone, Tile & Masonry Protector (STMP)	3	*	*	4	4	4	4	3	2
Stand Off® Limestone & Marble Protector	2	*	*	3	2	2	4	3	3
“Yellow Limestone”									
Treatment	Coco-Cola	Mustard	Ketchup	Red Wine	Balsamic Vinegar	Soy Sauce	Olive Oil	Wesson Oil	Hot Coffee
Untreated Control	5	*	*	5	5	5	5	5	5
Stand Off® Stone, Tile & Masonry Protector (STMP)	4	*	*	4	4	4	4	3	2
Stand Off® Limestone & Marble Protector	2	*	*	3	3	3	3	3	2
“Grey Limestone”									
Treatment	Coco-Cola	Mustard	Ketchup	Red Wine	Balsamic Vinegar	Soy Sauce	Olive Oil	Wesson Oil	Hot Coffee
Untreated Control	5	*	*	5	5	5	5	5	5
Stand Off® Stone, Tile & Masonry Protector (STMP)	3	*	*	4	3	4	2	2	2
Stand Off® Limestone & Marble Protector	2	*	*	2	2	3	2	2	3

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

Test Results – Stain Repellency**% Stain Removal**

“Cappuccino Marble”									
Untreated Control									
	Coco-Cola	Ketchup	Mustard	Red Wine	Balsamic Vinegar	Soy Sauce	Olive Oil	Wesson Oil	Hot Coffee
24 hr	100 %	100 %	100 %	100 %	100 %	100 %	85 %	85 %	100 %
4 hr	100 %	100 %	100 %	100 %	100 %	100 %	85 %	85 %	100 %
1 hr	100 %	100 %	100 %	100 %	100 %	100 %	90 %	90 %	100 %
10 min	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Stand Off® Stone, Tile & Masonry Protector (STMP)									
	Coco-Cola	Ketchup	Mustard	Red Wine	Balsamic Vinegar	Soy Sauce	Olive Oil	Wesson Oil	Hot Coffee
24 hr	100 %	100 %	100 %	100 %	100 %	80 %	80 %	95 %	98 %
4 hr	100 %	100 %	100 %	100 %	100 %	80 %	80 %	95 %	98 %
1 hr	100 %	100 %	100 %	100 %	100 %	95 %	85 %	100 %	100 %
10 min	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Stand Off® Limestone & Marble Protector									
	Coco-Cola	Ketchup	Mustard	Red Wine	Balsamic Vinegar	Soy Sauce	Olive Oil	Wesson Oil	Hot Coffee
24 hr	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
4 hr	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
1 hr	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
10 min	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %

<1 % -- Indicates the % stain removal cannot be determined due to saturation of the oil stain.

100% -- Indicates etching upon the surface.

Test Results – Stain Repellency**% Stain Removal**

“Shadow Marble”									
Untreated Control									
	Coco-Cola	Ketchup	Mustard	Red Wine	Balsamic Vinegar	Soy Sauce	Olive Oil	Wesson Oil	Hot Coffee
24 hr	100 %	400 %	400 %	400 %	400 %	100 %	100 %	100 %	100 %
4 hr	100 %	400 %	400 %	400 %	400 %	100 %	100 %	100 %	100 %
1 hr	100 %	400 %	400 %	400 %	400 %	100 %	100 %	100 %	100 %
10 min	100 %	400 %	400 %	400 %	400 %	100 %	100 %	100 %	100 %
Stand Off® Stone, Tile & Masonry Protector (STMP)									
	Coco-Cola	Ketchup	Mustard	Red Wine	Balsamic Vinegar	Soy Sauce	Olive Oil	Wesson Oil	Hot Coffee
24 hr	100 %	400 %	400 %	400 %	400 %	100 %	100 %	100 %	100 %
4 hr	100 %	400 %	400 %	400 %	400 %	100 %	100 %	100 %	100 %
1 hr	100 %	400 %	400 %	400 %	400 %	100 %	100 %	100 %	100 %
10 min	100 %	400 %	400 %	400 %	400 %	100 %	100 %	100 %	100 %
Stand Off® Limestone & Marble Protector									
	Coco-Cola	Ketchup	Mustard	Red Wine	Balsamic Vinegar	Soy Sauce	Olive Oil	Wesson Oil	Hot Coffee
24 hr	100 %	400 %	400 %	400 %	400 %	100 %	100 %	100 %	100 %
4 hr	100 %	400 %	400 %	400 %	400 %	100 %	100 %	100 %	100 %
1 hr	100 %	400 %	400 %	400 %	400 %	100 %	100 %	100 %	100 %
10 min	100 %	400 %	400 %	400 %	400 %	100 %	100 %	100 %	100 %

<1 % -- Indicates the % stain removal cannot be determined due to saturation of the oil stain.

400 % -- Indicates etching upon the surface.

Test Results – Stain Repellency**% Stain Removal**

“Red Limestone”									
Untreated Control									
	Coco-Cola	Ketchup	Mustard	Red Wine	Balsamic Vinegar	Soy Sauce	Olive Oil	Wesson Oil	Hot Coffee
24 hr	<1 %	100 %	100 %	100 %	100 %	<1 %	<1 %	<1 %	<1 %
4 hr	100 %	100 %	100 %	100 %	100 %	<1 %	<1 %	<1 %	<1 %
1 hr	100 %	100 %	100 %	100 %	100 %	<1 %	<1 %	<1 %	<1 %
10 min	100 %	100 %	100 %	100 %	100 %	<1 %	<1 %	<1 %	<1 %
Stand Off® Stone, Tile & Masonry Protector (STMP)									
	Coco-Cola	Ketchup	Mustard	Red Wine	Balsamic Vinegar	Soy Sauce	Olive Oil	Wesson Oil	Hot Coffee
24 hr	100 %	100 %	100 %	100 %	100 %	85 %	50 %	50 %	90 %
4 hr	100 %	100 %	100 %	100 %	100 %	87 %	75 %	75 %	90 %
1 hr	100 %	100 %	100 %	100 %	100 %	95 %	80 %	80 %	90 %
10 min	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	90 %
Stand Off® Limestone & Marble Protector									
	Coco-Cola	Ketchup	Mustard	Red Wine	Balsamic Vinegar	Soy Sauce	Olive Oil	Wesson Oil	Hot Coffee
24 hr	100 %	100 %	100 %	100 %	100 %	100 %	98 %	98 %	100 %
4 hr	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
1 hr	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
10 min	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %

<1 % -- Indicates the % stain removal cannot be determined due to saturation of the oil stain.

100 % -- Indicates etching upon the surface.

Test Results – Stain Repellency**% Stain Removal**

“Yellow Limestone”									
Untreated Control									
	Coco-Cola	Ketchup	Mustard	Red Wine	Balsamic Vinegar	Soy Sauce	Olive Oil	Wesson Oil	Hot Coffee
24 hr	<1 %	40 %	10 %	98 %	98 %	<1 %	<1 %	<1 %	<1 %
4 hr	<1 %	90 %	20 %	98 %	98 %	<1 %	<1 %	<1 %	<1 %
1 hr	<1 %	100 %	100 %	98 %	98 %	<1 %	<1 %	<1 %	<1 %
10 min	<1 %	100 %	100 %	98 %	98 %	<1 %	<1 %	<1 %	<1 %
Stand Off® Stone, Tile & Masonry Protector (STMP)									
	Coco-Cola	Ketchup	Mustard	Red Wine	Balsamic Vinegar	Soy Sauce	Olive Oil	Wesson Oil	Hot Coffee
24 hr	100 %	100 %	5 %	95 %	30 %	20 %	5 %	5 %	90 %
4 hr	100 %	100 %	95 %	97 %	35 %	30 %	15 %	15 %	90 %
1 hr	100 %	100 %	100 %	97 %	50 %	50 %	25 %	25 %	100 %
10 min	100 %	100 %	100 %	100 %	98 %	90 %	90 %	90 %	100 %
Stand Off® Limestone & Marble Protector									
	Coco-Cola	Ketchup	Mustard	Red Wine	Balsamic Vinegar	Soy Sauce	Olive Oil	Wesson Oil	Hot Coffee
24 hr	100 %	100 %	10 %	100 %	<1 %	100 %	100 %	100 %	100 %
4 hr	100 %	100 %	<1 %	100 %	<1 %	100 %	100 %	100 %	100 %
1 hr	100 %	100 %	<1 %	100 %	<1 %	100 %	100 %	100 %	100 %
10 min	100 %	100 %	100 %	100 %	<1 %	100 %	100 %	100 %	100 %

<1 % -- Indicates the % stain removal cannot be determined due to saturation of the oil stain.

100% -- Indicates etching upon the surface.

Test Results – Stain Repellency**% Stain Removal**

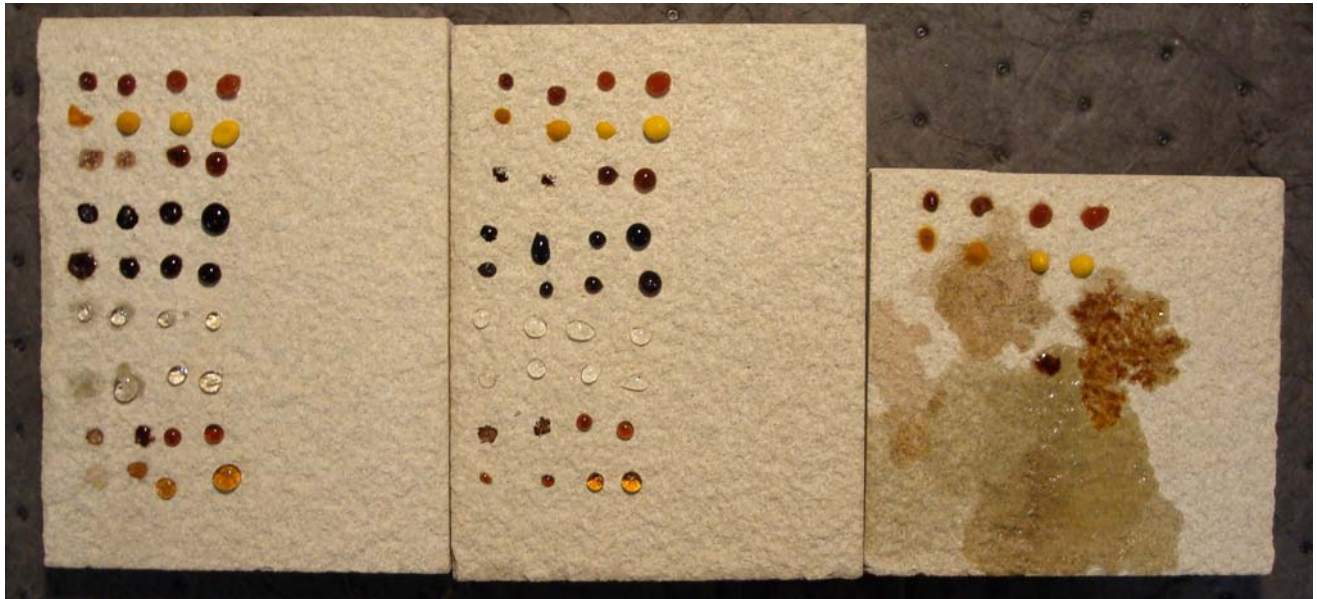
“Grey Limestone”									
Untreated Control									
	Coco-Cola	Ketchup	Mustard	Red Wine	Balsamic Vinegar	Soy Sauce	Olive Oil	Wesson Oil	Hot Coffee
24 hr	<1 %	5 %	5 %	<1 %	<1 %	<1 %	<1 %	<1 %	<1 %
4 hr	<1 %	85 %	15 %	<1 %	<1 %	<1 %	<1 %	<1 %	<1 %
1 hr	<1 %	100 %	80 %	<1 %	<1 %	<1 %	<1 %	<1 %	<1 %
10 min	<1 %	100 %	80 %	<1 %	<1 %	<1 %	<1 %	<1 %	<1 %
Stand Off® Stone, Tile & Masonry Protector (STMP)									
	Coco-Cola	Ketchup	Mustard	Red Wine	Balsamic Vinegar	Soy Sauce	Olive Oil	Wesson Oil	Hot Coffee
24 hr	100 %	100 %	50 %	100 %	100 %	100 %	100 %	100 %	100 %
4 hr	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
1 hr	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
10 min	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Stand Off® Limestone & Marble Protector									
	Coco-Cola	Ketchup	Mustard	Red Wine	Balsamic Vinegar	Soy Sauce	Olive Oil	Wesson Oil	Hot Coffee
24 hr	80 %	100 %	5 %	90 %	30 %	20 %	30 %	20 %	80 %
4 hr	80 %	100 %	85 %	90 %	30 %	75 %	30 %	20 %	80 %
1 hr	80 %	100 %	85 %	90 %	40 %	85 %	100 %	100 %	100 %
10 min	80 %	100 %	85 %	95 %	80 %	100 %	100 %	100 %	100 %

<1 % -- Indicates the % stain removal cannot be determined due to saturation of the oil stain.

100% -- Indicates etching upon the surface.

Photographs – Stain Repellency

“Grey Limestone” Stains Applied



“Grey Limestone” Stains Removed



Photographs – Stain Repellency

“Cappuccino Marble” Stains Applied



“Cappuccino Marble” Stains Removed



Surface Sheen

Conclusions – Stain Repellency

Based upon laboratory evaluations, Stand Off® Stone, Tile & Masonry Protector (STMP) and Stand Off® Limestone & Marble Protector improved the surface beading of the samples. In addition, the treatments evaluated were effective in repelling the staining agents from the submitted samples. Although Stand Off® Limestone & Marble Protector was most effective. Some stains resulted in etching on both the limestone and marble. The etching on the treated surface was not as distinct as the untreated surface. Stand Off® Stone, Tile & Masonry Protector (STMP) and Stand Off® Limestone & Marble Protector protected the samples from oil stain saturation.

Recommendations – Stain Repellency

Recommendations for stain resistance treatment for the samples submitted by Classic Stone, Inc., Northbrook, IL are provided in the chart below. Recommendations are based on the treatments that proved most effective for providing stain repellency on the submitted samples.

Sample	Stain Repellent	Maintenance Cleaner
“Cappuccino Marble” “Red Limestone” “Yellow Limestone” “Grey Limestone”	Stand Off® Limestone & Marble Protector	Enviro Klean® 2010 All Surface Cleaner
“Shadow Marble”	Stand Off® Stone, Tile & Masonry Protector (STMP) or Stand Off® Limestone & Marble Protector	

***NOTE:** Stand Off® Limestone & Marble Protector is manufactured and marketed in compliance with VOC regulations. This product may not be suitable for sale in states and districts with more restrictive regulations.

The ability of a stain repellent treatment to prevent staining is affected by a variety of factors. Therefore, on-site testing should be carried out for all installations with the recommended systems to ensure job site workmanship yields equivalent results.

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 stain repellent product and procedures for a particular project. See product literature for additional application and product information.



Alia Bober
Project Testing Laboratory Technician



PALLET TAG PROGRAM
Laboratory Report

Classic Stone, Inc
1420 Techny Rd.
Northbrook, IL 60062



Project No. 0807-06 PTP

Prepared For:
PROSOCO
SINCE 1939

Prepared By:
AMT Laboratories
September 2008