



PALLET TAG PROGRAM LABORATORY REPORT



PROSOCO, Inc.

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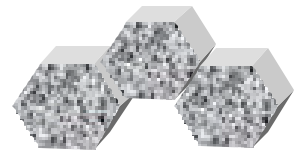
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ATTACHMENTS

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



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FOR: Craig Frieze
cc: Paul Tessier
Stephen Dean

SUBJECT: Miller Materials
Kansas City, MO

DATE: October 24, 2002

PROJECT: 0208-10 PTP

SAMPLES SUBMITTED:

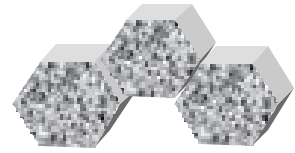
(2) "Gray" tumbled concrete pavers

Size: 9 1/2" x 3 1/8" x 14" (both)

Submitted by: Craig Frieze



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PURPOSE OF TESTING:

Two integrally colored concrete pavers with large, small and fine aggregate were submitted for testing, one paver to be tested using PROSOCO's new construction cleaning products, and one paver to be tested with water repellent and stain repellent products.

A. Cleaning & Color Uniformity Testing* - Sure Klean[®] Custom Masonry Cleaner, Sure Klean[®] Burnished Custom Masonry Cleaner, Enviro Klean[®] Safety Klean, and Enviro Klean[®] 2010 All Surface Cleaner were evaluated at various dilutions to determine the optimal concentration of cleaner that leaves the external surface looking most like the natural through-body color of the CMU. Color uniformity was evaluated by comparing aggregate exposure and surface pigment alternation/removal of each cleaned surface compared to the natural through-body color of the CMU.

Aggregate Exposure is the visual examination comparing aggregate exposure of the interior, through-body section of CMU to surfaces cleaned with selected product(s) at given dilutions.

Surface Pigment Alteration/Removal* is the visual examination comparing the pigmentation of the interior, through-body section of the CMU to surfaces cleaned with selected product(s) at given dilutions.

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

0 – Worst match to through-body	3 – Good match to through-body
1 – Poor match to through-body	4 – Best match to through-body
2 – Fair match to through-body	

* NOTE: When cleaning integrally colored CMU.

Integrally colored concrete masonry units (CMU's) frequently have high amounts of pigments concentrated on the surface of the cured concrete unit. Variation of surface pigment concentrations from one CMU to the next creates a blotchy appearance in the completed wall. Allowed to remain on the surface of the CMU, the weakly bound pigment will weather and streak, further detracting from the appearance of the completed CMU wall.

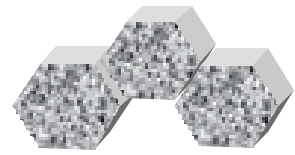
In addition to removing excess mortar and construction related soiling, the goal of any cleaning operation undertaken on integrally colored CMU should include removal of unnaturally high concentrations of surface pigment. By revealing the natural through-body color on the integrally colored unit, the overall color uniformity and weathering resistance of the completed CMU wall is improved.

B. Protective Water Repellents – Consolideck[®] Saltguard[®] WB, Sure Klean[®] Weather Seal Siloxane WB Concentrate, Stand Off[®] SLX100 Water & Oil Repellent, Stand Off[®] Stone, Tile, & Masonry Protector, and Stand Off[®] Impregnator were evaluated for their ability to provide water repellency to the submitted sample.

C. Stain Resistance – Stand Off[®] Stone, Tile & Masonry Protector, Stand Off[®] SLX100 Water & Oil Repellent, and Stand Off[®] Impregnator were evaluated for their ability to resist applied staining agents on the submitted sample. Enviro Klean[®] 2010 All Surface Cleaner diluted with 10 parts fresh water was evaluated for its ability to remove the staining agents from the submitted sample.



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PRODUCTS EVALUATED FOR CLEANING AND COLOR UNIFORMITY

Sample	Product	Dilution
"Gray" Tumbled Concrete Paver	Sure Klean [®] Custom Masonry Cleaner	1:2, 1:4, 1:6, 1:8
	Sure Klean [®] Burnished Custom Masonry Cleaner	1:2, 1:3
	Enviro Klean [®] Safety Klean	1:4, 1:10
	Enviro Klean [®] 2010 All Surface Cleaner	1:10

WATER REPELLENT PRODUCTS EVALUATED

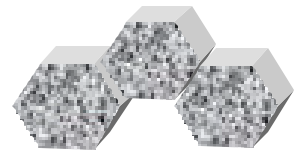
Sample	Product	Dilution
"Gray" Tumbled Concrete Paver	Consolideck [®] Saltguard [®] WB	Concentrate
	Sure Klean [®] Weather Seal Siloxane WB Concentrate	1:9
	Stand Off [®] Stone, Tile, & Masonry Protector	Concentrate
	Stand Off [®] SLX100 Water & Oil Repellent	Concentrate
	Stand Off [®] Impregnator	Concentrate

STAIN REPELLANT PRODUCTS EVALUATED

Sample	Product
"Gray" Tumbled Concrete Paver	Stand Off [®] Stone, Tile, & Masonry Protector
	Stand Off [®] SLX100 Water & Oil Repellent
	Stand Off [®] Impregnator



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SECTION A – CLEANING & COLOR UNIFORMITY TESTING

DESCRIPTION OF PRODUCTS EVALUATED

These cleaning trials were conducted to determine the optimal cleaning/color uniformity.

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® Burnished Custom Masonry Cleaner - A general-purpose, non-etching acidic cleaner that removes rust, mud, oil, atmospheric dirt, mortar smears and other stains without altering the surface texture. Burnished Custom Masonry Cleaner adds depth to colors, brightens white matrices and exposed aggregate.

Enviro Klean® Safety Klean – An effective, safe alternative to acidic compounds for cleaning brick, tile, and concrete surfaces. Safety Klean removes excess mortar, dirt, and other common job site soiling. Safety Klean contains no hydrochloric acid and is safe to use on metal surfaces. Apply by brush or low pressure spray.

Enviro Klean® 2010 All Surface Cleaner – An effective, safe alternative to acidic compounds for cleaning stone, tile, and masonry surfaces. 2010 All Surface Cleaner is concentrated for tough industrial cleaning jobs yet is water-rinsable and contains no harsh acids, caustics, or solvents. Can be used in concentrate or diluted with up to 10 parts water. Apply by brush or low-pressure spray.

TEST METHOD – Cleaning & Color Uniformity

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

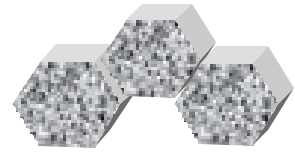
1. Prewet the surface with water.
2. Apply each cleaner at the appropriate dilutions.
3. Allow appropriate dwell time, as specified.

Custom Masonry Cleaner	3 minutes
Burnished Custom Masonry Cleaner	5 minutes
Safety Klean.....	5 minutes
2010 All Surface Cleaner.....	10 minutes
4. Reapply the products and moderately agitate with a brush.
5. Pressure rinse thoroughly.*
6. Allow the sample to dry for at least 18 hours and visually examine.

* 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 - Cleaning

% removal

"Gray" Tumbled Concrete Paver		
Product	Dilution	% Effectiveness
Custom Masonry Cleaner	1:2	100%
Custom Masonry Cleaner	1:4	100%
Custom Masonry Cleaner	1:6	100%
Custom Masonry Cleaner	1:8	100%
Burnished Custom Masonry Cleaner	1:2	100%
Burnished Custom Masonry Cleaner	1:3	100%
Safety Klean	1:4	100%
Safety Klean	1:10	100%
2010 All Surface Cleaner	1:10	100%

CONCLUSIONS - Cleaning and Color Uniformity

In tests conducted, all cleaners and dilutions tested were able to remove surface soiling effectively without any adverse effects to the substrate. Use higher concentrations and surface agitation to maximize aggregate exposure. Use low concentration and surface agitation to minimize aggregate exposure.

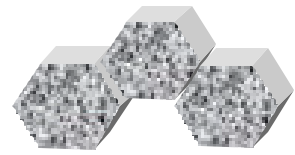
All dilutions of Sure Klean[®] Custom Masonry Cleaner tested affected the substrate in a similar manner, removing slight, moderate and heavy concentrations of pigmented matrix from the concrete pavers, exposing small and large aggregate, and enhancing the natural appearance of the integrally colored concrete masonry unit.

All dilutions of Sure Klean[®] Burnished Custom Masonry Cleaner and Enviro Klean[®] Safety Klean tested affected the substrate in a similar manner, removing slight to moderate concentrations of pigmented matrix from the concrete pavers, exposing small and large aggregate, and enhancing the natural appearance of the integrally colored concrete masonry unit.

Enviro Klean[®] 2010 All Surface Cleaner diluted with 10 parts fresh water was able to remove surface dirt without altering the appearance of the concrete paver in any way.



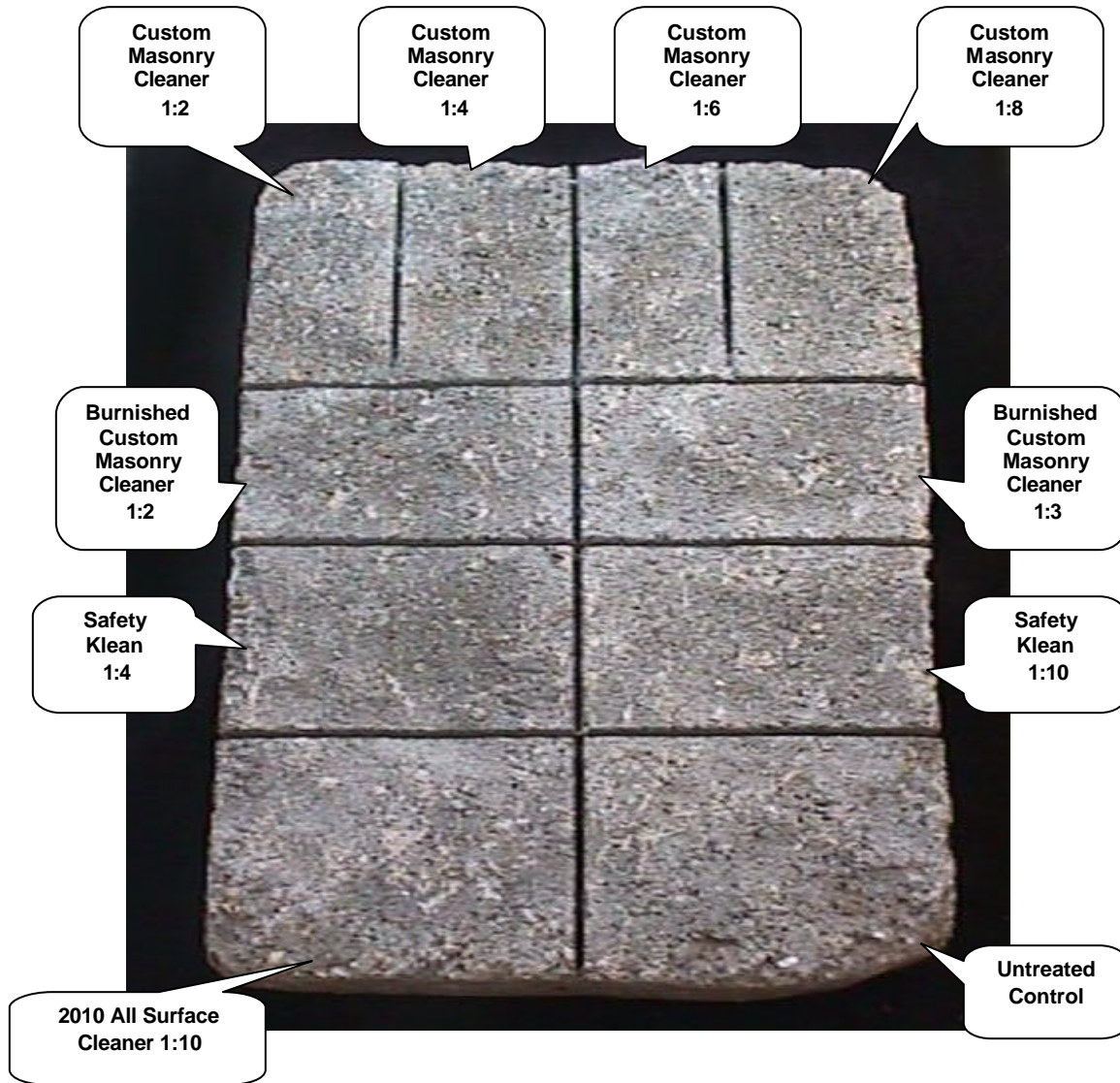
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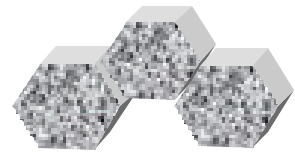
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PHOTOGRAPH – Cleaning and Color Uniformity





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RECOMMENDED PRODUCTS AND DILUTIONS – CLEANING & COLOR UNIFORMITY

Recommendations for cleaning for the “Gray” tumbled concrete paver submitted by Miller Materials, Kansas City, MO are provided in the chart below. Recommendations are based on the optimum dilution for complete removal of mortar.

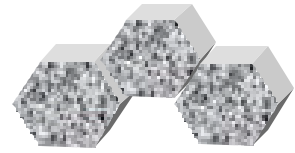
Sample	New Construction Cleaning & Color Uniformity
“Gray” Tumbled Concrete Paver	Sure Klean [®] Custom Masonry Cleaner (1:8)
	Sure Klean [®] Burnished Custom Masonry Cleaner (1:3)
	Enviro Klean [®] Safety Klean (1:10)
	Enviro Klean [®] 2010 All Surface Cleaner (1:10)

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 application and product information.



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SECTION B - 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 water based silane/siloxane water repellent and “chloride screen” to protect concrete and masonry surfaces. Saltguard® WB protects masonry surfaces from moisture intrusion and chemical attack of chloride salts. Provides effective protection against deicing salts and salt air. Apply with a brush or low pressure spray.

Sure Klean® Weather Seal Siloxane WB Concentrate – A self-emulsifying water repellent concentrate designed for dilution with fresh water at the jobsite. This solvent-free blend of silanes and oligomeric alkoxy siloxanes mixes easily with water to produce a penetrating water repellent ideal for application to dense or porous masonry surfaces.

Stand Off® SLX100 Water & Oil Repellent – A modified, “neat” silane system that offers invisible protection and low volatility. SLX100 protects concrete and masonry surfaces against water and waterborne contaminants. In addition to water repellency SLX100 offers stain resistance and chloride screen.

Stand Off® Stone, Tile & Masonry Protector (STMP) – A penetrating oil and stain repellent that improves stain resistance and simplifies maintenance cleaning of interior and exterior stone, tile, concrete and masonry surfaces. Apply by brush or low pressure spray.

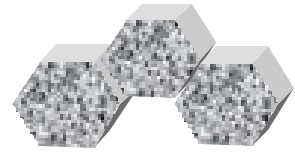
Stand Off® Impregnator – Combines water and oil repellency to prevent staining by waterborne or oily substances. Deeply penetrates and chemically bonds within the substrate to provide long-lasting protection against water- and oil-related staining and deterioration. In addition, Impregnator forms an effective chloride screen to reduce surface erosion and corrosion of rebar in reinforced concrete caused by water and water-carried salts.

SAMPLE PREPARATION - Protective Water Repellents:

The submitted block was scored, allowed to dry, and to reabsorb atmospheric humidity for 24 hours prior to treatment. The treatment method consisted of a wet-on-wet brush application. All treatments were allowed to cure at least 14 days prior to testing.



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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 TECH Note RILEM Tube Test Procedures.

TEST RESULTS - Protective Water Repellents

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

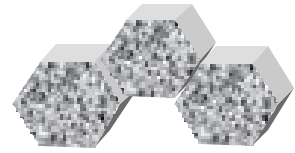
RESULTS	
"Gray" Tumbled Concrete Paver	
Untreated Control	< 40 mph
Saltguard WB	45 mph
Siloxane WB Concentrate (1:9)	60 mph
SLX100	60 mph
Stone, Tile, & Masonry Protector	59 mph
Impregnator	60 mph

CONCLUSIONS - Protective Water Repellents

Based upon laboratory evaluations, Sure Klean[®] Weather Seal Siloxane WB Concentrate (1:9), Stand Off[®] SLX100 Water & Oil Repellent, Stand Off[®] Stone, Tile, & Masonry Protector, and Stand Off[®] Impregnator all provided above excellent water repellency on the submitted concrete paver.



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RECOMMENDATIONS - PROTECTIVE WATER REPELLENTS

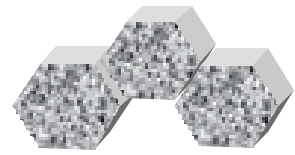
Recommendations for water repellency treatment for the concrete paver submitted by Miller Materials, Kansas City, MO are provided in the chart below. Recommendations are based on the treatments that proved most effective.

Sample	Water Repellent
"Gray" Tumbled Concrete Paver	Sure Klean [®] Weather Seal Siloxane WB Concentrate (1:9) Stand Off [®] SLX100 Water & Oil Repellent Stand Off [®] Stone, Tile & Masonry Protector Stand Off [®] Impregnator

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 application and product information.



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SECTION C – STAIN RESISTANCE

DESCRIPTION OF PRODUCTS EVALUATED

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

Products Evaluated for Stain Protection:

Stand Off[®] Stone, Tile & Masonry Protector – A penetrating oil and stain repellent. 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[®] SLX100 Water & Oil Repellent - A modified, “neat” silane system that offers invisible protection and low volatility. SLX100 protects concrete and masonry surfaces against water and waterborne contaminants. In addition to water repellency SLX100 offers stain resistance and chloride screen.

Stand Off[®] Impregnator – Combines water and oil repellency to prevent staining by waterborne or oily substances. Deeply penetrates and chemically bonds within the substrate to provide long-lasting protection against water- and oil-related staining and deterioration. In addition, Impregnator forms an effective chloride screen to reduce surface erosion and corrosion of rebar in reinforced concrete caused by water and water-carried salts.

Product Evaluated for Stain Removal:

Enviro Klean[®] 2010 All Surface Cleaner (1:10)

Food and Oil Products Evaluated:

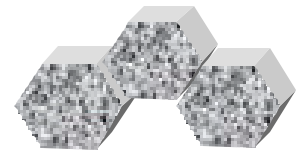
Coca Cola
Ketchup
Mustard
Red wine
Balsamic Vinegar
Soy Sauce
Olive oil
Wesson Oil
Coffee

Temperature:

ambient (~70°F)
ambient (~70°F)
ambient (~70°F)
ambient (~70°F)
ambient (~70°F)
ambient (~70°F)
ambient (~70°F)
250°F
120°F



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SAMPLE PREPARATION – Stain Resistance

Sample was cleaned with Enviro Klean[®] 2010 All Surface Cleaner diluted with 10 parts water, allowed to dry and absorb atmospheric moisture for 24 hours prior to treatment. The method of application for protective treatments consisted of a wet-on-wet saturating brush application. Sample was allowed to cure for at least 2 weeks prior to testing

TEST METHOD – Stain Resistance

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°) 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°

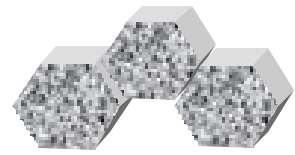


5. Wetting beyond the contact area (darkening); angle is flat.





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TEST METHODS: Continued

Stain Resistance

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 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.

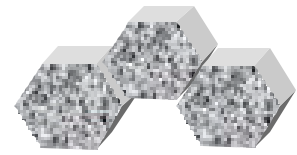
TEST RESULTS – Surface Beading

"Gray" Tumbled Concrete Paver				
	Untreated Control	SLX100	STMP	Impregnator
Coca Cola	3	3	2	2
Ketchup	N/A	N/A	N/A	N/A
Mustard	N/A	N/A	N/A	N/A
Red Wine	3	2	2	2
Balsamic Vinegar	3	3	2	2
Soy Sauce	3	2	2	2
Olive Oil	4	3	2	3
Wesson Oil	5	2	2	3
Hot Coffee	3	3	3	3

N/A – non-free flowing staining agent



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TEST RESULTS – Stain Resistance

Cleaned with: Enviro Klean[®] 2010 All Surface Cleaner (1:10)

% Removal

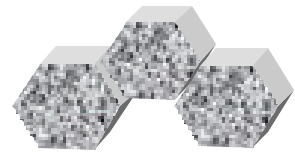
“Gray” Tumbled Concrete Paver

Untreated Control									
	Coca Cola	Ketchup	Mustard	Red Wine	Balsamic Vinegar	Soy Sauce	Olive Oil	Wesson Oil	Hot Coffee
24 hr	100%	100%	40%	80%	80%	80%	<1 %	<1 %	75%
4 hour	100%	100%	50%	80%	80%	80%	<1 %	<1 %	80%
1 hour	100%	100%	80%	100%	100%	100%	<1 %	<1 %	100%
10 min.	100%	100%	100%	100%	100%	100%	<1 %	<1 %	100%
Stand Off[®] Stone, Tile, & Masonry Protector									
	Coca Cola	Ketchup	Mustard	Red Wine	Balsamic Vinegar	Soy Sauce	Olive Oil	Wesson Oil	Hot Coffee
24 hr	100%	100%	100%	50%	85%	100%	30%	30%	80%
4 hour	100%	100%	100%	50%	90%	100%	90%	90%	80%
1 hour	100%	100%	100%	50%	100%	100%	100%	100%	100%
10 min.	100%	100%	100%	100%	100%	100%	100%	100%	100%
Stand Off[®] SLX100 Water & Oil Repellent									
	Coca Cola	Ketchup	Mustard	Red Wine	Balsamic Vinegar	Soy Sauce	Olive Oil	Wesson Oil	Hot Coffee
24 hr	100%	100%	100%	100%	100%	100%	30%	30%	100%
4 hour	100%	100%	100%	100%	100%	100%	30%	30%	100%
1 hour	100%	100%	100%	100%	100%	100%	80%	80%	100%
10 min.	100%	100%	100%	100%	100%	100%	100%	100%	100%
Stand Off[®] Impregnator									
	Coca Cola	Ketchup	Mustard	Red Wine	Balsamic Vinegar	Soy Sauce	Olive Oil	Wesson Oil	Hot Coffee
24 hr	100%	100%	60%	80%	100%	100%	30%	30%	100%
4 hour	100%	100%	80%	80%	100%	100%	50%	50%	100%
1 hour	100%	100%	80%	90%	100%	100%	80%	80%	100%
10 min.	100%	100%	90%	100%	100%	100%	80%	80%	100%

% Removal of staining agent
* Etching due to acidic staining agent



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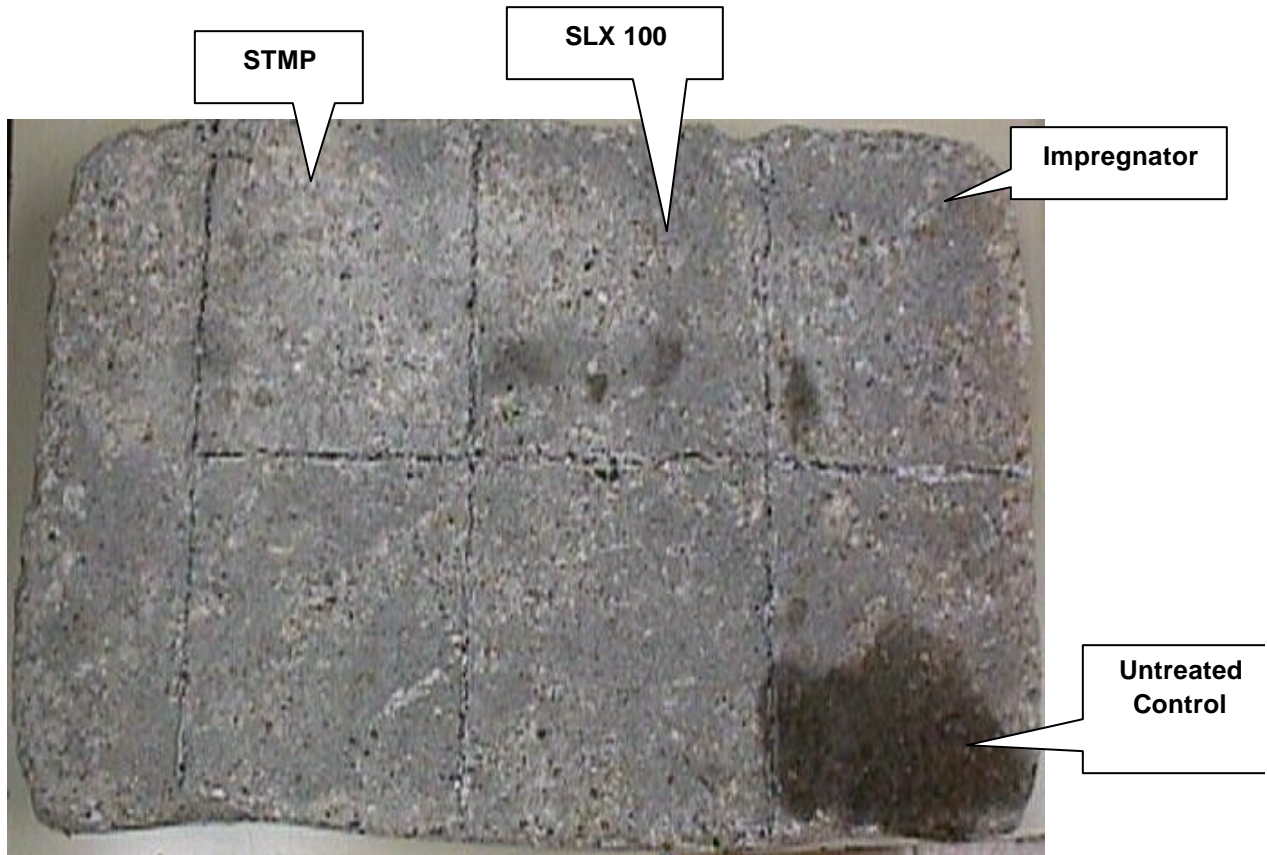


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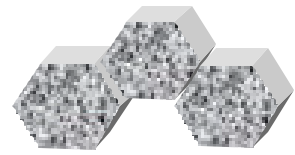
PHOTOGRAPH – Stain Resistance

“Gray” Tumbled Concrete Paver





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CONCLUSIONS – Stain Resistance

Based upon laboratory evaluations, Stand Off[®] Stone, Tile & Masonry Protector (STMP) was the most effective at repelling the staining agents from the submitted concrete paver. Stand Off[®] SLX100 was also very effective but did not repel the oil stain agents as well as STMP.

RECOMMENDATIONS – STAIN RESISTANCE

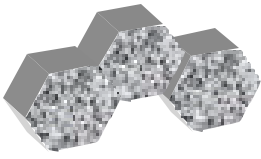
Recommendations for stain resistance treatment for the “Gray” tumbled concrete paver submitted by Miller Materials, Kansas City, MO are provided in the chart below. Recommendations are based on the treatment that proved most effective for providing stain repellency to the staining agents applied.

Sample	Stain Repellent	Maintenance Cleaner
“Gray” Tumbled Concrete Paver	Stand Off [®] Stone, Tile & Masonry Protector	Enviro Klean [®] 2010 All Surface Cleaner (1:10)

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 graffiti control product and procedure for a particular project. See product literature for application and product information.

Courtney A. Williams
Project Testing Coordinator

CAW/



Laboratory Report

Pallet Tag Program Evaluation

**Miller Materials
Kansas City, MO**

Project No. 0208-10 PTP

Prepared For:

Prepared By:



***PROSOCO, Inc.
September 2002***