

Attachment B

**District of Columbia
Department of General Services
2012 Earthquake Initiative**

**One Judiciary Square Building Parking Garage
Concrete Damage Condition Assessment
and Repair Recommendations
October 10, 2012**



Introduction:

This report provides the results of a structural investigation of existing deterioration and damage to the parking garage entrance ramps and parking decks at One Judiciary Square. The recommendations in this report include structural repairs and installation of a protective waterproof traffic coating to ensure extended usability and integrity of the parking garage. The recommendations of this report are beyond the initial assessment and report issued with a date of 2/15/12.

For this investigation test samples were performed by Froehling & Robertson, Inc to determine the levels of chlorides in the concrete slab at various locations in the garage. Their results are included as part of this report, and the locations identified on the drawings.

Robert Silman Associates performed a detail survey of the slabs of the parking garage to determine the extent of concrete repair required. This report included their recommendations and drawings indicating the extent of repairs and typical repair details.

Waterproof Traffic Coating:

Upon completion of the repairs the surface of the ramps and parking decks shall be coated with a waterproof traffic barrier. A product recommendation is included as part of this report.

The waterproof traffic barrier shall be installed on the entire surface of the entrance ramps and the deck of parking level P1.

Striping:

Parking stall striping and signals on the floor slab will be removed during the repairs and waterproofing. These will need to be documented and replicated upon completion of the repairs.



**One Judiciary Square Building Parking Garage
Concrete Damage Condition Assessment
and Repair Recommendations**

RSA PROJECT NO. W2861
September 27, 2012

PREPARED FOR:

Bell Architects, PC
1228 9th Street NW
Washington, DC 20001
Attn: Robert D. Swank

By:

Robert Silman Associates
1053 31st Street NW
Washington, DC 20007

BACKGROUND

Robert Silman Associates (RSA) conducted an investigation on June 27th of the parking garage concrete slab at the One Judiciary Square (OJS) building, located at 441 4th St. in Northwest DC. This investigation involves an assessment of areas at the parking garage where there is visible concrete slab damage. This assessment is based on visual observation of accessible areas and sounding the concrete with a metal rod to identify locations of potential delamination. In support of the visual observation assessment and sounding of the concrete, RSA recommended testing of the existing structural concrete slab to identify the content of chloride ion intrusion into the concrete. Below is a summary of findings from the visual observation assessment, concrete test results, and recommendations.

FINDINGS

Visual Observation Assessment

During the assessment, RSA noted several conditions which are described below and shown on the plans, sheets S-1 thru S-5:

1. Observed damage on the top surface of the concrete slab: specifically loss of concrete and exposed reinforcement, particularly near the ramps and at the south side of parking level P1. Locations of these areas and their respective square footage are shown on the plans, see sheets S-1, S-3, and S-5.
2. Additional delamination of concrete was identified by sounding at areas where damage on the top surface of the concrete slab was observed. Locations of these areas and their respective square footage are shown on the plans, sheets S-1, S-3, and S-5.
3. Concrete spalling and exposed reinforcement at underside of the parking garage level P1 and first cellar level slabs. In areas where reinforcing steel is exposed, it appears that the cross section area of the exposed rebar at the underside of the ramps has been reduced to 80% or less of its original area due to corrosion. Cracking, corrosion stains, and delaminating concrete was observed mostly at the underside of parking level P1. Locations of these areas and their respective square footage are shown on the plans, sheets S-2 and S-5.
4. Additional delamination of concrete was identified by sounding around the observed concrete spalls at underside of the parking garage level P1 and first cellar level slabs. Locations of these areas and their respective square footage are shown on the plans, sheets S-2 and S-5.
5. Delamination of concrete was also identified by sounding of observed cracks on the underside of the concrete slabs. Existing concrete patches on the underside of parking level P1 were showing signs of failure, with areas of delamination identified by sounding. Locations of these areas and their respective square footage are shown on the plan, sheet S-2.

The conditions observed are most likely attributed to infiltration of water, likely laden with salts, which leads to rebar corrosion. The expansion of steel which occurs as it corrodes then causes cracking and delamination of the concrete. On the underside of the parking garage slab this is seen as spalls, and deterioration of the finished top surface slab, leaving a soft, dusting, less wearing-resistant surface.

Concrete Testing for Chloride Ion Content

In support to findings from the visual observation assessment, RSA recommended testing of the existing structural concrete slab to identify the content of chloride ion intrusion into the concrete. A total of 16 samples were extracted by Froehling & Robertson in accordance with the AASHTO T260 Standard. These samples were extracted in the vicinity of the 8 locations indicated by RSA on sheets S-2 and S-5. Concrete samples were analyzed by CONCORR laboratory according to procedure A of the AASHTO T260 standard.

A maximum acceptable level of chloride is in the range of 0.024%-0.030% by weight of concrete.

Testing results provided indicate varied levels of chloride ion content in the existing parking garage reinforced concrete with lower chloride content at sample locations S3, S5, S6, S7, and S8 and higher chloride ion content at sample locations S1, S2, and S4. Locations where higher chloride content was found are all at or near the south side ramp between the street level and parking level P1.

Locations with chloride content approaching levels of concern, however, are not currently at a level that we believe required remedial steps.

RECOMMENDATIONS

- RSA recommends concrete repairs per enclosed sheet S-6 "CONCRETE REPAIR NOTES" at the locations shown on drawings S-1 thru S-5. The area of repairs is a basis for pricing allowance. Unit cost for repairs shall be provided.
- The level of chloride content reported by the testing agency does not warrant more comprehensive remedial steps beyond the local repairs indicated on drawing S-6.
- A traffic bearing water proof membrane shall be specified by a water proofing specialist. A comprehensive design of water management to preventing continued water intrusion into the slab will help to ensure longevity of the structure.

Enclosed: Laboratory Chloride Ion Content Testing Results from CONCORR, Drawings S-1 thru S-6.

TOTAL CHLORIDE ION CONTENT OF CONCRETE SAMPLES

www.concorr.com

Client: <u>Froehling & Robertson, Inc.</u>
<u>22923 Quicksilver Dr., Ste. 111</u>
<u>Sterling, VA 20166</u>
Project: <u>One Judiciary Square</u>

Total Chloride Ion Analysis Performed in Accordance with AASHTO T260

Total Chloride:

Water Soluble:

Date Test Performed: 9/11/2012

Date Results Reported: 9/11/2012

Note: pound per cubic yard calculated using unit weight of concrete as 3915 pcy.

Sample	Location	Depth	% by Wt. of Concrete	parts per million (ppm)	pounds per cubic yard (pcy)
1	S1-1	1"	0.014	139	0.54
2	S1-2	4"	0.006	59	0.23
3	S2-1	1"	0.009	94	0.37
4	S2-2	4"	0.011	107	0.42
5	S3-1	1"	0.008	79	0.31
6	S3-2	4"	0.004	44	0.17
7	S4-1	1"	0.034	336	1.32
8	S4-2	4"	0.011	109	0.43
9	S5-1	1"	0.006	59	0.23
10	S5-2	4"	0.007	69	0.27
11	S6-1	1"	0.005	46	0.18
12	S6-2	4"	0.005	50	0.20
13	S7-1	1"	0.006	63	0.25
14	S7-2	4"	0.006	55	0.22
15	S8-1	1"	0.007	68	0.27
16	S8-2	4"	0.007	67	0.26

CONCORR, Inc. 45710 Oakbrook Court, Suite 160, Sterling, VA 20166-7223 Ph: 571-434-1852 fax:571-434-1851

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Recommended Product

Vulkem® 350/345/346

Elastomeric, Waterproof Traffic Bearing

Product Description

Vulkem 350/345/346 is a modified polyurethane Traffic Deck Coating System composed of a base coat (350), heavy duty intermediate coat (345) and a top coat (346). This unique waterproofing system is designed to have tenacious adhesion, extreme impact, and abrasion resistance along with remarkable chemical stability. The elastomeric properties of the System's components enable the complete assembly to give and work with the concrete slab, bridging the shrinkage cracks.

Vulkem 350 Base Coat is a one-part urethane membrane that bonds firmly to clean, dry concrete and metal. It retains its integrity even if substrate movement causes hair-line cracks of up to 1/16 inch (1.5mm). If cut or damaged, Vulkem 350 will prevent water migration between it and its substrate. Vulkem 350 is available in an R (roller) and an SL (self-leveling) grade for vertical and horizontal application.

Vulkem 345 intermediate coat is a two-part urethane that is applied after the Vulkem 350 base coat has cured. The intermediate coat is loaded with aggregate to give the system excellent impact, abrasion and chemical resistance.

Vulkem 346 Top Coat is an Aliphatic Polyurethane that is applied after the Vulkem 345 intermediate coat has cured. Interlaminar adhesion to Vulkem 345 is exceedingly strong. The top coat affords excellent abrasion resistance, UV stability and chemical resistance to complete the Vulkem Traffic Deck Coating System.

Basic Uses

Vulkem 350/345/346 is a cold-applied Traffic Deck Coating System designed for waterproofing concrete slabs and protecting occupied areas underneath from water damage. Additionally, the System will protect the concrete from damaging effects of water, deicing salts, chemicals, gasoline, oils and anti-freeze.

Applicable Standards

Conforms to ASTM C957.

Packaging

Vulkem 350: 5 Gallon (18.9 L) Pails, 55 Gallon (208.2 L) Drums.
Vulkem 345: 5 Gallon (18.9 L) Pails, 55 Gallon (208.2 L) Drums.
Vulkem 346: 2 Gallon (7.6 L) Pails, 5 Gallon (18.9 L) Pails, 55 Gallon (208.2 L) Drums.



Standard Colors

Vulkem 346 is available in Beige, Gray, Limestone, Maple and Slate Gray. Special colors available upon request.

Installation

Concrete shall be water cured and in place for at least 14 days, preferably 28 days. Concrete finish shall be a light steel trowel followed by a fine hair broom, or equivalent finish. New or existing slabs must be dry, clean, sound and free of all contaminants which may interfere with adhesion or proper curing. Chemical and/or mechanical surface preparation may be required.

Refer to the Vulkem 350/345/346 Application Instructions for specific application details. The techniques involved may require modification to adjust to the job-site conditions. Consult your Tremco Field Representative for specific design requirements.

Limitations

- Do not apply to damp or contaminated surfaces.
- Use with adequate ventilation.

Availability

Immediately available from your local Tremco Field Representative, Tremco Distributor or Tremco Warehouse.

Warranty

Tremco warrants its Coatings to be free of defects in materials, but makes no warranty as to appearance or color. Since methods of application and on-site conditions are beyond our control and can affect performance, Tremco makes no other warranty, expressed or implied, including warranties of MERCHANTABILITY and FITNESS FOR A PARTICULAR PURPOSE, with respect to Tremco Coatings. Tremco's sole obligation shall be, at its option, to replace or refund the purchase of the quantity of Tremco Coating proved to be defective and Tremco shall not be liable for any loss or damage.

TYPICAL PHYSICAL PROPERTIES

Property	Test Method	Basecoat Vulkem 350	Interm. Coat Vulkem 345	Topcoat Vulkem 346
Solids (by weight)	ASTM D1353	88%	82%	72%
Drying Time @75°F, 50% RH	ASTM D 1640	30 mil film 24 hours	15 mil film 12 hours	9-11 mil film 24 hours
Flash Point	Set-A-Flash	112°F	95°F	85°F
Hardness (Shore A)	ASTM D 2240	25-35	60-70	85-95
Tensile Strength	ASTM D412 @75°F	320 psi	750 psi	3205 psi
Elongation	ASTM D 412	1040%	90%	120%
Adhesion (Peel Strength)	ASTM D903	Unprimed Concrete 30 lb/in	Vulkem 350 Basecoat 100% cohes.	Vulkem 345 Interm. Coat 100% cohes.
Abrasion Resistance (1000 cycles)	ASTM D4060	N/A	N/A	100mgms
MVT	ASTM E 96(B)	N/A	N/A	2.0 perms
Weathering Resistance	ASTM D 822 Weatherometer 350 hours	N/A	N/A	No effect
Salt Spray	ASTM B 117	N/A	N/A	No effect
Accelerated Aging	ASTM D573	No loss of elongation or tensile strength.	No loss of elongation or tensile strength.	No loss of elongation or tensile strength.
Adhesion (Pull-off)	ASTM D4541	400psi	N/A	N/A
		ASTM C-957 Requirement		Typical Value
Chemical Resistance (Tensile Retention)		Greater than		
Water		70%		98%
Ethylene Glycol (Anti-Freeze)		70%		97%
Mineral Spirits		45%		85%
Motor Oil		Not included as part of ASTM C-957		92%
Hydraulic Brake Fluid		Not included		84%
Deicing Chemicals		Not included		99%
7% Detergent Solution		Not included		100%
Fire Rating		UL Rating – Class A		

N/A = Not applicable to component, data is applicable to System or Topcoat only.

NOTE: These are typical values and should not be taken as specification items.



Vulkem® 350NF/345/346

Medium and Heavy Duty Traffic Coating System

1. Purpose

1.1 The purpose of this document is to establish uniform procedures for applying the **Vulkem 350NF/345/346 Traffic Deck Coating System**. This document describes application procedures for medium and heavy duty requirements. The techniques involved may require modifications to adjust to job site conditions. If you have any questions, about your application, contact your local Tremco Field Sales Representative for specific design requirements. This document will provide the necessary instructions and trouble shooting for the application of the Vulkem Traffic Deck Coating System to qualify for the manufacturer's warranty.

2. Substrate Preparation

2.1 Investigation of the substrate should be performed to determine the type of surface preparation that will need to take place to achieve the appropriate surface profile required for the coating application. Depending on the condition of the concrete, one or more types of surface preparations may be required. Refer to **ICRI's Technical Guideline No., 03732-Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings and Polymer Overlays** for best practices on selecting the appropriate method of concrete preparation. Thin film and high-build coating applications will require the surface profile, CSP 3-4.

3. Conditions of Concrete Surfaces

3.1 Concrete shall be water cured and in place according to the industry standard of 28 days and is our recommendation prior to installing the coating materials. Twenty-eight days is usually sufficient to allow excess moisture to leave a concrete slab. Should the coating application have to be applied prior to 28 days, please contact your local Tremco Representative or Tremco Technical Services.

3.2 Concrete must be dry prior to the coating application. Excess moisture in the concrete can prevent the coating materials to not perform as intended. To detect whether or not the concrete contains excess moisture, several tests may be employed:

- ASTM D 4263 – Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
- ASTM F 2170-02 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs
- Calcium Chloride Test
- Tramex moisture meter may also be used for decks not exposed to sunlight. Contact Tremco's Technical Service if this method is used.

3.3 Concrete shall be free of any laitance and can usually be achieved by shotblasting (preferred method or sandblasting the surface. For proper methods, refer to **ICRI's Technical Guideline No., 03732**. For supplier information contact Tremco's Technical Services.

3.4 Concrete surface shall be properly cleaned so that the surface to receive the coating, sealant or liquid applied flashing is free of mold, paint, sealers, coatings, curing agents, loose particles, and other contamination or foreign matter which may interfere with the adhesion. Jobsite conditions may require the use of a Vulkem primer.

3.5 Shrinkage cracks in the concrete surface which are 1/16 inch (1.6mm) wide or greater shall be ground out to a minimum 1/4 inch wide by 1/2 inch (6mm x 12mm) deep and treated according to the instructions in section 5, Detail Work.

3.6 Structural cracks regardless of width shall be ground out to a minimum 1/4 inch wide by 1/2 inch (6mm x 12mm) deep and treated according to the instructions in section 5, Detail Work.

3.7 Spalled areas shall be cleaned, free of loose contaminants prior to repair. Due to the fact that jobsite conditions vary it is recommended that you contact Tremco's Technical Services or your local Tremco Sales Representative for the best method of repair.

3.8 In the event of exposed reinforcing steel it is recommended that the structural engineer of record be contacted for investigation of the condition and for the best method of repair.

3.9 Surfaces shall be made free of defects which may telegraph and show through the finished coating. Surfaces which are rough (fins, ridges, exposed aggregate, honeycombs, deep broom finish, etc.) shall be leveled and made smooth by applying a coat of sand-filled epoxy.

3.10 All drains shall be cleaned and operative. Drains shall be recessed lower than the deck surface. Surface shall be sloped to drain to provide positive drainage. Drains should be detailed as instructed below:

- Cut a 1/4 inch wide by 1/2 inch deep (6mm x 12mm) keyway into the concrete surface at any point where the coating will have an exposed terminating edge. That is, any point where the coating will end in an open area subject to traffic. For example, at the end of a ramp, around drains and along side expansion joints.

3.11 If the project is a restoration deck, old sealant and backing material shall be removed. The joint interface will require a thorough wire brushing, grinding, sandblasting, solvent washing and/or primer.

4. Jobsite Materials

4.1 Recommended Materials and their use as follows:

Dymeric 240FC: A two-part, chemically-curing, gun-grade, polyurethane deck joint sealant for use in sealing cracks, control joints and for use in forming cants.

Vulkem 116: A one-part, moisture curing, gun grade polyurethane sealant for use in precast, masonry and in forming cants.

Vulkem 350NF Base Coat: A one-part, low odor, low VOC, polyurethane coating used as the elastomeric waterproofing membrane of the system available in an R (roller) grade and SL (self-leveling) for vertical and horizontal applications.

Vulkem 345 Wear Coat: A two-part, aromatic, polyurethane coating to provide optimum wearing characteristics.

Vulkem 346 Top Coat: A one-part, aliphatic modified coating to provide additional chemical and UV resistance to the coating system.

Backer Rod: A closed cell polyethylene back up material used in expansion joints and at the base of cants to prevent three-sided adhesion, and to control the depth of the sealant.

Vulkem Primer #171: A one-part, film-forming primer to be used on metal and porous surfaces.

TREMPRIME Non-Porous Primer: A one-part primer for use on metal surfaces.

TREMPRIME Multi-Surface Urethane Primer: A low VOC, quick drying, two-part primer for use between urethanes, wood, concrete, PVC and steel.

Vulkem Primer #191: A one-part interlaminary primer for use when applying a fresh coat of Vulkem urethane after preceding coat has been exposed for long periods and/or has lost its surface tack.

Vulkem Primer #191 Low VOC: A low VOC compliant one-part porous and interlaminary primer for use in applying a fresh coat of Vulkem coating or sealant after preceding coat has been exposed for long periods of time.

Aggregate: 20-30 mesh silica sand or alumina oxide, which imparts a textured surface and contributes to slip and wear resistance.

5. Detail Work

Note: Do not apply sealant or coatings to a frosty, damp or wet surface or when air temperature is below 40°F (4°C) or the surface temperature is above 110°F (43°C). Cure times as stated below are based upon standard ambient conditions of 75°F (25°C), 50% Relative Humidity. A decrease in ambient temperature will significantly lengthen the cure time.

5.1 Mix Dymeric 240FC using an appropriate mixing blade in a slow speed electric or air powered drill motor. Avoid trapping air into the mixture. Move the mixing blade around the inside of the container to assure complete disbursement of the catalyst. For mixing equipment options contact Tremco's Technical Services.

5.2 Lay a 1/4" inch (6mm) diameter Backer Rod into the corner at the juncture of all horizontal and vertical surfaces (such as: curbs, wall sections, columns or penetrations through the deck). Apply a bead of Dymeric 240FC or other approved Tremco Sealant 1" inch (2.5 cm) wide over the Backer Rod. Tool the sealant bead to form a 45° cant. Use sufficient pressure to force out any entrapped air and to assure complete wetting of the surface. Remove excess sealant from the deck or wall surface.

NOTE: Backer Rod is only required for moving joints.

5.3 Install a Backer Rod, 1/8 inch to 1/4 inch (3mm to 6mm) diameter larger than the joint width to all prepared expansion joints. Set depth of Backer Rod to control the depth of the sealant. (Depth of sealant is measured from the top of the concrete surface.) Proper depth of sealant is as follows:

- For joints 1/4 inch (6.4mm) to 1/2 inch (12.7mm) wide, the width to depth ratio should be equal.
- For joints 1/2 inch (12.7mm) wide or greater, that are not expansion joints, should have a sealant depth of 1/2 inch (12.7mm). Minimum joint size is 1/4 inch by 1/4 inch (6.4mm by 6.4mm).

5.4 Completely fill joint with Dymeric 240FC or other approved Tremco Sealant. For cracks, tool sealant flush with the surface.

Note: For treatment of expansion joints, contact your local Tremco Sales Representative.

5.5 Allow Dymeric 240FC or approved Tremco Sealant to cure overnight.

5.6 Apply a strip of tape (masking tape or duct tape) to the vertical sections, two or three inches above the Dymeric 240FC (or other approved Tremco Sealant) cant to provide a neat termination of the vertical detail coat. Apply 25 mil (.64mm) thick detail coat of Vulkem 350NF Roller Grade over the treated cant and extend it to the tape on the vertical surface and 4 inches (100mm) onto the horizontal surface. Feather-edge the terminating edge of the Vulkem 350NF Roller Grade detail coat on the horizontal surface so it will not show through the finished coating.

5.7 Apply a 25 mil (.64mm) thick detail coat of Vulkem 350NF Roller Grade, 6 inches (150mm) wide centered over all untreated cracks, all routed and sealed cracks and over all cold joints. Feather-edge terminating edge of detail coat to keep these edges from showing through the finished coating.

5.8 Allow all detail coats to cure for a minimum of 4 to 6 hours depending on temperature and humidity.

NOTE: Expansion joints should not be coated over.

6. Coating Application

Note: Recommended coverage rates are approximate. Sand loading methods and concrete surface profiles may increase the amount of material required to obtain uniform coverage.

6.1 Thoroughly mix the Vulkem 350NF with an appropriate mixer taking care not to entrap air bubbles within the coating. Approximate mixing time should take 1 - 2 minutes.

6.2 Apply Vulkem 350NF at 65 square feet per gallon to yield 25 wet mils thick to the entire area to be coated, including over all detail coats, but excluding expansion joints. The recommended method of application is with a notched squeegee. Cross-rolling may follow in the event the coating may need to be leveled out. Vulkem 350NF can be applied with a solvent resistant, medium nap roller sleeve.

6.3 Allow Vulkem 350NF a minimum of 4 to 6 hours and a maximum of 24 hours to cure. Cure rates depend on temperature and humidity. Refer to cure rate guideline at the end of this document

6.4 If the Vulkem 350NF has been applied for 24 hours or longer during the ideal temperature application range (see chart on last page of document), it should be cleaned with a damp cloth of xylene (do not saturate it). Prime coat it with Vulkem Primer #191 or Vulkem Primer #191 Low VOC. We highly recommend that you contact your local Tremco Sales Representative with any questions on whether or not priming is necessary.

6.5 Thoroughly mix the Vulkem 345 with an appropriate paddle mixer taking care not to entrap air bubbles within the coating. Approximate mixing time should take 1 to 2 minutes prior to adding the catalyst. Carefully mix the two components for 2 to 3 minutes, adding the catalyst to the vortex of the material. Scrape down the sides of the pail, and mix for an additional 1 to 2 minutes. Use care to not incorporate air into the coating. This could potentially lead to the development of blisters during the coating application.

6.6 The first coat of Vulkem 345 is applied with a notched squeegee and a solvent resistant medium nap roller sleeve at the rate of 105 square feet per gallon to yield 15 wet mils to driving lanes, ramps, turn areas and ticket areas.

6.7 There are two acceptable methods of applying the silica sand:

Method A – Sand to Refusal

6.7a Immediately following the application of the Vulkem 345 broadcast to refusal (flood coat) the material with 20 to 30 mesh (.6mm -.9mm) diameter silica sand. Allow this first application to cure about 2 to 6 hours during ideal ambient temperatures and relative humidity. Before proceeding with the second application sweep or blow off any excess sand.

6.7b For a medium duty application, apply a second coat of Vulkem 345 to the entire deck to be coated at a rate of 105 square feet per gallon to yield 15 wet mils including over the previously coated areas. Immediately broadcast the second application with 20 to 30 (.6mm-.9mm) mesh silica sand to refusal. Allow the Vulkem 345 to cure about 2 to 6 hours during ideal ambient temperatures and relative humidity.

Method B - Backroll

6.8a Immediately following the application of the Vulkem 345 broadcast 20 to 30 mesh (.6mm -.9mm) diameter silica sand into the wet Vulkem 345. Broadcast the sand at a rate of 15 to 18 pounds per gallon (1.57kgs/L) of Vulkem 345. Backroll the sand into the coating to insure all the aggregate is evenly distributed. Allow the first coat of Vulkem 345 to cure about 2 to 6 hours during ideal ambient temperatures and relative humidity.

6.8b For a medium duty application, apply a second coat of Vulkem 345 over the entire surface of the deck at a rate of 105 square feet per gallon to yield 15 wet mils with a roller or squeegee. Immediately following the application of the Vulkem 345 broadcast the sand at a rate of 15 to 18 pounds per gallon of Vulkem 345. Backroll the sand into the coating to insure all the aggregate is evenly distributed.

6.9 Apply Vulkem 346 Top Coat with a medium nap solvent resistant roller sleeve at a rate of 125-175 square feet per gallon to yield 10-12 wet mils depending on the silica method used.

6.10 For a heavy duty system install an additional top coat of Vulkem 346 over the entire surface of the deck at a rate of 125-175 square feet per gallon to yield 10-12 wet mils.

6.11 The textured properties of the finished deck coating system aid in the system's wear and slip resistance. We recommend a test patch be completed by the applicator and obtaining customer acceptance prior to the application.

6.12 Tremco recommends a minimum of 72 hours before allowing vehicular traffic on the deck, but 5 days is preferable.

7. Clean up

7.1 Clean all adjacent areas to remove any stains or spills with MEK, Toluene or Xylene.

7.2 Clean tools or equipment with MEK, Toluene, or Xylene before materials cure.

7.3 Clean hands by soaking in hot, soapy water then brush with a stiff bristle brush.

8. Material Usage Guidelines

The following is a guide to determine material usage:

Dymeric 240FC: For a 1" (25.4mm) cant bead over a 1/4 inch (6mm) backer rod, 1 gallon of sealant for every 20 linear feet is

required (1 liter for 8 meters)

Vulkem 350NF Base Coat: When applied at 65 square feet per gallon (1.57m²/L) will yield a mil thickness of 25 wet mils.

Vulkem 345 Wear Coat: When applied at 105 square feet per gallon (2.5m²/L) will yield a mil thickness of 15 wet mils.

Vulkem 346 Top Coat: When applied at 125-175 square feet (3.7-4.3m²/L) per gallon depending on silica method will yield a mil thickness of 10-12 wet mils.

Aggregate: Approximately 15 to 18 pounds of approved aggregate will be used with each gallon of Vulkem 345, as prescribed in Section 6, Method B.

9. Troubleshooting

This section describes common industry application issues when certain environmental conditions exist. Below are some commonly seen issue and remedies. **If any of these should occur it is always recommended that you contact your local Tremco Sales Representative or Tremco's Technical Services.**

9.1 A deck that contains too much moisture may change into a vapor, which then condenses at the concrete-membrane interface before the coating has cured and may cause blisters or bubbles and ultimately interfere with proper adhesion. If this should occur they can be cut out allowing moisture to escape. After moisture has escaped and the surface is dry, the area can be repaired.

9.2 If the coating application has been installed at a thickness that is greater than our installation instructions pinholes, blisters or bubbles may occur in the coating. To avoid this occurrence, the material should be applied in thinner coats or in accordance to the installation instructions.

9.3 If the coating is applied in very hot ambient temperatures, the air in the small spaces between the concrete particles increases in volumes and forms blisters. Contact Technical Services should this occur.

9.4 If the previous coating application has not fully cured, solvent may become trapped between the coats and lead to large sized blisters. When cut out, they may still be tacky on the underside. Blisters may be cut out and repaired after the surface has been allowed to fully dry.

10. Weather Impact on Coating Application:

This section discusses the impact of applying these coatings outside the ideal temperature application range of 65-85°F at 50% relative humidity.

10.1 At temperatures lower than the ideal range the material will be more viscous and will slow the cure rate. Refer to chart below for approximate cure rates at varying temperatures.

10.2 Deck temperatures may affect cure rates even when ambient temperatures may be high.

10.3 Enclosed areas may slow the cure rate of the coating because humidity levels tend to be low in these conditions due to the low exchange of air over the membrane

10.4 In extremely dry conditions with relative humidity less than 20% even when temperatures are high, cure rates can still be extended.

Vulkem 350NF/345/346 Quick Reference Application Chart

Layer	Product	Wet Mils	Cure Time*	Square Feet Per Gallon
Base Coat	Vulkem 350NF	25	Minimum of 4 to 6 hours	65 square feet
Wear Coat (drive lanes, ramps, turns, ticket areas)	Vulkem 345	15	2 to 6 hours	105 square feet
Wear Coat # 2 for Medium Duty System Apply to entire deck	Vulkem 345	15	2 to 6 hours	105 square feet
Top Coat Apply to entire deck	Vulkem 346	10-12	72 hours for vehicular traffic	125-175 square feet

*Cure times are based on ideal ambient temperature at 50% relative humidity. See chart below for ideal temperature range.

Approximate cure times at varying temperatures at 50% Relative Humidity

Temperature at 50% Relative Humidity	350NF	345	346
40°-55° F 4.4°-12.8° C	48 hours	40 hours	40 hours
55°-65° F 12.8°-18.3° C	16-24 hours	12-24 hours	12-24 hours
65°-85° F 18.3°-29.4° C	4-6 hours	2-6 hours	6- 8 hours
85° F 29.4° C	< or = 4 hours	2 hours	2-4 hours

Variations in temperature and humidity can affect the cure rate of the coating. The above chart should be used as a guide only to determine the approximate rate of cure. Other factors can also influence the cure rate such as substrate temperature and enclosed environments. For more information about proper application procedures please refer to the Installation Instructions or contact Technical Services.

