

## ***KELMAR T.E. Flexible Membrane System***

### **IMPORTANT: READ THIS FIRST**

Master Builders does not warrant the performance of this product unless the instructions of this document and other related Master Builders documents are adhered to all respects.

### **DESCRIPTION:**

The KELMAR T.E. system is a multi-layered, totally engineered\* product consisting of a flexible membrane that is protected by a durable wearcourse to offer the ultimate protection for reinforced concrete against leakage and chloride penetration for suspended slabs in parking structures, and shipping and receiving areas.

The KELMAR T.E. system contains:

- A stretch coat approximately 3 inches to 4 inches (75 mm to 100 mm) over designated cracks, construction and control joints no greater than 1/16" (1.6 mm) wide.
- A water based epoxy primer, designed for this system, to ensure a permanent tenacious bond.
- A 20 to 25 mil DFT (.5 to 64 mm) thickness of water based, water protection membrane.
- A customized wearcourse designed to accommodate the anticipated traffic.

The thickness of the wearcourse is designed to meet the various traffic and environmental exposures.

EXPOSURE 1	For parking stalls or other areas exposed to light traffic.
EXPOSURE 2	For level traffic lanes and gradually sloping ramps, and for parking stalls in high traffic.
EXPOSURE 3	For steep and/or helix ramps, high torque turning areas, and areas adjacent to ticket cashiers, etc.
EXPOSURE 4	Heavy traffic in shipping and receiving areas.

### **THICKNESS:**

Typical thickness is between 50 and 230 mils.

### **COLORS:**

Available in Black.

### **EQUIPMENT LIST:**

#### **Safety Equipment:**

- Commercial exhaust fans or air movers for enclosed or underground slabs.
- Industrial rubber gloves and/or disposable work gloves, wipe rags.
- Protective hand cream such as Fend S-2. Soap and water.
- Respirators with organic vapor cartridges similar to Comfo II by Mine Safety Appliances U.S. and Canada or Protex 7500 - 30 West Safety Products in U.S., Leavitt Safety Ltd., in Canada.

#### **Surface Preparation Equipment:**

- Equipment for mechanically abrading surface to remove laitance such as metallic shotblast or sand blast of method of preparation as recommended by manufacturer.
- Industrial rubber gloves and/or disposable work gloves, wipe rags.
- Protective hand cream such as Fend S-2. Soap and water.
- Respirators with organic vapor cartridges similar to Comfo II by Mine Safety Appliances U.S. and Canada or Protex 7500 - 30 West Safety Products in U.S., Leavitt Safety Ltd., in Canada.
- Industrial vacuum.
- Regular and stiff bristled brooms.
- Magnetic broom to pick up steel shot.
- Masking tape, paper and/or polyethylene for protection of adjacent areas.

## **KELMAR T.E. System Installation Procedure**

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#### **Mixing and Installation Equipment:**

- High intensity, temporary lighting and extension cords.
- Slow speed drill mixer with Jiffy type blade.
- Long handled squeegees, width approximately 18 inches to 24 inches, as well as long handled rollers.
- Airless spray (such as Graco 533 or 733 converted to a 1:1 ratio, reversa-clean with a .050 or larger tip).
- Staining equipment - window screen.
- Shovels - lightweight, short handled for broadcast of aggregate.
- Aggregate blower (optional).
- Mechanical sweeper with nylon bristles.
- Temporary heating equipment, if necessary (electric - no open flame).
- Fans to assist drying, if necessary.

#### **PROJECT PREPARATION:**

##### **KELMAR T.E. System Preparation:**

- Substrates should be checked for soundness and "hollow" areas should be removed. All deteriorated or spalled areas and cracks 1/16 inch (1.6 mm) wide or greater should be prefilled.
- Concrete should have a low water:cement ratio at time of placement. (28 day cure is recommended.)  
LIGHTWEIGHT CONCRETE IS NOT A RECOMMENDED SUBSTRATE.
- Concrete may have a maximum 4% moisture content by mass (ASTM D 1863-76).
- Alternatively, check moisture content by ASTM D 4263, which calls for taping an 18 inches x 18 inches (45.72 cm x 45.72 cm) square of Polyethylene or other clear film to the floor. If condensation appears on the underside of the film or if the concrete becomes visibly damp or darkens in color within 8 hours, with an infrared light placed 24 inches above the square, the concrete is not dry enough to place a membrane system.
- All substrates must be sound, clean, dry and free from all contaminants.
- Surface and air temperature must be a minimum of 50°F (10°C) during entire installation and 24 hours thereafter.
- Provide sufficient air movement to prevent condensation on surface during installation.

##### **Planning Installation:**

Make sure all materials are on location to match approved samples including:

- Epoxy resins and hardeners for primer, membrane, wearcourse and topcoat.
- Aggregates for wearcourse.
- Solvents for thinning and cleaning.

##### **Aggregates:**

- Aggregates used in the wearcourse must be six (6) or higher on the Moh Scale, with proven durability. As a general rule, 30-35 mesh (U.S. Sieve) spherical shaped, washed, dried, bagged and uniform size aggregate is recommended because of its availability, economy and freedom of excessive dust.
- Store in dry area.

#### **APPLICATION PROCEDURES:**

##### **Masking:**

After suitable preparation has been completed, mask all surfaces that require protection. PROTECT ALL ADJACENT SURFACES AND AUTOMOBILES IN IMMEDIATE AREA AGAINST OVERSPRAY, PARTICULARLY FROM THE PRIMER, SINCE IT MAY FOG WHEN SPRAY APPLIED.

##### **Flashing:**

Flashing shall be as recommended by the manufacturer and shall be installed prior to coating application.

##### **Stretch Coat:**

- A stretch coat refers to a band of NEO V II C membrane approximately 3 inches to 4 inches in width, applied over cracks and control or construction joints, and any other designated areas of stress, to provide extra thickness.
- Stretch coats are required whenever KELMAR T.E. system or KELMAR FWC II is applied.
- DO NOT apply over expansion joints.
- Stretch coats can be applied both before, or after, the entire area has received membrane, and in some cases both before and after.
- All cracks 1/16 inch or wider should be routed, blown clean with dry and oil free compressed air, primed and caulked with the recommended Master Builders product, prior to installing stretch coat or membrane.
- Cracks developed during application should be addressed per the contractor and manufacturer.
- Fine cracks can be prefilled with mortar as recommended by Master Builders.

## **KELMAR T.E. System Installation Procedure**

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#### **Priming:**

- Thoroughly mix DUALOX SF Resin with Hardener separately.
- Mix equal parts of Resin, Hardener and water mechanically.
- Apply this priming mixture at recommended coverage by airless spray or roller -- DO NOT APPLY TOO HEAVILY.
- (Optional) Apply by roller on top decks and in windy conditions as recommended to reduce overspray potential.
- ALLOW TO CURE UNTIL FILM IS CAPABLE OF TAKING FOOT TRAFFIC, THEN PROCEED WITH APPLICATION OF NEO V II C MEMBRANE WITH MINIMUM DELAY. THIS IS PARTICULARLY TRUE ON TOP DECKS WHEN QUICK DRYING CONDITIONS PREVAIL.
- ON EXTERIOR TOP DECKS, THE PRIMER AND MEMBRANE MUST BE APPLIED THE SAME DAY TO ENSURE INTERCOAT ADHESION -- when quick drying conditions prevail.
- When slow drying conditions prevail, overnight drying of DUALOX SF material may be necessary, but cure time should never exceed 16 hours.
- Excessive curing of DUALOX SF material will necessitate repriming with MONOBOND.
- Drying will depend upon temperature, humidity and ventilation.
- To avoid pinholes in membrane, grout small holes and depressions with a mortar made of DUALOX SF material and Portland cement.

#### **Membrane:**

- The NEO V II C system is a single component liquid.
- Apply over twice the desired thickness of wet material (2.4 times) to get the specified dry thickness. Use a wet film gauge to determine thickness.
- Thoroughly stir or agitate materials before applying.
- Screening NEO V II C material is recommended, particularly prior to spray application.
- Spray at recommended coverages, adjusting pressures to eliminate pinholes.
- If necessary, materials may be thinned slightly with clean water.
- Allow to cure until film is capable of taking foot traffic (this can vary from an hour to overnight, depending on drying conditions).
- In poorly ventilated areas, provide air movement to prevent condensation and assist cure.
- Normal Off White color of membrane turns to buff when dry.
- If subsequent coat of NEO V II C material is applied too soon, the total membrane film will swell and blister away from DUALOX SF primer.
- Install epoxy wearcourse when membrane is tack free.
- Membrane should be applied to all cove base and curb detail.

#### **Intercoat Priming Precautions:**

- If DUALOX SF primer has cured too long (no tack whatsoever), reprime with MONOBOND.
- If NEO V II C material HAS CURED TOO LONG -- (more than 16 hours under good drying conditions, or more than 24 hours under marginal conditions), wipe the surface very carefully with Xylol, using tack rags or "wrung out" string mop and prime with MONOBOND to receive NEO V II C material. Allow to dry at least 1 hour to allow solvents to evaporate. Then, apply next coat while MONOBOND is still tacky. If MONOBOND has cured too long (no tack to dry newspaper), reprime with MONOBOND.
- If NEO V II C material has cured over 48 hours, consult manufacturer.

#### **KELMAR T.E. Wearcourse:**

NOTE: KELMAR MUST BE TACK FREE IN ORDER TO RECEIVE KELMAR RESIN AND HARDENER.

- Thoroughly mix the resin and hardener separately with a Jiffy mixer.
- Combine components by mixing with a Jiffy mixer at the correct ratio for approximately 3 minutes. In hot temperatures, reduce the mixing time to avoid premature handling of material.
- Do not allow a prereaction time. Always spread material quickly.
- To facilitate application, particularly for roller application, thinning with Xylol 5 - 10% is permissible.
- EXPOSURE 1 calls for dipping and rolling with a 1/2 inch dynel roller.
- EXPOSURES 2, 3 and 4 require application by notched squeegee followed by backrolling.
- Frequently check coverages and, if necessary, adjust notches in the squeegee.
- "Cut in" to all edges, equipment, etc. by brush.
- Wearcourse only (without aggregate) is normally applied over membrane to cove base on walls, columns and curbs. If system involves a black tie coat, body coat can be eliminated from base, but not from curbs.
- Always maintain a wet edge by leaving approximately 12 inches (30 cm) of applied KELMAR epoxy without aggregate to permit "tying in" the next area without lapping.
- Some installers are successfully spraying KELMAR wearcourse. Consult Master Builders for detailed specifications.
- For EXPOSURES 3 and 4 (particularly in quick drying conditions) apply all coats on the same day. Leave the first coat rough, but remove all loose aggregate to get better bond.

## **KELMAR T.E. System Installation Procedure**

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#### **Broadcast Aggregate:**

- Aggregate can be spread manually by shovel or suitable aggregate blower is recommended.
- In either case, broadcast aggregate evenly onto wearcourse in a "rainfall pattern" to eliminate waves or ripples.
- Continue broadcasting until dry aggregates are uniformly visible on the surface.
- Aggregate should be broadcast to excess for both KELMAR T.E. system and KELMAR FWC II system.
- Allow to cure.

#### **Removal of Aggregate:**

- Removal of all aggregate not bonded to wearcourse with a mechanical sweeper equipped with a pickup, or by stiff bristled brooms.
- Use mechanical leaf blower to get aggregate out of the corners and edges.
- Recovered aggregate can be reused.
- On large jobs, use mechanical sweeper such as Tennant's 280.
- On small and medium sized jobs, a Clark's Whisker or Advance's Retriever may be used.

#### **Lock Coats (Optional):**

- Mix MASTERTOP® 1910 coating.
- For EXPOSURES 1 and 2 colored Black, apply one coat of MASTERTOP 1910 coating.
- Apply MASTERTOP 1910 coating under the same temperature and site conditions as required for NEO V II C material.
- For most protected garage areas, Black is preferred. It will not display traffic patterns caused by wear of the tie coat, and will reduce evidence of oil and grease spillage.
- Apply by spray if possible. Roller application may show lap marks.
- For EXPOSURES 3 and 4, use KELMAR Resin and Hardener.
- For EXPOSURES 3 and 4, the mixture should be diluted with Xylol (up to 10%), applied by squeegee to ensure retention of texture.
- Both KELMAR T.E. and KELMAR FWC II Resin and Hardener can be used as lock coats.
- MASTERTOP 1910 coating should be allowed to cure for two or three days, if possible, before exposing to normal traffic.

#### **Line Marking:**

If line marking is the responsibility of the applicator, MASTERTOP 1910 coating in White or Yellow may be employed.

#### **CLEANING:**

- Prior to hardening, DUALOX SF material, NEO V II C material and MASTERTOP 1910 coating can be cleaned with warm, soapy water.
- Both KELMAR and KELMAR FWC II Resin and Hardener can be cleaned with MIBK, Xylol, or similar solvents.
- To clean spray equipment after using NEO V II C material, flush with clean water for a few minutes until the water appears clear.
- Recirculate approximately 2 gallons of MIBK through the equipment for 20 to 30 minutes.
- Give the equipment a final rinse with approximately 1/2 gallon of MIBK, leaving the lines full with this solvent overnight, at which time they can be flushed out.
- As ongoing maintenance, KELMAR T.E. and KELMAR FWC II materials can both be cleaned with KELMAR cleaner.

**CONDENSED APPLICATION STEPS FOR KELMAR T.E. SYSTEM  
EXPOSURE 1**

<b>STEP</b>	<b>METHOD OF APPLICATION</b>	<b>COMPONENTS MIXING RATIOS</b>	<b>APPROXIMATE COVERAGE</b>
Preparation	Patch & repair where needed. Steel shotblast, grit blast or water blast		
Stretch Coat	Approximately 3" to 4" (75 mm to 100 mm) over cracks and construction joints. Cracks over 1/16" (1.6 mm) should be repaired or routed and filled with appropriate sealant.	NEO V II C suitable reinforcing fabric 15 mils DFT	Variable
Primer	Spray or roller apply	DUALOX SF Resin DUALOX SF Hardener Water (Ratio 1:1:1) 8 mils WFT (MONOBOND can be used in lieu of DUALOX)	285 ft <sup>2</sup> /gal
	<b>NOTE:</b> If primer is tack free or contaminated, reprime with MONOBOND.		
Membrane	Spray, squeegee or roller apply	NEO V II C 20 mils DFT	40 ft <sup>2</sup> /gal 32 ft <sup>2</sup> /gal
	<b>NOTE:</b> If membrane is contaminated, carefully wipe with Xylol and/or prime with MONOBOND prior to placing wearcourse		
Wearcourse	Notched blade squeegee, backroll 1/2" to 3/4" nap	KELMAR Resin KELMAR Hardener (Ratio 1:1) 18 mils DFT 30-35 mesh aggregate broadcast to excess	88 ft <sup>2</sup> /gal  3/4 lb/ft <sup>2</sup>
Aggregate Removal	Manual or mechanical sweeping		
*Lock Coat A (OPTIONAL)	Squeegee	KELMAR Resin KELMAR Hardener (Ratio 1:1) 5 to 10 mils DFT May be thinned up to 10% with Xylol	160 to 320 ft <sup>2</sup> /gal
*Lock Coat B (OPTIONAL)	Spray	MASTERTOP 1910 coating 2 to 3 mils DFT	250 to 300 ft <sup>2</sup> /gal

\* Consult Master Builders for details regarding Tie Coat options. Be careful of overspray. Roller application may show lap marks.

**CONDENSED APPLICATION STEPS FOR KELMAR T.E. SYSTEM  
EXPOSURE 2**

<b>STEP</b>	<b>METHOD OF APPLICATION</b>	<b>COMPONENTS MIXING RATIOS</b>	<b>APPROXIMATE COVERAGE</b>
Preparation	Patch & repair where needed. Steel shotblast, grit blast or water blast		
Stretch Coat	Approximately 3" to 4" (75 mm to 100 mm) over cracks and construction joints. Cracks over 1/16" (1.6 mm) should be repaired or routed and filled with appropriate sealant.	NEO V II C (optional suitable reinforcing fabric) 15 mils DFT	Variable
Primer	Spray or roller apply	DUALOX SF Resin DUALOX SF Hardener Water (Ratio 1:1:1) 8 mils WFT (MONOBOND can be used in lieu of DUALOX)	285 ft <sup>2</sup> /gal
	<b>NOTE:</b> If primer is tack free or contaminated, reprime with MONOBOND.		
Membrane	Spray, squeegee or roller apply	NEO V II C 20 mils DFT	40 ft <sup>2</sup> /gal
	<b>NOTE:</b> If membrane is contaminated, carefully wipe with Xylol and/or prime with MONOBOND prior to placing wearcourse		
Wearcourse	Notched blade squeegee, backroll 1/2" to 3/4" nap	KELMAR Resin KELMAR Hardener (Ratio 1:1) 27 mils DFT 30-35 mesh aggregate broadcast to excess	59 ft <sup>2</sup> /gal  1 lb/ft <sup>2</sup>
Aggregate Removal	Manual or mechanical sweeping		
*Lock Coat A (OPTIONAL)	Squeegee	KELMAR Resin KELMAR Hardener (Ratio 1:1) 5 to 10 mils DFT May be thinned up to 10% with Xylol	160 to 320 ft <sup>2</sup> /gal
*Lock Coat B (OPTIONAL)	Spray	MASTERTOP 1910 coating 2 to 3 mils DFT	250 to 300 ft <sup>2</sup> /gal

\* Consult Master Builders for details regarding Tie Coat options. Be careful of overspray. Roller application may show lap marks.

**CONDENSED APPLICATION STEPS FOR KELMAR T.E. SYSTEM  
EXPOSURE 3**

<b>STEP</b>	<b>METHOD OF APPLICATION</b>	<b>COMPONENTS MIXING RATIOS</b>	<b>APPROXIMATE COVERAGE</b>
Preparation	Patch & repair where needed. Steel shotblast, grit blast or water blast		
Stretch Coat	Approximately 3" to 4" (75 mm to 100 mm) over cracks and construction joints. Cracks over 1/16" (1.6 mm) should be repaired or routed and filled with appropriate sealant.	NEO V II B (optional suitable reinforcing fabric) 15 mils DFT	Variable
Primer	Spray or roller apply	DUALOX 83 Resin DUALOX 83 Hardener Water (Ratio 1:1:1) 8 mils WFT (MONOBOND can be used in lieu of DUALOX)	285 ft <sup>2</sup> /gal
	<b>NOTE:</b> If primer is tack free or contaminated, reprime with MONOBOND.		
Membrane	Spray, squeegee or roller apply	NEO V II B 20 mils DFT	40 ft <sup>2</sup> /gal
	<b>NOTE:</b> If membrane is contaminated, carefully wipe with Xylol and/or prime with MONOBOND prior to placing wearcourse		
Wearcourse	Notched blade squeegee, backroll 1/2" to 3/4" nap	KELMAR Resin KELMAR Hardener (Ratio 1:1) 1st Coat: 27 mils DFT 2nd Coat: 27 mils DFT 1st Coat: coarse aggregate (e.g., 1# Whitehead or Trap Rock) 2nd Coat: 30-35 mesh aggregate broadcast to excess	59 ft <sup>2</sup> /gal 59 ft <sup>2</sup> /gal 1 lb/ft <sup>2</sup> 1 lb/ft <sup>2</sup>
Aggregate Removal	Manual or mechanical sweeping		
*Lock Coat A (OPTIONAL)	Squeegee	KELMAR Resin KELMAR Hardener (Ratio 1:1) 5 to 10 mils DFT May be thinned up to 10% with Xylol	160 to 320 ft <sup>2</sup> /gal
*Lock Coat B (OPTIONAL)	Spray	MASTERTOP 1910 coating 2 to 3 mils DFT	250 to 300 ft <sup>2</sup> /gal

\* Consult Master Builders for details regarding Tie Coat options. Be careful of overspray. Roller application may show lap marks.

**CONDENSED APPLICATION STEPS FOR KELMAR T.E. SYSTEM  
EXPOSURE 4**

<b>STEP</b>	<b>METHOD OF APPLICATION</b>	<b>COMPONENTS MIXING RATIOS</b>	<b>APPROXIMATE COVERAGE</b>
Preparation	Patch & repair where needed. Steel shotblast, grit blast or water blast		
Stretch Coat	Approximately 3" to 4" (75 mm to 100 mm) over cracks and construction joints. Cracks over 1/16" (1.6 mm) should be repaired or routed and filled with appropriate sealant.	NEO V II B (optional suitable reinforcing fabric) 15 mils DFT	Variable
Primer	Spray or roller apply	DUALOX SF Resin DUALOX SF Hardener Water (Ratio 1:1:1) 8 mils WFT (MONOBOND can be used in lieu of DUALOX)	285 ft <sup>2</sup> /gal
	<b>NOTE:</b> If primer is tack free or contaminated, reprime with MONOBOND.		
Membrane	Spray, squeegee or roller apply	NEO V II C 20 mils DFT	40 ft <sup>2</sup> /gal
	<b>NOTE:</b> If membrane is contaminated, carefully wipe with Xylol and/or prime with MONOBOND prior to placing wearcourse		
Wearcourse	Notched blade squeegee, backroll 1/2" to 3/4" nap	KELMAR Resin KELMAR Hardener (Ratio 1:1) 1st Coat: 27 mils DFT 2nd Coat: 27 mils DFT 3rd Coat: 27 mils 1st Coat: coarse aggregate (e.g., 1# Whitehead or Trap Rock) 2nd Coat: 30-35 mesh aggregate 3rd Coat: 30-35 mesh aggregate broadcast to excess	59 ft <sup>2</sup> /gal 59 ft <sup>2</sup> /gal 59 ft <sup>2</sup> /gal 1 lb/ft <sup>2</sup> 1 lb/ft <sup>2</sup> 1 lb/ft <sup>2</sup>
Aggregate Removal	Manual or mechanical sweeping		
*Lock Coat A (OPTIONAL)	Squeegee	KELMAR Resin KELMAR Hardener (Ratio 1:1) 5 to 10 mils DFT May be thinned up to 10% with Xylol	160 to 320 ft <sup>2</sup> /gal
*Lock Coat B (OPTIONAL)	Spray	MASTERTOP 1910 coating 2 to 3 mils DFT	250 to 300 ft <sup>2</sup> /gal

\* Consult Master Builders for details regarding Tie Coat options. Be careful of overspray. Roller application may show lap marks.

**KELMAR T.E. AND KELMAR FWC II T.E.**  
**MATERIAL CONSUMPTION GUIDE (PER 1,000 SQUARE FEET)**

**MATERIALS (U.S. GALLONS)**                      **EXPOSURE 1   EXPOSURE 2   EXPOSURE 3   EXPOSURE 4**

DUALOX SF Resin	1.6	1.6	1.6	1.6
DUALOX SF Hardener	1.6	1.6	1.6	1.6
NEO V II C • 20 mils DFT (40 mils WFT) • 20 mils DFT (50 mils WFT)	25 31	25 31	25 31	25 31
KELMAR Resin	6	8.5	17	25
KELMAR Hardener	6	8.5	17	25
KELMAR FWC II Resin	6	8.5	13.5 to 17	22 to 25
KELMAR FWC II Hardener	6	8.5	13.5 to 18	22 to 25
Tie Coats (Optional) • KELMAR Resin • KELMAR Hardener • KELMAR FWC II Resin • KELMAR FWC II Hardener • MASTERTOP 1910 Coating	2 to 3.2 2 to 3.2 2 to 3.2 2 to 3.2 2.5 to 4	2 to 3.2 2 to 3.2 2 to 3.2 2 to 3.2 2.5 to 4	2 to 3.2 2 to 3.2 2 to 3.2 2 to 3.2 2.5 to 4	2 to 3.2 2 to 3.2 2 to 3.2 2 to 3.2 2.5 to 4
Aggregates (Pounds) • 35 Mesh • #1 Whitehead	600	1,000	1,000 1,000	2,000 1,000

**NOTES:**

1. KELMAR must be bonded to NEO V II C within 16 hours of NEO V II C material application. Use MONOBOND (2 gal/1,000 sq. ft.) material as a primer on NEO V II C material if KELMAR material is applied after 16 hours.
2. Extra NEO V II C material should be ordered to properly prepare cracks.

**MASTER BUILDERS, INC.**  
**United States**  
 23700 Chagrin Blvd.  
 Cleveland, OH 44122  
 800-MBT-9990  
 Fax 216-831-6910

**Canada**  
 3637 Weston Road  
 Toronto, Ontario M9L 1W1  
 800-387-5862  
 Fax 416-741-7925

**Mexico**  
 Blvd. M. Avila Camacho 80, 3er Piso  
 53390 Naucalpan, Mexico  
 011-525-557-5544  
 Fax 011-525-395-7903

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