

# ULTRA-FLEX™

## INDUSTRIAL APPLICATIONS MANUAL



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# Product Overview

## **INTRODUCTION: *ULTRA-FLEX™ Family of Products***

The **Ultra-Flex** line of products provides **specialized coatings** and **surface preparation materials** which will insure the highest performance and durability in protective applications ranging from construction and industrial equipment to wastewater treatment. These products provide fabrication, installation and maintenance professionals the solutions they need for coating and protecting various material systems against moisture and other chemicals. These include applications for ferrous metals, concrete, wood, plastics, and fiberglass.

Ultra-Flex products are produced by Lava Liner Industries and have been manufactured for over 20 years, both under private label and as Ultra-Flex products. These products have been specified by customers and their engineering firms because they meet the needs of the most demanding coating applications both in the U.S. and internationally.

Ultra-Flex products have been tested and qualified according to applicable ASTM, DIN, NSF, EPA, NFPA, UL and UBC standards and are manufactured in accordance to rigorous internal quality control standards. Ultra-Flex products will provide outstanding performance in a vast variety of uses if selected appropriately and applied with recommended equipment and methods.

Following is an overview of the individual products and suggested uses. Combining **Ultra-Flex Coatings** together with **Ultra-Flex Surface Preparations** (as shown in the table at the end of the overview) not only eases and streamlines job application; it provides both a level of uniform protection and durability that stand-alone coatings cannot provide.

## **ULTRA-FLEX™ Product Overview Part 1: Coatings**

### **Ultra-Flex™ ECO 5000**

The most general purpose coating product is Ultra-Flex ECO 5000. It is a two component, industrial organic polyurethane that cures to form an elastomeric membrane which is impermeable to water and many aqueous alkaline or acid compositions.<sup>1</sup> Ultra-Flex ECO 5000 will guard against corrosion, prevent the intrusion of water, can qualify for containment of potable water and is extremely effective in many, if not all, industrial requirements for a flexible barrier against vapor or moisture.

Applications of Ultra-Flex ECO 5000 span the range from reservoir and sewage treatment, pipeline protection, coatings for the wire and cable industry, potting for electrical connections, and cooling tower and evaporative cooling equipment rehabilitation and preservation. Its remarkable flexibility and adhesion give it outstanding performance and durability especially when paired with Ultra-Flex surface preparations.

Ultra-Flex ECO 5000 is black in color and is sold in one gallon size containers and five gallon metal pails with activator provided in proportionately sized containers. Ultra-Flex ECO 5000 can be delivered in 55 gallon drum quantities for large plural component spray applications and insitu spray booths.

Ultra-Flex ECO 5000 can be used to meet LEED standards. See the table below for specifics.

LEED Category & Section	Section (Points)	Description	Ultra-Flex ECO 5000, ECO 5000TG
Recycled Content	MR 4.1 (1)	Post-Consumer	>20%
Local Regional Materials	MR 5.1 (1)	Final Assembly Point	Hayward, CA 94545
Low Emitting Materials	EQ 4.1 (1) EQ 4.2 (1)	VOC Content of Adhesives/Paint below Defined Limits	YES
	EQ 4.4 (1)	Free of Added Urea-Formaldehyde Resins	YES

Ultra-Flex ECO 5000 also comes in a trowel grade and is ordered as Ultra-Flex ECO 5000TG.

### **Ultra-Flex FR (fire resistant additive)**

Ultra-Flex FR has all the superior water and chemical resistant properties of the Ultra-Flex ECO 5000 coating but has been specifically formulated to provide fire protective properties. Like Ultra-Flex ECO 5000, the FR is a two component, industrial polyurethane that cures to form an elastomeric membrane that is impermeable to water and many aqueous alkaline or acid compositions. It has been tested to UL 174 and UBC 64 standards and is not only highly fire resistant to direct flame, but is also self extinguishing once the flame is removed. Ultra-Flex 5000 FR is available in one gallon

<sup>1</sup> See Chemical Resistance Chart for specific compositions and containment requirements or limitations.

size containers and five gallon metal pails with activator provided in proportionately sized containers. Ultra-Flex 5000 FR application instructions are the same as the application instructions for the Ultra-Flex ECO 5000.

### ***Ultra -Flex 6800***

Ultra Ray-Flex is a two component, aliphatic polyurethane coating for applications where it resistance to high end and polar solvents is required. It can be used to coat over Ultra-Flex ECO 5000 or as a stand-alone coating

Ultra -Flex 6800 is available in four gallon kits. Coverage rate for Ultra-Flex 6800 is approximately 108 square feet per gallon at 10 mil thickness.

## **ULTRA-FLEX™ Product Overview Part 2: Surface Preparations**

### **Metal and Inorganic Surfaces**

#### ***Ultra-Flex™ AP (Adhesion Promoter)***

Ultra-Flex AP is a highly effective surface preparation specifically formulated to create a chemical adhesion between the Ultra-Flex ECO 5000 coating and a metal or inorganic based substrate. This is accomplished through unique siloxane chemistry using bifunctional molecules to form a crosslink between organic and inorganic materials. Ultra-Flex AP is sold in 1 gallon cans, 5 gallon pails and 55 gallon drums.

#### ***ULTRA-FLEX RCI-A (Ferrous Metal Surface Pre-treatment)***

RCI-A is a rust converting primer for metal substrates. RCI-A not only provides a priming base for surfaces that have been cleaned or sand blasted but converts and protects surface areas that remain slightly oxidized or can not be completely ground or cleaned to a white metal surface. This is particularly true during rehabilitation of industrial equipment like cooling towers containing surfaces that are not easily accessed, such as joints or welds on conjoined metal parts near overhangs or other obstructions. RCI-A easily flows onto metal surfaces and into cracks and corners not accessible by sanding, grinding or blasting to clear the surface of rust converting it to a non-reacting film. RCI-A is also an excellent pretreatment for large metal roofs and metal surfaces where sand blasting is not practical. RCI-A will provide pretreatment protection for a period of up to 15 days without top coating or retreatment. RCI-A is sold in 1 gallon and 5 gallon pails.

## **ULTRA-FLEX™ Product Overview Part 2: Surface Preparations, cont'**

#### ***Ultra-Flex™ AP/API74 (Adhesion Promoter)***

Ultra-Flex AP174 is a custom manufactured product for creating a chemical adhesive bond between Ultra-Flex polyurethane coating and substrates such as ABS Plastics, Nylon, Plexiglas, Polycarbonate, PVC, Polyethylene or Polypropylene. These surfaces are notorious for the inability to coat, rehabilitate or paint over. Many of these substrates are used to line ponds, reservoirs, roofs or other large surfaces and until Ultra-Flex AP174, the ability to repair or rehabilitate was severely limited. In most instances such materials previously had to be removed and replaced. Now their service life can be extended using Ultra-Flex AP174 and coating with Ultra-Flex ECO 5000. Ultra-Flex AP174 is sold only in 55 gallon drums.

#### ***Ultra-Flex™ EP-990C Penetrating Epoxy (Concrete Penetrating Epoxy)***

Ultra-Flex EP-990C is two component low viscosity epoxy and applied as a penetrating treatment thereby producing a barrier against water for concrete and other cementitious surfaces. The resinous substance that is formed is very hard and hydrophobic.

Benefits of Ultra-Flex EP-990C are:

- Reduced spalling and cracking due expansion and contraction from temperature fluctuations and freeze-thaw cycles.
- Reduced oxidation of rebar and metal supports.
- Reduced leaching and efflorescence.
- Increased wet and dry compressive strength.
- Reduced chloride absorption.
- Increased life of the concrete substrate.

Ultra-Flex EP-990C also provides an improved surface for coating with Ultra-Flex ECO 5000 or Ultra-Flex FR.

Ultra Flex EP-990C is sold in 3 gallon kits and 15 gallon kits...

### Product Overview Part 3: Recommended Product Uses

<b>APPLICATIONS</b>	<b>RECOMMENDED SURFACE TREATMENT</b>	<b>COATING</b>
<b>Steel pipe, metal girders, cables, cooling towers</b>	<b>RCI-A</b>	<b>Ultra-Flex ECO 5000/ Ultra-Flex 6800</b>
<b>Steel Fabrication</b>	<b>RCI-A</b>	
<b>Concrete Surfaces</b>	<b>EP-990C</b>	<b>Ultra-Flex ECO 5000/ Ultra-Flex 6800</b>
<b>Concrete Containment (Internal)</b>	<b>EP-990C</b>	<b>Ultra-Flex ECO 5000</b>
<b>Steel Tanks / Containers(Exterior)</b>	<b>RCI-A</b>	<b>Ultra-Flex 6800</b>
<b>Plastic Pipe (e.g. PVC)</b>	<b>AP/AP174</b>	<b>Ultra-Flex ECO 5000/ Ultra-Flex 6800</b>
<b>Metal Surfaces</b>	<b>RCI-A or AP/AP174</b>	<b>Ultra-Flex ECO 5000/ Ultra-Flex 6800</b>



# **GENERAL APPLICATION SPECIFICATIONS – ULTRA-FLEX ECO 5000**

## ***Description***

1. ULTRA-FLEX ECO 5000 can be applied as a waterproofing, damp proofing or vapor barrier membrane over new or existing, flat concrete surfaces, concrete block construction, Celotex, polystyrene insulation, Dens Glass<sup>®</sup> sheathing or Dens Deck<sup>®</sup>, metal decking and most clean construction surfaces.
2. ULTRA-FLEX ECO 5000 is a cold applied, two component, liquid urethane. It cures to form a tough, durable, seamless, water impermeable barrier. ULTRA-FLEX ECO 5000 may be applied by spray, squeegee roller or brush and retains its flexibility in hot or cold environments. (165°F to -60 °F)
3. ULTRA-FLEX ECO 5000 is self-flashing and adheres to most clean construction materials.
4. ULTRA-FLEX ECO 5000 may be used to bridge hairline cracks (up to 1/8” or 3mm) in the substrate without compromising the integrity of the membrane when fully cured.

## ***Safety***

1. Construction should be done with equipment and procedures designed to minimize danger to personnel and materials.
2. Protective equipment including safety glasses should be worn when applying liquid products to prevent accidental splash or spray into the eyes.
3. Smoking, welding or metal grinding should not be allowed on or near the spray application of Ultra-Flex to avoid potential flashing or ignition during the application process.

## ***Surface Preparation***

### ***SPECIAL SURFACES***

All surfaces are different and require specific attention to details that are not covered in a general application instruction. Please read the sections following this section for the type of surface you intend coating.

1. Coating Concrete Surfaces
2. Coating Synthetic Surfaces (e.g. EPDM, PVC, Fiberglass, etc)
3. Coating Metal Surfaces

## ***General***

1. ULTRA-FLEX ECO 5000 is applied on a clean, dry, and structurally sound substrate. Any oil and/or grease spots must be thoroughly cleaned. If paint or a previous coating has been applied, the surface must be lightly sanded. All release agents, previous paint or coatings that are loose or flaking must be removed.
2. The following is a list of normal practices used in surface preparation:
  - a. Inspect and clean the surface thoroughly.
  - b. Correct water drainage as necessary.
  - c. Repair structural defects (i.e., cut out blisters, secure any loose sections).
  - d. Repair or replace vents, drains, protrusions, tie-backs, hooks, loose nuts, bolts, eyes, supports, etc.
  - e. Mask and protect surrounding structures which are not to be covered with ULTRA-FLEX ECO 5000.
3. Surface Pretreatments  
Individual surfaces have performance characteristics that may require a specific pretreatment. For individual substrate solutions, please refer to the section on the specific substrate described later.

## ***Vertical or Sloping Surfaces***

Vertical or sloping surfaces should be coated in two applications. Each application will be approximately 20 mils thick to prevent running and an uneven surface coating. A second coat should be applied after 30 minutes and within 4 hours and only when the surface of the first coat is tacky but not completely cured.

## ***Horizontal Surfaces***

ULTRA-FLEX ECO 5000 is self-leveling and therefore horizontal surfaces can be rolled, squeegeed, brushed or sprayed. Single coat applications are possible where the surface is level and the chance for run off is minimal.

## ***Materials***

Ultra-Flex Part A (Black Prepolymer in a 1 or 5-gallon metal bucket.)

Ultra-Flex Part B (Light brown to golden liquid in a ½ gallon or 16 ounce plastic jug.)

Surface Pretreatment as set forth in the section on a specific substrate described below.

## ***MANUAL APPLICATION AND MIXING***

### ***Equipment***

½ inch Drill (Milwaukee ½” D Handle Drill 500 RPM’s or equivalent.)



Polyester Fabric (Woven, non-woven or stitch bonded.)

Plaster mixer



### Miscellaneous Materials

1. Disposable Short-Nap Rollers (nap of ¼” or less) and/or paint brushes
2. Clean Up and Masking Materials
3. Mineral Spirits or solvent
4. Rags
5. 2-3 empty ea. - 5 gallon HDPE or metal buckets
6. Wall Clock or timed electrical outlet or watch
7. Cleaning / Solvent brushes
8. Razor knife for cutting fabric
9. Inexpensive Poly/plastic sheeting
10. Masking tape - 2 inch or wider
11. Vacuum or air nozzle
12. Absorbent paper towels, shop rags or clean cloth rags

### ***Manual & Hot Pot Mixing***

#### **ULTRA-FLEX ECO 5000 IS MIXED IN THE FOLLOWING MANNER:**

1. Open the 5-gallon Prepolymer Part A can. This will contain 4.5 gallons of material and when mixed with the Part B will provide 5 mixed gallons and a liner approximately 40 mils thick for a 140 square foot area when cured (Approximately 45 wet mils).
2. Pour the ½ gallon of Part B activator into the Part A and begin to mix immediately with the paddle mixer for a minimum of 3.5 minutes to insure a homogenous mix.

3. Prevent air bubbles from forming by mixing at approximately 500 rpm and do not fold or force the system to entrap air by causing a deep vortex in the can while mixing.
4. Once the Part A and Part B are mixed, it has a pot life of approximately 30 to 45 minutes within which the application can take place without substantial hardening of the mixture making it impossible to obtain an adequate coat to the substrate.
5. The premixed Ultra-Flex will begin to set immediately. When spraying, keep a 5 gallon bucket of mineral spirits or other solvent on hand to purge the pump and spray lines at least every 2-3 five gallon cans used. Do not allow Ultra-Flex to remain in the lines or the pump for more than 5 minutes without continued spraying or cleaning the lines with solvent.

### ***Brush or Roller Application***

Due to the pot life of ULTRA-FLEX of only 30-45 minutes for workability, it is suggested that once a five gallon can is mixed, two or three persons should be used to apply the product.

When rollers are used, they can be dipped directly into the can and applied. Avoid excessive back rolling of the material as it will tend to create bubbles and fisheyes that can remain in the ULTRA-FLEX and will undermine the impermeability of the membrane.

When brushes are used, it is preferable to pour the contents in the five-gallon bucket into smaller one-gallon containers. These are more easily handled by an applicator and can be less problematic for the application. Again, try not to back brush excessively as it will cause bubbles and fisheyes that will be hard to eliminate and can effect the impermeability of the membrane when cured.

When the brush or roller become thick, stiff and will not hold much material, discard the brush and begin with a new brush.

### ***Spraying***

#### **Hot Pot Spray Application:**

Hot pot spraying is defined by the pre-mixing of the two components in the general manner prior to application using air assisted spray equipment. The following equipment is used to spray apply Ultra-Flex after mixing: Binks Sprayer Model 98-943 or GRACO Bulldog or Equivalent pumps capable of handling high viscosity material and maintaining a 40:1 pressure ratio. Example is shown below:



Binks Model 7E2 Spray Gun or equivalent

Typical equipment can be obtained from companies on the internet or listed on sites such as <http://www.paintsprayerslv.com/> .

Stand, base or trolley fabricated to insure stability for the pump and 5 gallon container assembly. There are pump assemblies that will fit directly over a 5-gallon metal can and pump directly from the can.

### ***HOT POT Spraying***

To set up the spray equipment, set the air pressure to 35 pounds for the air dispersion portion of the nozzle. The product pressure should be set at approximately 70 pounds per square inch.

Follow all recommended procedures as are provided by the spray equipment manufacturer or representative. Of particular importance is to make sure that the air assist dispersion line is the first line to have air pressure applied when preparing to start-up the equipment and the last one to be turned off at the shut-down of the equipment. This will avoid any back flushing of mixed material into the gun and air dispersion lines. We recommend that you first spray coat the vertical surfaces first with a light (25 - 30 mils) coat of ULTRA-FLEX. Thicker coating in one pass will increase the possibility of runs in the material. After completing the first passes on vertical surfaces, a second coat can then be applied to obtain the desired thickness. This coat should then be applied approximately ½ hour to 4 hours after the application of the prior coat. This will help to insure that inter-coat adhesion will be accomplished and that the finished coat is monolithic.

During the spraying of ULTRA-FLEX, the material will begin to set up chemically. As you continue to apply the material, it will have a tendency to set up in the hoses and in the pump. It is suggested that you maintain a 5-gallon bucket near the pump that is about ½ full of mineral spirits or solvent and that the entire system be flushed after every 10 or 15 gallons of material has been sprayed. When the temperature is 75°F or above, the increased ambient temperature can cause ULTRA-FLEX to set up more rapidly and you may have to flush more often. You can flush by placing the pump into the mineral spirits in the can and then spraying the nozzle directly back into the can. This will avoid waste

and the waste material can be used several times for flushing before having to be discarded.

Once you have completed the spraying of each coat you should immediately follow the recommended procedures for cleaning the pump, hose and gun assemblies with mineral spirits, solvent or MEK.

Upon completion of the above procedure, you should proceed to the touch-up process of areas which have been incompletely or improperly covered during the initial spraying and to smooth any areas sagging due to excessive coverage on vertical surfaces.

This stage of the operation is critical as the ULTRA-FLEX will begin to set up rapidly and any imperfections not corrected will remain on the finished product.

### **Plural Component Spraying:**

Lava-Liner has identified a plural component spray machine that is compatible with the spraying of Ultra-Flex 2 component products. The Xtreme® spray machine has been tested and used by Lava-Liner at the International Technology Center in Minneapolis, MN. This equipment is recommended by Lava-Liner for any spray application that requires the ability to spray a product on a vertical surface and maintain a minimum thickness and fast setting material that has been designed by Lava-Liner to meet the demanding needs of spraying anti corrosion materials and waterproof membranes. You can view the equipment by visiting the GRACO website

at: [http://www.graco.com/Internet/T\\_PDB.nsf/SearchView/XtremeMix/](http://www.graco.com/Internet/T_PDB.nsf/SearchView/XtremeMix/)

The Xtreme equipment will result in added savings in time, reduced product waste and ease of application. The two components are kept separate until mixed in line within a static mixer. The proportions are easily set and all controls are electronic and digitally viewed. No mixing is required when using this machine and therefore pot life is also not an issue.



## ***PATCHING AND REPAIRING ULTRA-FLEX™ ECO 5000***

1. When it is necessary to repair or patch Ultra-Flex the procedure for surface preparation should be followed as is set forth above. Additional steps should be taken before applying a new coat to the exposed surface to be repaired.
2. Clean the surface with mineral spirits or solvent.
3. Rough up the Ultra-Flex surface surrounding the breach or area to be repaired by about 2 inches beyond the area to be patched with 60-80 grit sand paper or a clean, oil free wire brush.
4. Wipe the roughened surface again with mineral spirits (naphtha solvent) to clean all of the debris that will form from sanding leaving the surface clean and dry.
5. Apply Ultra-Flex AP (Adhesion Promoter) to the rough surface and allow to dry for about 15 minutes.
6. Apply a freshly mixed coat of Ultra-Flex ECO 5000 to the area to be treated and all the way around the roughened area surrounding the surface to be coated.

# COATING CONCRETE SURFACES

## *Cured Surfaces:*

A curing period is necessary for all concrete surfaces to be coated with ULTRA-FLEX ECO 5000. Portland Cement Concrete shall be dry and cured at the time of application of ULTRA-FLEX ECO 5000. This curing period is needed for the concrete to attain proper hardness and for evaporation of excess water to prevent blistering which could be caused by vapor pressure underneath the applied coating membrane. Recommended curing of concrete varies from 28 days to six months depending upon service conditions and coating used. Recommended procedure for new concrete is to moisture cure, using plastic film, wet burlap or water spray; precoat with a float finish to Class "B" tolerances and then surface with ULTRA-FLEX ECO 5000.

If the concrete is not sufficiently cured or contains water, it is recommended to prepare the surface of the concrete with Ultra-Flex EP-990C (Concrete Penetrating Epoxy). Ultra Flex EP-990C will bond concrete surface to form a water proof and solid surface to which Ultra-Flex can adhere. Ultra-Flex EP-990C draws on the moisture and water in the atmosphere and concrete to hydrolyze certain molecules and bond with the cementitious materials. This will render a surface that is hardened and dried providing superior adhesion and less likelihood of bubble defects in the top coating (see following section on Out-Gassing).

## *Clean and Dry*

All concrete, whether new or old must be clean and dry, and free of loose powder, release agents, curing compounds, laitance or debris. It is highly recommended to remove the existing cement paste on the surface and expose the tops of the underlying aggregate.

## *Surface Preparation*

1. The surface should be prepared to a CSP of 4 to 6 using the following methods:
  - a. Abrasive blasting (ASTM D 4259-88),
  - b. Water blasting (generally at 2500 psi minimum), allow concrete to dry (ASTM D 4259-88),
  - c. Shot blast (ASTM D 4259-88), horizontal surfaces.
  - d. Mechanical grinding.
2. Pretreated with Ultra-Flex EP-990C (Concrete Penetrating Epoxy)



## ***Out-Gassing***

1. If the concrete surface is porous, or wet, a surface curing agent or sealer may be required to prevent out-gassing or the formation of bubbles as a result of entrapped air or moisture. See the use of Ultra-Flex EP-990C for moisture curing and sealing.
2. Out-gassing is generally the result of retained moisture or the result of expansion of entrapped air on the surface of porous concrete.
3. Out-gassing from moisture can be prevented by making sure that the surface to be coated is dry and there is no moisture retained below the immediate surface that can react with the Ultra-Flex coating as it is applied.
4. Out-gassing from entrapped air can be prevented in most instances by coating the surface with Ultra-Flex when the temperature of the surface to be coated is in a temperature declining mode. Ultra-Flex is black, and as such acts as an absorber of solar energy. The accumulation of heat under a dark surface can increase the temperature of the concrete by as much as 90°F. This absorbing effect causes the air trapped within the concrete's pores to heat and expand. The air expands and tries to push its way out of the concrete (out-gassing), creating hundreds of bubbles in the surface of the Ultra-Flex, as it cures. As a result, it is common that out-gassing will occur when concrete is coated in direct sun light.

## **Methods to Prevent Out-Gassing**

Out-gassing can be minimized or prevented by using Ultra-Flex EP-990C and following the above rules or alternatively by:

Pre-coating the surface with an epoxy primer to prevent the out-gassing from having an effect on the surface while being coated with Ultra-Flex. The use of an epoxy coating seals the surface with a hard and impenetrable barrier that generally presents no problem downstream. .

## ***Precautions***

Application of Ultra-Flex ECO 5000 over concrete surfaces should not take place if:

1. Material temperature is below 60°F at time of application.
2. Surface temperature is below 50°F.
3. Surface moisture is present or rain is imminent and will affect area to be coated.
4. Surface temperature drops below the dew point.
5. Concrete is curing or in a temperature rising mode.
6. Other conditions are obviously unsuitable.

## **COATING SYNTHETIC SURFACES**

### **PREPARATION FOR ULTRA-FLEX™ CHEMICAL BONDING**

#### ***Ultra-Flex AP***

Over the years, Ultra Flex has been used to coat many different surfaces. Although well known for its ability to physically bond to metal surfaces, concrete and wood, the use of Ultra-Flex AP (Adhesion Promoter) will provide a chemical bond between Ultra-Flex and the substrate. The following surfaces are compatible with Ultra-Flex AP.

#### ***Fiberglass***

1. New Fiberglass: Degrease with mineral spirits, MEK solvent or TSP
2. Old Fiberglass: Power wash and scrub thoroughly with a solution of TSP and water. Rinse thoroughly and let dry
3. Abrade smooth surfaces with sandpaper or other abrasive medium.
4. Remove dust with tack rag.
5. Do not wipe with acetone.
6. Spray a fog coat or wipe with a very light coat of Ultra-Flex AP.

#### ***Glass, Ceramics***

1. Degrease with solvent-type degreaser or TSP
2. If possible, frost with wet / dry sandpaper and water
3. Rinse and allow to dry.
4. Spray a fog coat or wipe with a very light coat of Ultra-Flex AP

#### ***Ultra-Flex AP174***

The following synthetic surfaces require the judicious application of Ultra-Flex AP174, a new adhesion promotion material which has been developed that forms a chemical bond with an application of Ultra-Flex ECO 5000.

#### ***ABS Plastics, Nylon, Plexiglas, Polycarbonate, PVC, Polyethylene or Polypropylene***

1. Degrease with mineral spirits. Or wash and scrub thoroughly with a solution of TSP and water. Rinse thoroughly and let dry.
2. If possible, abrade with emery cloth or Scotchbrite® pad.
3. Spray a fog coat or wipe with a very light coat of Ultra-Flex AP174
4. Wait ½ hour before coating with Ultra-Flex.

***Natural Rubber (Latex), Synthetic or Vulcanized Rubber***

1. Treat the surface for 5 – 10 minutes with concentrated sulfuric acid.
2. Rinse with clean cold water followed by clean hot water.
3. Dry thoroughly.
4. Spray a fog coat or wipe with a very light coat of Ultra-Flex AP.
5. Wait ½ hour before coating with Ultra-Flex.

*Note: Flex the rubber – the appearance of small hairline cracks indicates the rubber is ready for bonding.*

**WARNING! SOME OF THE CHEMICALS SUGGESTED IN THE ABOVE PROCEDURES ARE HAZARDOUS! THE ORDER OF MIXING OF SOME FORMULAS IS CRITICAL.**

**WHEN MIXING ACIDS AND WATER, ALWAYS ADD ACID TO WATER AND NEVER POUR OR MIX WATER INTO ACID.**

## COATING METAL SURFACES

When coating any metal surface it is important that an applicator take into consideration all of the following circumstances.

### *Surface Preparation*

All surfaces must be clean and dry. All oil, paint, scale, oxidation (rust), dirt, and grease must be removed. Surfaces should be cleaned with pressure washing and the use of an industrial cleaner or acid etching agent and thoroughly rinsed before application to the surface. All ULTRA-FLEX products are self-flashing. However, in certain circumstances it may be advisable to prime and or pre-treat the surface in a more effective manner to prepare for coating. Specific applications of surface pretreatments are described below.

### *Acid Etching*

New metal surfaces are generally pre-coated at the manufacturing facility with fine oil or other protective grease or light paint that will inhibit water and moisture from penetrating and resulting in corrosion. This coating must first be removed prior to applying any coating or surface treatment. Depending upon the type of oil or protective coating, the method for removing the film will vary. Acid etching with a dilute solution (approx 2% acid in water) muriatic acid will clean most surfaces and etch the metal to provide a clean surface to which most coatings will adhere. **Not to be used for galvanized metal (see galvanized metal section below).** Vinegar, Citric acid, oxalic and phosphoric acids are other acids that are effective cleaners however some should be avoided unless applied by trained personnel. Vinegar in many cases is a good, safe cleaner to remove oils and grease residue and will easily rinse off. It is not as reactive as other acids are with certain metals and is generally not harmful to the environment.

Another very safe method for removing grease and oil is the use of TSP (trisodium phosphate). Depending on the extent of the oil or grease coating, one of the above methods will prepare the surface for obtaining a proper surface to which you can apply EndRust™. You should test the above to determine which best suits your particular surface.

Oils and grease removed by etching or by washing should be contained and removed in a safe manner consistent with good practices and in accordance with Federal, State and local ordinances.

## ***Sand Blasting***

In coating a metal surface, the greater the surface area that is covered, the greater the adhesion. If possible, it will usually be best to sand blast a metal surface prior to coating. Sand blasting increases the surface area to which a coating can adhere. The surface must be either blown clean using a compressed air or wiped down using a non-greasy volatile solvent. After sand blasting the surface of metal, some types may be subject to immediate oxidation (i.e. mild steel). You should not leave the surface exposed to the atmosphere without a coating for any lengthy period to avoid the condensation of moisture or flash rusting to occur. Therefore, if the surface is not to be coated within a reasonably short period of time, it is recommended that the metal that has been blasted be coated with a primer, preferably EndRust or EndRust AP.

## ***Abrading***

Any number of methods may accomplish manual or mechanical roughening of the surface. The use of sand/emery paper, wire brushes sander, grinder or other mechanical device can be used to aid in cleaning and abrading the surface. As in above, after the surface has been abraded, the residual dust and metal filings should be removed either by using compressed air or by wiping the surface with a highly volatile solvent prior to coating.

Mechanical scoring or acid etching are but two methods for preparing a surface prior to coating. Both mechanical and chemical cleaning processes increase the surface area to which a coating may attach.

## ***Chemical Bridging, Ultra-Flex AP (Adhesion Promoter)***

Maximizing the adhesion of a coating is extremely important to increase the duration during which a coating will remain effective and protective against corrosion and oxidation. In addition to mechanical scouring and etching, it is recommended that an additional step to create a chemical bond between metal and the Ultra-Flex ECO 5000 be taken. This is accomplished through the judicious application of adhesion promoters as discussed below.

Adhesion promoters function similarly and are comprised of an application medium, i.e. solvent or alcohol and a bi-functional molecule. The molecules that are applied to a surface have bifunctional compounds. One of the compounds is an organofunctional group which will react with the polymer binder in a coating. The other end is an inorganic based group (often metal) that becomes attached to the metal substrate. A chemical bridge is thus formed between the coating and the metal substrate when the adhesion promoter is used. The effects of the adhesion promoter are even more pronounced when combined with the pre-treatment of a metal surface by chemical or mechanical etching prior to the application of an adhesion promoter.

If the surface is clean and dry and coating will take place within 3 hours of the blasting to a white or near white metal surface, then Ultra-Flex AP is the recommended primer. Ultra-Flex AP will prevent the formation of rose rust for up to 3 hours.

When the surface has been braided to a white metal conditions or near white metal condition and the surface is not to be coated for up to several days, the surface after blasting or abrading should immediately be coated with EndRust AP. EndRust AP will prevent the formation of rose (flash) rust or convert any rust that has formed to a non reactive substance and will enable the surface to stand without deterioration for up to 15 days without additional priming. Ultra-Flex ECO 5000 can then be applied as the final protective membrane.

### ***EndRust Surface Preparation (Priming)***

It may not be practical to sand blast a metal surface and therefore priming the surface will provide a clean and dry substrate for subsequent coating application. EndRust is the recommended primer for a metal to be coated with Ultra-Flex ECO 5000 when the surface can not be adequately cleaned by abrasion or sand blasting. EndRust should not be used on any surface that is coated with any substance containing silicon or any coating that will leave an oily or greasy residue. If the primed surface is left exposed for several days, it is wise to wipe down the surface to remove any condensation or dust particles that may have accumulated on the surface.

### ***Galvanealed (galvanized) Metal Surfaces***

Galvanized surfaces, when new, generally have a light oil coverage which is applied during the manufacturing process. This surface may wear off with time and open-air exposure. However, it is always safe to assume that not all of the surface is clean and dry. Therefore, galvanealed metal can be cleaned with any typical alkaline or acid cleaner. **Caution: The use of hydrochloric or muriatic acid is not recommended due the formation of hydrogen gas and potentially harmful fumes that may cause respiratory distress.** One of the best methods for pre-treating large metal areas is by using a spray wand and manually pressurized system to apply a combination of an acid cleaner/iron phosphate solution. Rinse with hot water. You may use compressed air to aid in the dry off. Immediately follow the procedures for priming above and apply Ultra-Flex ECO 5000 as soon as possible after the area is completely dry.

### ***Anodized Aluminum***

Anodizing produces an oxide layer on the surface of the metal. That oxide layer can pick up moisture from the air from just standing. It also has a tendency to pick up microscopic dust particles that will interfere with proper adhesion. It is recommended that any anodized surface be pre-treated by wiping down with Ultra-Flex AP. Caution, wiping with Ultra-Flex AP, a fast evaporating organic solvent, can cause some additional problems and concerns. When the atmospheric conditions are at or near the dew point or freezing conditions exist, wiping the surface with a fast evaporating solvent may chill the

surface and cause moisture to quickly condense on the surface. Heating the parts for a while then wiping them with Ultra-Flex AP can help avoid problems in freezing conditions. As long as the parts are clean and dry, the interval between anodizing and coating is not critical.

## **APPLICATION SPECIFICATION FOR ULTRA-FLEX AP™, ULTRA-FLEX AP174™**

Adhesion Promoters are best applied using pump operated manual spray equipment. The use of airless spray equipment can be used but **low pressure and large nozzles** should be used to avoid high atomization and waste of the material. The surface to which it is applied should be clean and dry. The adhesion promoter should be applied at a rate of approximately 400 sq. ft. per gallon. The adhesion promoter should be let to stand for at least 1/2 hour and allowed to flash off until the surface is dry. Ultra-Flex membrane should be applied in accordance with the following time table:

Adhesion Promoter	Coating Window
Ultra Flex AP	After ½ hour and within 3 hours.
Ultra Flex AP174	After ½ hour and within 3 hours.

## **APPLICATION SPECIFICATION FOR ULTRA-FLEX™ EP-990C (CONCRETE PENETRATING EPOXY)**

Ultra-Flex EP-990C (Concrete Penetrating Epoxy) is applied by airless sprayer, manual pump sprayer (Garden Type), brush or roller. The surface should be clear of loose dirt, grease or oil, standing water and other contaminants. The Surface may be moist or damp but the dryer the surface, the deeper the penetration and longer the effectiveness of the waterproof properties. The surface should be profiled to a CSP 4 to 6. When applied repeated applications may be required until the surface is saturated and remains wet for several minutes. When applied on vertical surfaces, apply in an upward application until the surface runs with the Ultra-Flex EP-990C for about 6 to 8 inches below the roller, brush or spray fan. Ultra-Flex EP-990C is clear and will dry to a finish that will indicate that the surface has formed a bond with loose cementitious material making the surface water proof within 24 hours. Do not apply in rain or when rain is imminent.

Exposure of Ultra-Flex EP-990C to moisture or water in open container prior to application may cause the material to cure in the can and will void any waterproofing and structural enhancement.

If applying by an airless sprayer, caution should be taken to avoid overspray and prevent drift to avoid contamination of windows, automobiles or other nearby substrates that may be affected.

READ the MSDS sheet before using this product. This material is a **FAMMABLE LIQUID**. Use this material in a well ventilated area and avoid breathing, skin contact and do not smoke in the vicinity of application. Keep away from open flame, sparks or other sources of ignition.

Ultra-Flex EP-990C has a one year shelf life. Use immediately after opening or purge open container with a dry nitrogen blanket and immediately seal the container to avoid contamination by atmospheric moisture.

***PHYSICAL PROPERTIES:***

Ultra-Flex EP-990C when tested in accordance with NCHRP Report # 244 will produce the following results:

Color	Clear
Reduction of water absorption into concrete (ASTM C 642) (21 day soak)	Exceeds
Reduction of chloride content in concrete	Exceeds
Moisture vapor transmission	100%
UV 90 day exposure (ASTM C 1378)	No change in appearance
Flash Point (Abel)	54°F / 12 °C