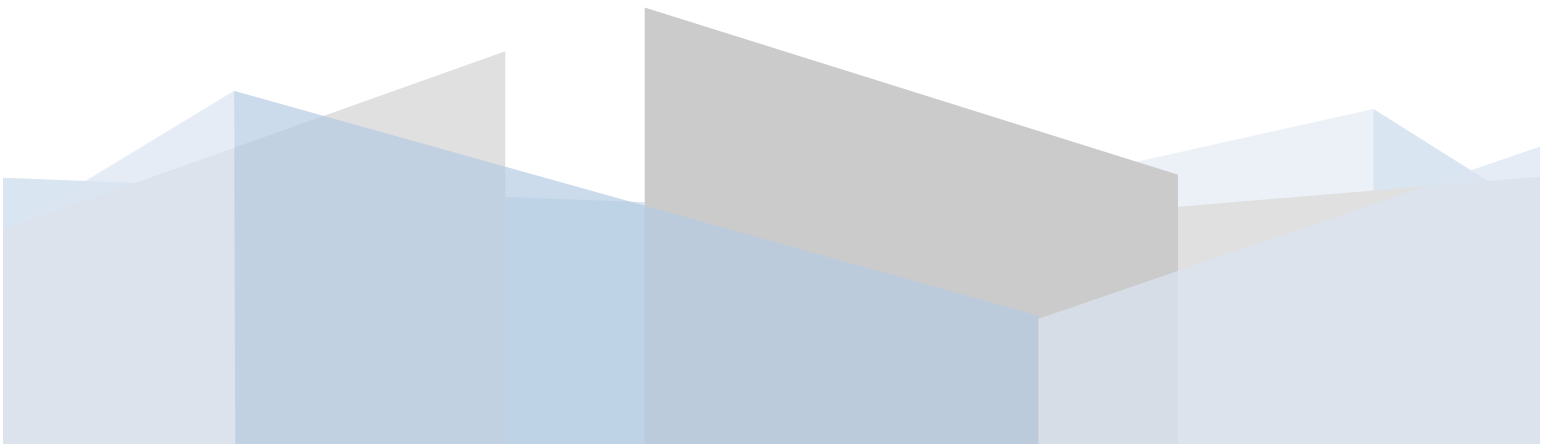


PlexiDeck™ MMA  
Methacrylate Resins for Protective  
Coatings and Civil Engineering



# PlexiDeck MMA Installation Guide



## **PlexiDeck MMA Chemistry**

The chemistry of PlexiDeck MMA methacrylate reactive resins is vastly different from many other commonly used resin technologies on the market today. This chemistry is further enhanced by PlexiDeck MMA proprietary formulations for PlexiDeck MMA flooring and concrete restoration systems. The performance characteristics of PlexiDeck MMA products offer many advantages to contractors and users alike. This performance guide describes:

- What methacrylate resins are
- How PlexiDeck MMA is different from other construction materials
- Important characteristics and benefits of PlexiDeck MMA
- Typical applications for PlexiDeck MMA
- Important health and safety aspects of PlexiDeck MMA

### **What makes PlexiDeck MMA so durable?**

The performance properties and molecular structure of methyl methacrylate (MMA)- the basic building block of all PlexiDeck MMA products- explains the outstanding durability of PlexiDeck MMA systems. MMA is a unique synthetic monomer and is the most important ingredient in PlexiDeck MMA products.

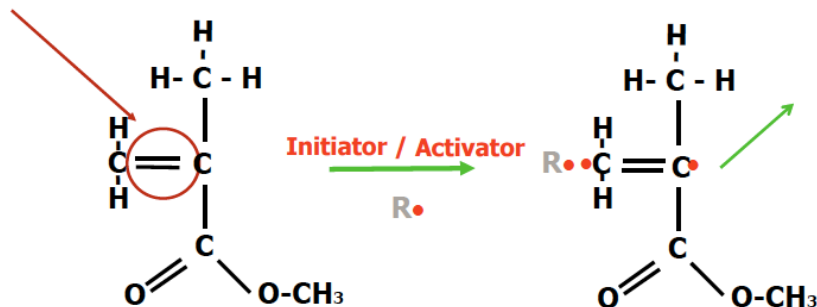
The reactive C=C double bond of each molecule enables polymerization of the MMA into longer, branched chains. When hardener (50% benzoyl peroxide powder) is added, an exothermic reaction occurs resulting in the polymerization of MMA, creating solid polymethyl methacrylate (PMMA).

The PMMA chemical formula shows clearly that the main molecular chain is surrounded and protected by branched groups. This chemistry explains why PlexiDeck MMA products perform so well in tough environments and offer superior UV resistance. The addition/combination of other reactive monomers, modifiers, and polymers creates PlexiDeck MMA products with different flexibility, viscosity, and allows their use over wide application temperatures.

### **What are Methacrylate Reactive Resins?**

PlexiDeck MMA product are categorized under the chemical family called “methacrylate reactive resins”. Methacrylate systems generally consist of two components – a liquid resin and an initiator or “powder hardener.” The two components are mixed at the construction site and liquid applied to a surface. The liquid then changes its physical state to a solid, i.e., it cures, via a chemical reaction called (free radical) polymerization (see diagrams 1 below).

Diagram 1

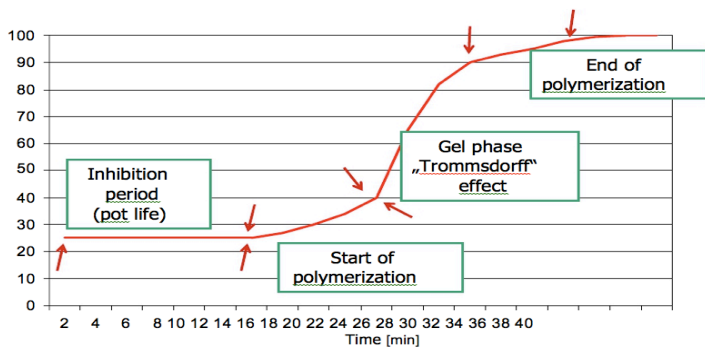


The polymerization starts by means of radicals (R•) formed by BPO (Initiator) and Amine (Activator).

### The PlexiDeck MMA Difference

PlexiDeck MMA is different from other reactive resins commonly used in the construction industry: including epoxy, unsaturated polyester, polyurethane and hybrids. The most significant difference between PlexiDeck MMA and these resins is cure time. PlexiDeck MMA products are fully cured and traffic ready in one hour. None of the resins listed above provide this rapid cure process.

Diagram 2



### Important Features of PlexiDeck MMA Applications

PlexiDeck MMA methacrylate systems are used in a variety of construction projects for many different reasons. The following important characteristics of PlexiDeck MMA systems set them apart from other resins.

**Curing Process** – PlexiDeck MMA is a two-component system, consisting of a liquid and a powder hardener. The hardener dissolves instantly into the liquid and serves as initiator for the curing process. This hardener

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has no effect on the physical properties of the cured resins; therefore, the finished products are consistent from one batch/project to the next.

**Bond Tests** – PlexiDeck MMA products cure in only one hour; therefore, bond tests can be performed prior to every application. Placing patties of PlexiDeck MMA material on the prepared substrate, waiting 45 minutes to one hour for material to be tack-free, and chiseling out with a hammer to test bond, does a bond test. This simple test assures adequate preparation and successful application for every job.

**Application Temperature** – PlexiDeck MMA systems can be applied at temperatures ranging from -20° F to 104° F. Most other resins require a minimum temperature of 40° F to cure slowly. Contact PlexiDeck MMA for more information on low temperature formulations and additives.

**Viscosity and Temperature Sensitivity** – The viscosity of PlexiDeck MMA resins is much lower than other materials. This enables PlexiDeck MMA to penetrate into the substrate and form a superior bond. The viscosity of other flooring resins increases substantially and temperatures decrease. Temperature changes have only minor impact on PlexiDeck MMA materials.

#### **Key Benefits of PlexiDeck MMA**

The characteristics of PlexiDeck MMA products offer many benefits for customers looking for durable flooring and concrete restoration systems. When recommending PlexiDeck MMA, review these key advantages.

**Cost Efficiency** – The fast cure time found with PlexiDeck MMA materials eliminates costly downtime and schedule delays.

**Durability** – PlexiDeck MMA systems do more than “seal” concrete. The “weld” to the substrate and are abrasion, impact and wear resistant, providing a long-lasting, impervious barrier against everyday chemicals such as acids, caustics, gasoline, oils, liquids, hydraulic fluid, deicing salts and airborne pollutants.

**Easy Maintenance** – PlexiDeck MMA systems are non-porous, thus, spills cannot seep into the floor and are removed easily at any time. Systems can be cleaned with conventional cleaning equipment and processes.

**Recoating Ability** – PlexiDeck MMA systems chemically bond to themselves, therefore new PlexiDeck MMA can be applied on top of previous applications eliminating expensive preparation/removal of the substrate prior to a recoat. This is especially beneficial for high wear areas or where use of floor space changes.

**Custom Design Options** – PlexiDeck MMA systems offer design flexibility. Pigmented systems can be broadcast with many colors of decorative flakes or color quartz sands. Many different degrees of slip resistance can be produced to create the right flooring texture and provide an added level of safety for the end user.

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**Antimicrobial Product Protection Option** – Antimicrobial ingredients may be added to PlexiDeck MMA systems. They add an extra level of protection against stains and odors, etc. This antimicrobial benefit can help facilities meet federal, local and state health regulations.

**Typical PlexiDeck MMA Applications**

PlexiDeck MMA systems are used both indoors and outdoors in a variety of applications over concrete, wood, steel, asphalt and other construction materials. Here are some examples:

**Flooring Systems**

Stadiums, arenas, and public assembly facilities

Restroom, shower and locker room facilities

Food and beverage processing plants

Restaurants, freezers, coolers

Laboratory and medical facilities

Pharmaceutical facilities

Industrial and manufacturing plants

Warehouses

Health and fitness clubs

Day care and school facilities

**Concrete Restoration Materials**

Stadiums, arena and public assembly facilities

Roads

Runways

Overlays

Racetracks

Loading Docks

Columns and beams

Structural repair

Terra cotta repair

Patches, grouting

Expansion joints

Sea walls and jetty work

Bridges, tunnels and parking decks

# PlexiDeck™ MMA Methacrylate Resins for Protective Coatings and Civil Engineering

## **Safety Testing**

PlexiDeck MMA systems are rigorously tested on a continuous basis. Safety and exposure tests offer these results:

OSHA – MMA is rated as moderately toxic. The maximum exposure limit is 100 ppm over a Time Weighted Average (TWA) 8-hour workday.

Federal Railroad Administration – Before and after large-scale application of PlexiDeck MMA Polymer Concrete in an active, dual track, railroad tunnel, tests show clearly the MMA vapor concentrations never exceeded those permitted by OSHA.

Tyndall & Eglin Air Force Base (Florida) – Prior to using PlexiDeck MMA Polymer Concrete in NATO air bases in Europe, research facilities tested the product and found the same results as OSHA.

Over the past 20 years independent laboratories have performed many tests of PlexiDeck MMA systems during actual applications in the US and around the world. Invariable, OSHA limits were never exceeded when the material systems were installed as per the manufacturer's recommendations.

PlexiDeck MMA resins are NSF registered for use in food environments. NSF International is an independent, non-profit agency, which provides third-party assessment services for the USDA and other agencies. The NSF mark is recognized world wide for its value and is respected by regulatory agencies at the local, state and federal levels

## **Health and Safety**

Methacrylate resins have been in use for over 40 years. MMA specifically has a history dating back to the 1930's and finds use in many applications: acrylic sheet goods, window panes, molding powders for automobile tail lamp lenses, aircraft cockpits, packaging seals, prosthetic devices and dental and construction adhesives. PlexiDeck MMA resins in general and MMA specifically are safe products to use when proper handling and safety procedures are understood and followed. Here are some important aspects to keep in mind when working with PlexiDeck MMA materials.

## **Flammability**

U.S. D.O.T classifies MMA as a flammable liquid. It has a flash point of approximately 50° F (closed cup). By definition, flash point is the temperature at which vapor directly above a liquid will ignite when exposed to a source of ignition. In comparison, the flash point for acetone is 0° F and gasoline is -35° F.

Another important property is the Lower Explosive Limit (LEL). This is the minimum vapor concentration in air, which can result in an explosion when exposed to an ignition source. For MMA, this value is 21,000 ppm (2.12%).

## PlexiDeck™ MMA Methacrylate Resins for Protective Coatings and Civil Engineering

Any sources of ignition must not be allowed in areas where PlexiDeck MMA is present. This includes lit cigarettes, open flame heaters and the like. Containers should be electrically grounded when transferring PlexiDeck MMA resins.

### **Long Term Exposure**

In the 1970s, 1980s and 1990s, many tests done by and for the major MMA suppliers around the world show no evidence of carcinogenicity or mutagenicity for individuals exposed within OSHA limits. Two-year MMA inhalation studies (on rats and mice) conducted by the U.S. Department of Health and Human Services also substantiate these findings (see Technical Report Series #314-national Toxicology Program, 1980s). Furthermore, the February 1995 European Center for Ecotoxicology and Toxicology of Chemicals (ECETOC) report states, "MMA does not present a risk to the environment."

### **Toxicity**

OSHA rates MMA as moderately toxic. Maximum exposure limits have been established at 100ppm over 8 hours (TWA) and short term (STEL). Safety tests of PlexiDeck MMA materials established that it is highly unlikely vapor concentrations will ever exceed the legally permitted values if used properly. Consult MSDS for more information on exposure limits.

### **Odor**

PlexiDeck MMA resins have a discernable odor. This smell makes people aware of MMA's presence. It does not make PlexiDeck MMA products dangerous to humans or animals. Once the product is fully cured, this odor disappears completely. MMA has an extremely low odor threshold of 83ppb (part per billion). In comparison, many other commonly used solvents, for example acetone, have an odor threshold, which is almost 1000 times higher.

### **Volatility**

PlexiDeck MMA resins are 100% reactive and do not rely on solvent-evaporation for curing. Total volatile organic compound (VOC) of the resins as used is less than 100 g/l, i.e., less than 25% of permissible VOC. Cure times of 45 minutes to one-hour contribute significantly to this classification.

In order to minimize MMA evaporation prior to full cure and for safety reasons, PlexiDeck MMA resins contain an emission reductions "shield." This, in conjunction with proper application techniques, minimizes MMA evaporation so that indoor and even tunnel applications can easily be carried out in a safe manner.

### **MMA and Contact Lenses**

Since MMA technology is also the basis for plastic contact lenses, they should not be worn where exposure to vapors or splashing is a possibility. Serious damage to lenses and eyes could result.

# Installation Guide

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## 1.0 Purpose

This guide has been prepared for our new and also our existing applicators in order to assist with the proper installation of the PlexiDeck MMA Systems. Selection of coating systems, estimating, equipment, surface preparation, application, clean up, maintenance, and safety are described.

### 1.0.1 PlexiDeck MMA System Selection

PlexiDeck MMA resins are available in variety of grades, each meant for certain applications.

Before a PlexiDeck MMA or other protective coating system is selected for a particular job, the exact requirements of the end user should be established and reviewed. The following needs may be required, either alone or in combination with each other.

### 1.0.2 Chemical Resistance/Corrosion Protection

Whether to protect the concrete floor of an electroplating line or behind the bar of a restaurant, chemical resistance is often one of the principal reasons a coating system may be required. Harsh chemicals can attack concrete and the underlying steel reinforcement quite easily. In the case of steel plate used as flooring, corrosion due to rust and other chemical attack dictates the need for a protective coating.

### 1.0.3 Non Skid Requirements

In the food industry, non-skid floors are important in areas, which are frequently wet and slippery. Protective coatings are a means of either creating or restoring a non-skid finish in food processing facilities ranging from meat packing plants restaurant kitchens.

### 1.0.4 Impact resistance



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Impact is wide spread in many industrial environments. Whether due to heavy forklift traffic or repeated blows from falling objects, impact results in damage to concrete and other floors, causing unsafe working conditions. In these situations, a PlexiDeck MMA coating performs best due to its resilient characteristics.

#### 1.0.5 Dusting/New Construction

Dusting can often create problems in new concrete slab flooring, especially in warehouses or cooler/freezer environments, which must conform to USDA requirements.

#### 1.0.6 Waterproofing

Waterproofing is of primary concern in the sealing of concrete floors and protection of underlying operations, such as businesses below a loading dock, process rooms in multi-story plants, or levels in a parking garage. Once again, protection of the concrete from corrosion via the installation of an impermeable coating is in the object. Cove base resins may also be desirable for these applications.

#### 1.0.7 Repair of Freeze/ Thaw Damage

This type of concrete damage, evidenced by spalling, is prevalent in exterior structures such as parking garage, bridge decks, loading docks, and other areas, which are exposed to the effects of repeated contraction/expansion of the substrate. This can also be of concern in freezes, where the lowering and raising of operating temperatures can weaken the slab.

#### 1.0.8 Concrete Rehabilitation

Concrete rehabilitation is in order when the preceding problems have not been properly addressed. Spall repair, patching, even full depth slab repair may become necessary when corrosion and deterioration have gone too far. PlexiDeck MMA PC Polymer Concrete provides a solution in terms of shut downtime and rapid return to service.

#### 1.0.9 Pitching

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Pitching, or sloping areas of a floor towards drainage areas, is often required during the redesign existing plant space. Once again, PlexiDeck MMA PC Polymer Concrete aid in the quick execution of such plans.

#### 1.0.10 NSF Conformance

Also the result of some/all of the above factors, NSF conformance may force the plant owner to install a protective coating to rectify existing floor/wall problems in food processing areas.

### 1.1 PlexiDeck MMA Selection Guide

Based on these various needs, the chart at the end of this section may be used as a general guide to match the requirements of the floor coating job to the proper PlexiDeck MMA System. Selection is not necessarily limited to the suggestion made in the chart. Please consult the chemical resistance chart and product data sheet for specifics regarding the use of any PlexiDeck MMA system.

#### **PlexiDeck MMA Systems:**

**PlexiDeck MMA SL Pigmented Systems** is a 1/8 – 3/16 inch, solid color, mma seamless flooring and natural quartz aggregate. It is typically specified with a slip resistant finish.

**PlexiDeck MMA SL Color Quartz System** is a 1/8 - 1/4 inch, decorative, self-leveling mma seamless flooring and color quartz aggregate.

**PlexiDeck MMA SL Color Flake System** is a 1/8 – 3/16 inch thick, decorative, self-leveling mma seamless floor and decorative paint chips.

- All the above systems can be modified using PlexiDeck MMA Flexible Bodycoat for flexibility, thermal resistance and exterior use.
- Textures can range from smooth to skid resistant using various aggregates; such as aluminium oxide and glass beads.
- All the above systems can be modified as a thinner roll coat system.

**PlexiDeck MMA Crack Sealer Plus** is a very low viscosity, low surface tension, rapid curing mma resin used to repair and seal cracks in concrete structures.

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**PlexiDeck MMA Traffic Coat System** is a multi-layer, rapid curing mma resin formulated as a coating for application over concrete substrates subject to pedestrian and vehicular traffic.

**PlexiDeck MMA Bridge Deck Overlay System** is a non-cementitious, concrete bridge deck topping material in which graded aggregates are bound together in a slurry with an mma resin binder. The system is broadcast with a wearing course aggregate. Thin polymer overlays, applied in layers up to 3/8", extend the life of bridge decks by increasing waterproofing and skid resistance characteristics, by adding minimal deadweight and by dramatically reducing lane closure times for the motorist.

**PlexiDeck MMA Primer/Sealer** is a seamless floor coating consisting of fast curing mma resin in clear or pigmented finish. PlexiDeck MMA Primer can also be used as a sealer to increase substrate strength and eliminate dusting.

**PlexiDeck MMA Metal Primer ST** is a rapid curing methacrylate, rust inhibitive, corrosion resistant primer used to prepare steel prior to the installation of PlexiDeck MMA Systems.

**PlexiDeck MMA ESD Systems** is a seamless floor coating consisting of fast curing mma resin and can be used as a pigmented topcoat over PlexiDeck MMA System applications where controlled

*Electrostatic Dissipation is required.*

**PlexiDeck MMA PC Polymer Concrete** is a 100% reactive, high strength, mma based polymer concrete. It is typically used for repair, sloping and grouting.

**PlexiDeck MMA FX Polymer Concrete** is a 100% reactive, flexible, mma based polymer concrete. It is typically used for repairs where additional flexibility is necessary.

**PlexiDeck MMA Flexible Waterproof Membrane** is an addition of chopped fiberglass mesh embedded into flexible mma resin beneath the PlexiDeck MMA System.

**PlexiDeck MMA Coving Resin** is the addition of fumed silica, specially blended into mma resin creating a thixotropic formula used for coving and vertical surfaces.

1.1.1 Placing PlexiDeck MMA over "Different Substrate"

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While PlexiDeck MMA is recommended for application over concrete, metal, quarry tile and interior asphalt, other types of substrates such as old flooring must also be addressed. The following is a brief overview of these alternative substrates with our recommendations for preparation and priming.

#### 1.1.2 Epoxy Flooring

Typical epoxy floorings encountered are usually two component Bisphenol A and base materials combined with sands to produce trowel-on coatings with a porous, profiled texture.

PlexiDeck MMA relies primarily on a mechanical bond to such substrates, and so scarification or shot blasting are required in order to enhance the surface profile. PlexiDeck MMA Primer is recommended over these coatings, which may range from fully intact installations to remnants that are still bonded soundly to the existing substrate.

The simplest way to evaluate how well PlexiDeck MMA will adhere to an epoxy coating is via a bond test using MMA Primer. See Section 4.0.4.1 for test method if bond test fails.

Existing failing flooring that is not suitable for coating with PlexiDeck MMA and must be removed down to the concrete substrate.

#### 1.1.3 Vinyl Asbestos Tile Flooring

Vinyl Asbestos (VA) tile is common in many non-industrial flooring applications, such as schools, etc. If the tile is clean, dry, in good condition and firmly adhered to the subfloor,

PlexiDeck MMA may be used as a coating – i.e. a PlexiDeck MMA self-leveling formulation. The methyl methacrylate in the PlexiDeck MMA Primer will dissolve and soften then tile resulting in a strong bond when the primer cures and the tile hardens. Since some shrinkage will occur upon cure, especially during the application of the PlexiDeck MMA Bodycoat SL System, it is essential for the tile to be sound or else delamination will occur. The tile can be secured to the floor with nails or staples if required.

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This type of application is only appropriate for smaller areas, but may be an option when considering the removal of tile and the underlying mastic adhesive which can be troublesome. Please note, however, that mastic has the tendency to cause movement of the tiles, which may result in the subsequent reflection of outlines through the PlexiDeck MMA coating either immediately or after extended periods.

#### 1.1.4 Rapid-Setting Mortars

Magnesium phosphate or polymer-modified cementitious materials may be encountered when coating concrete floors. Such systems are often times used for small repairs or for the filling of drains – i.e., when rooms are remodeled.

These materials tend to have closed surfaces, which are difficult to bond to. PlexiDeck MMA relies on mechanical adhesion in these cases; therefore, proper surface preparation is required, i.e. shot blasting. Bond tests as described above can ensure that the surface has been prepared sufficiently and has an adequate profile. For these applications a second layer of PlexiDeck MMA Primer may be required.

#### 1.1.5 Polyester and Vinyl Ester Floor Coatings

These type of flooring resins are formulated with styrene monomer which acts as a diluent for easy workability and reacts with the polyester or vinyl ester chains, cross linking them into a three dimensional network. Floor coatings produced from these resins combined with suitable hardeners, sands, etc. tend to be extremely brittle with borderline adhesion, so it may require some thought as to remove or coat such surfaces with PlexiDeck MMA.

The advantage here is that the MMA in the PlexiDeck MMA Primer will once again dissolve the surface of such floor coatings, ensuring a strong bond. These surfaces need only be clean and dry for the installation of a PlexiDeck MMA System. Depending on their conditions, however, additional surface preparation may be required.

#### 1.1.6 Wood

Wood flooring encompasses many types of application from block floors in older heavy industrial plants to plywood floor and wall panels in commercial kitchens, on decks, etc.

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PlexiDeck MMA Primer normally bonds well to these materials with exception occurring in the presence of residual (a) phenol in plywood adhesive or (b) creosote used to impregnate floor blocks (c) knots. These will act in the same manner in inhibiting the cure of the primer.

The problems to focus on when considering these applications in the mechanical/thermal movement of the composite formed by the floor coating, the wood substrate and other subfloors; i.e. when  $\frac{3}{4}$  exterior grade plywood is used to rebuild a floor over debilitated one. In these situations, the coating system and application method must be chosen carefully. Floor anchoring, priming, joint treatment, fiberglass reinforcement, basecoat installation, etc., all require special techniques to ensure the success of these projects.

In summary, a PlexiDeck MMA or any other coating is only as good as the substrate to which it is bonded, therefore, proper evaluation and surfaces preparation is a must for successful applications. We would ask that you please consult with us for additional recommendations regarding these or any other substrates you may encounter; we would then be happy to provide you with lab or on-site technical assistance.

## 2.0 Materials & Estimating

### 2.0.1 Materials

#### 2.0.1.1 Fillers

In general the fillers used with PlexiDeck MMA resins largely determine the performance properties of the finished coating. Both the flow properties of liquid PlexiDeck MMA mixtures and the final characteristics when set can be influenced by the choice of fillers (i.e. flexibility, abrasion resistance, non skid properties and chemical resistance).

Of those available, the most widely used fillers are washed and dried Silica sand and flours. The following sizes, referred to in our guide formulations, have been found to perform effectively with PlexiDeck MMA resins:

Type	Typical Range
Silica Flour	No. 200
Silica Sand, X fine	No. 70-140
Silica Sand, Fine	No. 50-70
Silica Sand, Medium	No. 30-50
Silica Sand, Corse	No. 16-25

Our **Recommended Fillers for Used with PlexiDeck MMA Resins** provides an initial source of silica flours and sand, which are compatible with PlexiDeck MMA resins in various coating formulations. These filler sources are used when the system will be formulated on site from scratch using the guide formulation listed in the binder under the formulations tab. Due to normal variations inherent in raw material supplies, these recommendations must be treated as such; it is therefore the responsibility of the user to perform tests prior to any field application.

The **Pre-packaged Systems for Use with PlexiDeck MMA Resins** provides a list of pre-bagged filler systems, which have been formulated using pre-sourced aggregate available to these companies. These mixes have been optimized to offer resin savings as well as ease of use. Mix sizes for PlexiDeck MMA Bodycoat and PlexiDeck MMA Flexible Bodycoat are usually 1 - 2 gal resin batches to facilitate the use of 5 gal buckets for mixing. PlexiDeck MMA PC Polymer Concrete is usually in 1/2 gal resin batches. These pre-packed systems, PlexiDeck MMA SL Filler and PlexiDeck MMA PC Polymer Concrete Powder, are only available from manufacturer.

#### 2.0.1.2 Pigments

Synthetic metal oxide pigments in micronized form should be used whenever possible. These products disperse easily, are relatively inexpensive and are readily available.

Organic Pigments may be used in special cases, but it should be noted that some organic might still decompose after hardening with benzoyl peroxide. It is recommended to use only lightfast pigments. Carbon blacks are not suitable for pigmenting PlexiDeck MMA resins.

Those containing solvents or organics pigment, namely carbon black, must never be used.

Please consult our Recommended Pigments for Use with PlexiDeck MMA Resins bulletin for suppliers of various products, which are compatible with PlexiDeck MMA resins.

#### 2.0.1.3 Auxiliaries

Items such as Fumed Silica, PlexiDeck MMA HP Bond Promoter, PlexiDeck MMA Accelerator 101, PlexiDeck MMA Bond Enhancer and Hardener are available through manufacturer.

### 2.1 PlexiDeck MMA Estimating Guide

The Estimating Guide / Worksheet bulletin has been developed to assist the applicator in preparing a complete estimate for quoting on coating jobs.

#### 2.1.1 Material Estimate

Upon the completion of the job walk, consultation with the plant owner, and selection of the appropriate PlexiDeck MMA based system, a list of materials can be prepared, including resins, hardener, fillers, pigments and auxiliaries, by working through the calculation based on the area of the job.

#### 2.1.2 Price / ft<sup>2</sup>

Once the bill of materials has been established, the cost/ft<sup>2</sup> can be calculated. After including costs for surface preparation, labor and traveling, a complete quotation can be generated for bidding.

## 3.0 Tools and Equipment Required for Installing PlexiDeck MMA Coatings

### 3.0.1 Tools and Equipment



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There are various tools and equipment, which are required in order to properly install PlexiDeck MMA based coatings. While many of these are normally in the possession of any flooring contractor, we have provided a list of the commonly used items.

### 3.0.2 Brooms

Brooms are necessary for general clean up as well as for removing excess aggregate from broadcasted basecoats.

### 3.0.3 Brushes

Disposable bristle brushes are used for applying primer and sealer to confined areas, wall edges, etc. Better quality brushes may be used provided MMA Cleaner is available for cleaning after use.

### 3.0.4 Buckets

Polyethylene pails in 1 gal, 2 gal, and 5 gal sizes are most practical for the measuring and pre-batching of fillers and mixing of PlexiDeck MMA formulations. Cured materials release easily from PE pails, which can be reused during the course of the job. It is preferred to have several dozen of each size at the site. Metal pails are not recommended for mixing purposes.

Shallow buckets are preferred when broadcasting coarse aggregates into basecoats or sealers, since they are easy to hold. Usually these are fabricated from plastic pails or small fiber drums, which are cut to size. Mechanized aggregate blowers derived from sandblasting pots or otherwise may be considered as well for this purpose.

### 3.0.5 Bung Wrenches

Non-sparking types are useful for removing both 2" and ½" bungs from drums and pails of resin.

### 3.0.6 Chipping Hammers

Air or electric chipping hammers are required when removing deteriorated sections of concrete prior to the coating installation. They are also excellent for edge preparation.

Care must be taken against micro cracking and rebar damage to concrete when using these tools.

### 3.0.7 Clothing

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Applications in freezers are generally performed at temperatures ranging from –5°F to 0°F. Adequate clothing is a must, especially for larger freezers, which may involve several hours of installation time.

### 3.0.8 Compressors

Air compressors with moisture separators are required when removing dust and loose debris from substrates. Air must be free of oils or other contaminants. Electric or gas powered leaf blowers are also effective for this purpose.

### 3.0.9 Drill and Mixing Paddles

Explosion proof or air driven drills (500 +rpm, ½ HP) are used with mixing paddle for the blending of PlexiDeck MMA formulations in buckets. Jiffy Type paddles perform well and easily disperse all types of mixes, including cove base and mortars. Bung entering mixing blades are essential for redispersing contents of PlexiDeck MMA resin drums when cold temperature installations are performed.

### 3.0.10 Drum Racks

Drum racks of 55 gal. (180-200 kg) capacity of wheels is very convenient when setting up a mixing station, which must be moved during the course of the job.

### 3.0.11 Duct Work

Flexible hoses may be necessary in conjunction with exhaust fans and plastic tarps for work in areas where the odor of methyl methacrylate (MMA) is considered problematic; i.e. supermarkets in operation, freezers containing food products, etc. Exhaust air should be vented outside away from pedestrians.

### 3.0.12 Extension cords

Heavy duty (i.e.12 gauge) cords of 50-100 ft. length with multi-receptacle three prong boxes.

### 3.0.13 Fans

Explosion Proof fans, such as Tempest Fans, are necessary for applications in constricted areas where ventilation is poor. Airflow is required in order to allow for the proper formation of paraffin when there is a cure. Banks of fans may also be used when drying out wet floors after acid etching (acid etching is not recommended), etc.

#### 3.0.14 Gage Rakes

This tool is very effective for the fast and efficient application of self-leveling coatings.

Steel pins, attached to an adjustable crossbar, dictate the thickness of the coating. Rakes must be held square to the surface of the floor in order to maintain proper thickness; pre-set alternates should always be on hand, as the pins tend to wear with use.

#### 3.0.15 Generators

Portable generators of 1000 watt+ capacity are must when working in remote areas. Generators used in interior work must be kept away from the mixing station and application area.

#### 3.0.16 Gloves

Neoprene gloves are excellent for handling resins and accelerator, conventional clothing, leather workmen's gloves offer general protection for other personnel. Disposable nitrile gloves are also useful.

#### 3.0.17 Goggles

Splash proof goggles are preferred for personnel, especially contact lens wearers and others who may be irritated by the MMA vapors of the resin.

#### 3.0.18 Grounding Wires

These are required in order to prevent the generation of static electricity when transferring resin between containers.

#### 3.0.19 Hammers/ Chisels

These tools are required to remove the patties of PlexiDeck MMA from the prepared substrate in a bond test evaluation (see Section 4.0.4.1.).

#### 3.0.20 Hand Trucks

Hand trucks can be used for moving drums of resin, carting batches of coating material to the point of application, etc.

### 3.0.21 Knee Pads

Kneepads are essential when trowel finishing coating.

### 3.0.22 Masks

Organic vapor respirators may be required for indoor application. Paper dust/mist facemasks are a must when handling Fumed Silica and other types of fine materials. The mixing crewmembers handling quartz aggregate silica sands should also use these masks to prevent inhalation of silica dust.

### 3.0.23 Measuring Cups

Plastic mixing cups 8 vol. oz. or larger, are useful for measuring hardener powder, accelerator and pigments.

### 3.0.24 Moisture meters – See section 4.0.4.7

### 3.0.25 Mortar Mixers

Rotating 5 gal epoxy mixers or larger mortar/concrete mixers are often used to prepare PlexiDeck MMA PC Polymer Concrete and mortars. These units blend efficiently and do not entrap air. For larger repairs or pitching jobs, mortar mixers are a must.

### 3.0.26 Porcupine/Spiked Rollers

These rollers are essential for degassing some self-leveling coatings. They can also correct minor irregularities in the freshly applied coating, producing an exceptionally even surface finish.

### 3.0.27 Margin Trowel

Various widths are handy for filling cracks and working in tight areas.

### 3.0.28 Rollers / Sleeves

While most applicators prefer 9" rollers, 18 " frames are more efficient for large areas. Regarding rollers sleeves, the rougher the surface the heavier the nap required. These may range from ¼ - ¾" in size. Finer rollers may be required for sealers over smooth basecoats. Shed resistant, solvent resistant core sleeves are recommended.

### 3.0.29 Saws

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Power saws are often required for chase cuts in order to properly anchor leading edges of an overlay or to remove sections of existing flooring. Diamond blades are recommended for cutting concrete.

#### 3.0.30 Scales

Scales – 25 lb. and 100 lb. capacity, are excellent for calibrating buckets for fillers, resin, etc.

#### 3.0.31 Scoops

Scoops can be used for bagged fillers, etc. They also make a unique application tool for coving, producing a neat, rounded edge.

#### 3.0.32 Solvent

Solvents are used for cleaning tools, etc. MMA Cleaner or organic solvent such as acetone may be used. Cleaners and solvents should never be mixed with PlexiDeck MMA resins.

#### 3.0.33 Spigots

Self-closing plastic, brass or zinc safety spigots are preferred for PlexiDeck MMA drums and pails.

#### 3.0.34 Spiked Shoes

Golf, gardening or other spiked shoes are useful for walking on wet coatings for the broadcasting of aggregates or other purposes.

#### 3.0.35 Squeegees

Neoprene squeegees may be used for the application of self-leveling skim coats or for when heavy topcoats are necessary.

#### 3.0.36 Surface Preparation Equipment - See section 4

#### 3.0.37 Tape

Duct tape is especially good for making border areas. PlexiDeck MMA does not affect the tape; in addition, perfect seams can be formed when it is pulled away from the edge of the coating just prior to gel stage. This is an acquired skill and allows for the division of larger jobs into smaller ones with no concerns regarding cold joints, etc. The resulting edge of the coating formed from this technique provides for a good thickness guide to butt against later on.

For freezer applications, tape unfortunately does not adhere well to walls and floors.

Terrazzo strips may be required as a solution for easier cove installations.

#### 3.0.38 Thermometers

Surface type of thermometers or temperature guns are required a site to measure the temperature of the substrate and materials; amounts of hardener and accelerator can then be accurately determined.

#### 3.0.39 Torches

Small propane torches or larger, “weed burner “ types may be required when attempting to dry out wet concrete after etching, rainfall, etc. Care must be taken to keep this equipment away from resin, hardener and solvents. Concrete should not overheat when using torches, which may result in the formation of stress cracks and other damage.

#### 3.0.40 Trowels

Flat Steel trowels or Swimming Pool trowels may be used for Trowel On and Self– Leveling (SL) coatings. Notched trowels may be used for self-leveling coatings as well. Margin trowels are handy for repairs and minor finishing work. Lastly, specialized coving trowels are essential for neat, efficient cove base installation.

#### 3.0.41 Vacuum Cleaner

Industrial vacuum cleaners are a must for wet/dry jobs.

#### 3.0.42 Wheelbarrow

Among other uses, wheelbarrows can hold broadcast aggregates, which can be easily scooped into buckets or seeded directly.

#### 3.0.43 Floor Buffer

A standard Janitorial Floor Buffer is useful with a Malish Brush (8129 or equal) to loosen and remove excess paint chips. A sanding head with coarse aluminum oxide sandpaper is used to sand floor between topcoats for desired texture.

## 4.0 Surface Preparation

### 4.0.1 General

Surface Preparation is the most important aspect of any coating installation, as it often determines the successful performance of the product being installed. Any coating is only as good as the substrate it is being placed over. To ensure proper adhesion, not only should the appropriate method of surface preparation be chosen, but also it should be performed correctly. The following is a brief discussion of the commonly used methods of preparation with their advantages and disadvantages. It is suggested that the American Concrete Institute be consulted for further recommendations.

#### 4.0.2 Types of Preparation

##### 4.0.2.1 Wet Methods

##### 4.0.2.2 Acid Etching (not recommended)

Etching following the procedures in ASTM D 4263 can be used to clean the laitance from concrete and mill scale/surface rust from metal substrate. Oils and other contaminants cannot be removed by this method.

The surface should be dampened first, followed by application of 15-20% hydrochloric or phosphoric acid solution. Power scrubbers, rather than scrub brushes/stiff brooms, should be used, which are more effective in loosening debris. Neutralization should be performed with copious amounts of water and chemicals such as ammonia or baking soda. It is critical to completely rinse off the acid, for concrete residues will form salts, which are difficult to remove. The pH of the surface must be monitored using ASTM D 4263 throughout the process as an indicator of solutions remaining on the surface.

Etching is becoming less popular due to many restrictions now in place in various localities regarding disposal of waste liquids from the process. As a wet process, it is also questionable for PlexiDeck MMA installations; time must be allowed for the proper drying of the surface. In the case of metal, this must be done immediately, followed by application of the primer in order to avoid oxidation; for concrete, the drying process can take 6-12 hours to complete. Etching is not recommended, therefore, only for very small or constricted areas where mechanical equipment cannot be brought in.

##### 4.0.2.3 Power Scrubbing/ Detergent Washing

Washing with detergent solutions is often required to leach oils, fats and other contaminants from concrete substrate in food facilities, auto garages, etc. Once again, as a wet process, care must be taken to properly dry the concrete before applying any coating. Since

detergent washing does not remove laitance or weak concrete from the surface, shot blasting is usually the perfect complement for this type of preparation.

#### 4.0.3 Dry Methods

##### 4.0.3.1 Abrasive Blasting

Blasting using silica sands or other abrasive media can be used for both horizontal and vertical surfaces, but environmental regulations once again restrict its use. Wet blasting is an alternative. In general, blasting does not remove enough laitance to be effective for all applications, especially those in which thermal cycling or heavy traffic is known to occur. It is recommended, however, for walls whenever roll-on coating are to be applied.

##### 4.0.3.2 Chiseling / Jack Hammering

These methods are reserved for removing badly damaged concrete, i.e. from spalled areas, potholes etc. Chiseling or sawing is also required when keying/chase cutting the perimeter of thin patches or overlay sections.

##### 4.0.3.3 Sanding

Sanding machine, i.e. 16" circular, often produce satisfactory results when substrates such as wood or tile require minor preparation. Coarse grit aluminium oxide sandpaper sheets used with a floor buffer are common, as well as hand-held units.

##### 4.0.3.4 Diamond Grinding

Diamond Grinding often removes enough concrete for adequate adhesion of PlexiDeck MMA coatings. Hand-held units with vacuum attachment are especially useful for areas next to walls, odd shaped substrates, smaller jobs, etc. The dust generated by diamond grinder may be a problem for certain applications, i.e. food areas, etc.

##### 4.0.3.5 Scabbling

Scabbling is another method, which generates dust during use. The impacting action of the scabblers pummels the top surface of concrete with generally good results.

##### 4.0.3.6 Shot Blasting

This is the preferred method for all surfaces. A fully enclosed, dust free process, shot blasting can be controlled to produce light to extremely heavy surface profiles. Concrete can often be removed down to expose aggregate, a must for new, laitance rich surface and an ideal condition



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for PlexiDeck MMA coatings. Condition and speed of the blast machine, along with shot size, dictate the effectiveness of this method. As an example, a removal rate of ½ lb. of debris/ft<sup>2</sup> of surface has been found to be adequate for quantifying the amount of shot blasting required for bridge deck overlays.

#### 4.0.4 Evaluation of the Surface

Substrates that have been prepared by one of the above methods must be evaluated for adhesion of the coating prior to the start of any installation. The effectiveness of the method can be judged by a variety of bond test.

##### 4.0.4.1 Bond Test

This is a quick evaluation method for concrete using PlexiDeck MMA Primer. The primer is mixed to sand to a grout like consistency (approximately 1:2, respectively), producing perhaps one quart of mix at a time. An excess of hardener is added (typically 5-6% by weight of resin) and mixed well. This grout is placed onto the concrete in 4-5" diameter patties and allowed to cure. The additional hardener will reduce the cure time creating a fast, "worst case" situation for the test.

After approximately 30-40 min, or when the patties are cool to the touch, a hammer and chisel are used to remove them. If the substrate is sound and properly prepared, the patty will have concrete and broken aggregates bonded to it, demonstrating, that the adhesion of the primer to the concrete is stronger than the concrete itself. If the patty requires little force to remove it or has only laitance adhering, then additional surface preparation will be required before a judgment can be made. If the patty is tacky underneath and fully cured, then this may indicate that residual amine-curing agent of phenol is still present in the epoxy floor coating or that contaminants of some kind are present in the concrete and might be leaching out.

##### 4.0.4.2 Tensile Bond Test

The tensile bond of the primer or the complete coating to any substrate can be measured by several devices; described as follows.

##### 4.0.4.3 Elcometer

When used in accordance with ASTM D 4541, The Elcometer provides a direct reading of the tensile bond strength in pounds per square inch (psi). An aluminium 1" diameter dolly is glued to the primed substrate with a fast setting adhesive. When set, the coating is scored along the perimeter of the dolly in order to provide a true measure of tensile bond without any cohesive

contributions by the coating itself. The Elcometer is then attached to the dolly; which is removed in direct tension, resulting in failure of the substrate or at the bond line of the primer/substrate. For concrete substrates, a tensile bond in the range of 250 psi is suitable, which is lighter than the tensile strength of concrete itself.

#### 4.0.4.4 ACI 503 R Tensile Tester

Where the Elcometer is useful for measuring the bond of primers and thin mil coatings to various substrates, the ACI 503R tester is designed for the evaluation of heavier coatings, i.e. ¼" overlays for concrete bridge decks. Operating in a similar principle to the Elcometer, the ACI 503R Tester incorporates a 2" pipe cap, which is adhered to the surface of the coating. A core drill is then used to drill through the overlay into the substrate for the same reasons described previously. The mechanism of the ACI 503R tester also allows for the evaluation of direct tensile bond in psi.

#### 4.0.4.5 Moisture

In general, 5% is an acceptable level of moisture in concrete, which is to be coated with a PlexiDeck MMA system. While this is not easily measured, some techniques are described below.

#### 4.0.4.6 Polyethylene Sheet (ASTM D4263)

The *presence* of moisture can be determined using this test, which involves the securing of a PE sheet to the concrete with tape and observing the condensation of water over a period of time. The accumulation of water may either be due to the curing process in case of new concrete, residual moisture from wet processing operations or rising water/ vapor due to ground water effects.

#### 4.0.4.7 Moisture Meters

Many types of meters are available on the market today; unfortunately, none are entirely accurate for measuring the absolute moisture content of questionable substrates. They can be used, however, to monitor the relative change in moisture when a cooler is being dried out, for example, or the change, which occurs to a bridge deck surface as the sun warms the concrete.

#### 4.0.4.8 Porosity

Dampening the surface, for example, with a wet mop can perform a rather simple method of determining the degree of porosity of the prepared substrate. The beading or absorption of the

water by concrete gives a quick, visual indication of the porosity. A similar test can be used to check for the presence of sealers on unfamiliar concrete surfaces prior to preparation.

## 5.0 Project Staging

### 5.0.1 Storage of Materials

In general, materials should be stored inside at the same temperature at which the area to be coated is kept. All items must be kept completely dry with resin, hardener, accelerator and filler stored separately from each other. For high temperature applications, shipment of materials and subsequent storage at the jobsite in refrigerated trucks may be considered. An exact match in temperature is not required prior to installation. These recommendations are given in order to facilitate the dosage of hardener and accelerator, which the temperature dependent. A large temperature between the materials and the substrate should be avoided.

### 5.0.2 Mixing Station

A section of the coating area can be used to stage materials and set up the mixing station, which can be moved as the application proceeds. For freezers and coolers, this arrangement is recommended. Other applications might make use of a mixing station that is not in the area to be coated.

Resins, fillers and other additives should be set in an orderly fashion keeping in mind the mixing process. Pallets of sands, etc. should be to one side and resin to the other. Resin containers should be grounded; hardener should be kept away from accelerator. Plastic sheeting should be used to protect the primed surface of the substrate. Buckets can be calibrated by weight with a scale for the various fillers that are used in the coating. This enables the crew to use **volume measurements**; which are faster and more efficient to use. The temperature of the substrate and air should also be measured to determine the correct amounts of accelerator and / or hardener to be added to the resin. Temperatures should be checked for variation during the course of the application. Lastly, for the optimum efficiency of the mixing crew, specific tasks should be assigned to each worker, i.e. pouring resins, filler preparation, hardener dosage, blending etc.

### 5.0.3 Ignition Sources

All ignition sources must be extinguished prior to the application of PlexiDeck MMA coatings. This includes cigarettes, propane torches and overhead heaters with exposed flames, etc. All PlexiDeck MMA resins are classified as flammable liquid by the U.S. D.O.T. and should be handled accordingly. The hardener powder is classified as organic peroxide and should be kept away

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from ignition sources, as it is a combustible material. Precautions described in this guide and on the Material Safety data Sheets (MSDS) should be followed.

#### 5.0.4 Tenting / Food Removal

Portions or entire areas of a floor installation may need to be isolated when working in order to protect food products from the order of MMA. Temporary enclosures constructed of PE sheeting and wood frames are very effective for this purpose. All draft must be properly sealed, and a negative airflow must be included through the use of exhaust fans and ductwork. The tent should be airtight and tested prior to applying the floor coating. If required, food products are to be removed from the work area during the installation of the PlexiDeck MMA coating.

#### 5.0.5 Specific Low Temperature Considerations

##### 5.0.5.1 Accelerator

Applications below 35°F (3°C) require accelerator in addition to hardener in order to maintain a ten minutes pot life and one hour cure time of the PlexiDeck MMA resins. Please consult the dosing tables in our Mixing Chart for specific information.

The accelerator is classified as a Poison B (liquid), and should be handled only by protected personnel wearing goggles and gloves. Accelerator and hardener containers and measuring cups should be kept apart from another at the mixing station.

##### 5.0.5.2 Paraffin Separation

As mentioned in Section 3.9, bung-entering mixers are required for cold temperature applications. The paraffin contained in the PlexiDeck MMA resin can separate and clump at low temperatures, and so it is important to redisperse the resin before use. Approximately one full minute is sufficient time to product a homogeneous mixture in a 55 gal. (180 – 200 kg) drum.

It is always recommended to agitate or roll drums or pails prior to using to disperse any paraffin separation.

## 6.0 PRIMING

### 6.1 Concrete

After the proper evaluation of the surface has been made using the techniques described in Section 4.3, the concrete is ready to be primed. There is one PlexiDeck MMA primer which can be used to prime concrete, PlexiDeck MMA Primer. PlexiDeck MMA Primer is designed especially for concrete surfaces, has excellent adhesive capabilities and cures fully at low temperatures. PlexiDeck MMA Primer is a low viscosity, penetrating primer, which is used to prime concrete. It relies on penetration for its excellent bond. It is thus not recommended on hard, nonporous concrete. PlexiDeck MMA Primer with additive PlexiDeck MMA Bond Enhancer, This combination creates a primer, which has an improved bond on damp concrete, concrete with certain contaminants (i.e. acrylic and latex modifiers) and on non-porous concrete.

In general, 1 - 2 gal of primer should be mixed at a time. The hardener can be easily dispersed in to resin and blended with a mixer for approximately 30 seconds. Upon mixing, of all the primer should be poured out onto the floor surface and applied with rollers and brushes to allow for the full 10-minute pot life. Material kept in buckets will accumulate heat and gel prematurely; primer showing any sign of gelling, either by physically changing consistency or color, should no longer be used. Ideal coverage rates for primers are near 100 ft<sup>2</sup>/gal., which ensures an average film thickness of 10-15 mils. If desired, silica sand may be broadcast into the fresh primer at rate of 4 lb/100 ft<sup>2</sup> in order to (a) provide a non skid finish for the cured coating, if the basecoat is not immediately installed, and (b) prevent the basecoat from sliding and rolling during applications.

Once the primer is applied, it should not be overworked in any way so as not to disturb the formation of the paraffin layer. Typical cure times are inside of 1 hour; the primer must be fully cured before the basecoat can be applied. Tack coats are not required; upon application the basecoat will dissolve the surface of the primer, resulting in a welded bond upon cure. This process applies to all layers within any PlexiDeck MMA coating system.

### 6.2 Wood

PlexiDeck MMA Primer is also used for interior wood surfaces. For new construction where  $\frac{3}{4}$ " , A/C grade, exterior grade plywood is recommended, the panels must be well anchored to the subfloor, i.e. with screws or underlayment nails 4" on center. A closer, 3" stitch pattern should be used along the seams; joints should be 1/8"-1/4" wide. Care should be taken to ensure that the plywood used does not have an excess pf phenol, contained in the ply adhesive, which inhibits the cure of PlexiDeck MMA.

It is recommended that the entire surface of the plywood be treated after priming. This can be performed by reinforcement with chopped fiberglass mat laid up with a PlexiDeck

MMA Flexible Bodycoat. Such applications must be performed carefully in order to prevent the entrapment of air and allow for the resin to cure properly. PlexiDeck MMA Flexible Bodycoat can also be used in neat form as a joining material.

### 6.3 Metal

Metal substrates of all types require PlexiDeck MMA Metal Primer ST as the primer system. The metal may be prepared by shot blasting, sandblasting, grinding, or in some cases, acid etching. Follow PlexiDeck MMA Metal Primer ST mixing guide. The prepared primer is then mixed hardener powder as described above and applied. The application rates and pot life are identical to those of PlexiDeck MMA Primer. The advantage to using PlexiDeck MMA Metal Primer ST is a primer on metal is its flexibility and excellent tensile bond strength, often in excess of 700 psi.

PlexiDeck MMA Metal Primer ST is a rust inhibiting, corrosion resistant primer.

### 6.4 Tile

New or old tile substrate require PlexiDeck MMA Primer HP as a primer system, PlexiDeck MMA adhesive agent and hardener are all components which are added as described for PlexiDeck MMA Primer HP. Application rates are identical, although smooth tile may allow for better coverage. PlexiDeck MMA Primer HP not only has excellent adhesion to quarry, ceramic other mineral tile, but also to the grout as well. Surface preparation on new and old tile generally requires detergent washing and either sanding, diamond grinding or shot blasting on order to clean and remove contaminants and glaze from both the grout and tile surfaces. Loose tile must be removed and the area grouted with PlexiDeck MMA PC Polymer Concrete based mortar or compatible system.

### 6.5 Other Substrates

Other substrates such as old epoxy flooring, vinyl asbestos tile and miscellaneous patching materials may be suitable as substrates after proper evaluation. Please contact manufacturer for recommendations regarding these or other unusual substrates encountered.

## 7.0 Miscellaneous Repairs

### 7.1 General

Once concrete surfaces have been primed, other repairs can be evaluated prior to the installation of a PlexiDeck MMA coating system. A description of these repairs with recommended procedures follows.

## 7.2 Crack Treatment

### 7.2.1 Control Joints

When self-leveling or trowel-on PlexiDeck MMA coatings are installed in constant temperature environments, control joints are usually coated directly over in order to form a truly seamless floor. If it is desired to maintain the joint, PlexiDeck MMA Flexible Joint Resin resins may be utilized as caulking materials after the coating has been installed. These can be used either in (a) near form or (b) in combination with Sil-co-sil and pigment.

### 7.2.2 Fine Cracks

Fine, non-moving cracks are often taken care of during the priming operation. However, these or other imperfections may tend to show through self-leveling coating applications.

It is recommended to make scratch work filler using PlexiDeck MMA PC Polymer Concrete and sand in a grout-like consistency (approximately 1:2 by volume) for such minor repairs.

### 7.2.3 Moving Cracks

Active, moving cracks must first be designated as such by the resident engineer or by prior evaluation. Several techniques are available to treat this condition. Firstly, PlexiDeck MMA Flexible Joint Resin can be used in neat form to fill cracks, which have been routed and properly primed. The resin must be allowed to cure before the application of the basecoat. Secondly, chopped fiberglass mat can be laid up with a Flexible Bodycoat, usually PlexiDeck MMA Flexible Bodycoat, forming a bridge, which distributes the stresses from the crack over a wider area under the basecoat. Such applications must be performed carefully in order to allow the PlexiDeck MMA Flexible Bodycoat to cure properly.

### 7.2.4 Small repairs

Small repairs can be carried out using the PlexiDeck MMA Primer scratch work grout described previously or by using PlexiDeck MMA PC Polymer Concrete polymer mortar prepared in small batches. These mixes can be made in 5 gal buckets.

### 7.2.5 Sloping & Large Repair

Large applications of PlexiDeck MMA PC Polymer Concrete mortar mixes may be required when pitching floors toward drains or when partial / full depth slab replacement becomes necessary. It is recommended to mix polymer concretes in conventional mortar mixes, which do not entrap air. When repairs deeper than ½" are performed, additional aggregate should be added to the polymer mortar in order to extend the yield, reduce shrinkage

and produce a mix which is more compatible with the parent concrete. A general rule of thumb is that the aggregate size should not exceed  $1/3$  the depth of the repair, i.e. a 2" repair can make use of aggregate up to  $5/8$ " in size.

The **Mixing Charts** provides complete information suggested polymer concrete mixed based on PlexiDeck MMA PC Polymer Concrete, including aggregate sizes and corresponding yields. It is critical for low resin content mixes such as these that fillers are of the proper size and proportion in order to prevent air inhibition and poor cure. Once the applicator has found a combination of sands, etc. that perform effectively in a polymer concrete formulation, it is highly recommended that this become the standard for future work.

Impromptu polymer concrete mixes designed on-site often result in problems and should be avoided.

## 8.0 COVING

### 8.0 General

Coving with PlexiDeck MMA Coving Resin is a matter of technique, since the ten minute pot life and one hour cure time apply to these applications as well.

To create the consistency required for coving, fumed silica, i.e. Aerosil 200, Cabosil 200 is required as part of the mixture. Fumed silica allows the coving mix to thicken to the proper consistency for hanging purposes. It must be understood, however, that Fumed Silica, with a tremendous surface area compared to the other fillers used with PlexiDeck MMA Coving Resin, must be dispersed and wetted properly in order to avoid air inhibition and ensure a successful application. As an example, the consistency of Batch A of coving using the proper amount of Fumed Silica dispersed for a given amount of time may appear similar to Batch B using twice as much Fumed Silica mixed for one half the time. The Fumed silica in Batch A has been wetted down properly and has no dry surfaces entrapping air within the mix. As a result, the mix will perform as needed and cure correctly. Batch B, which appears to be acceptable, actually has a "false" consistency, and the entrapped air will result in air inhibition, improper cure and a lot of wasted time. A very similar condition occurs when improperly formulated polymer concrete mixes, also with entrapped air and dry surfaces, are encountered. The concept of air inhibition does not apply to epoxies and polyurethanes, but it must be understood when working with methyl methacrylate based resins. When mixing Fumed silica to MMA resins, the best rule is to allow to wet out for approximately 24 hours prior to use.

### 8.1 Gel



To prevent problems in dispersing Fumed Silica into PlexiDeck MMA Coving Resin, the resin used for coving, it is suggested that this portion of the cove mix be prepared as a gel at the applicator's shop prior to use at the job site. It is recommended to mix the materials, allow the gel to stand for approximately 24 hours and mix a second time for optimum wetting of the Fumed Silica.

## 8.2 Mixing

The cove base coating should be mixed in small batches, 1 quart to maximum 1 gallon of PlexiDeck MMA Coving Resin at a time for efficiency. The hardener can be dispersed into the gel with a mixer and some effort; subsequently, the fillers can be added. No. 16-25 and No. 50-70 sands are both required for coving based on PlexiDeck MMA Coving Resin and can be either natural quartz aggregate or color quartz aggregate for decorative applications. Please consult our **Mixing Charts** for details on formulations and coverage rates.

## 8.3 Application

### 8.3.1 Tools

Conventional coving tools can be used for hanging PlexiDeck MMA Coving Resin mixed with aggregate. Due to the time constrictions of a ten minute pot life, application must be quick and efficient for best results. Overworking the material will cause problems in finishing and curing. Tools may be brushed with PlexiDeck MMA Cleaner if required for workability. In addition up to 5% by weight No. 70-140 silica sand can be added to the mix to reduce sticking of coving on tools.

### 8.3.2 Methods

There are several methods in which to hand coving. The easiest way involves the use of coving strips placed on and at the base of the wall. Finishing is relatively easy by using the strips as pre-set guides. For effective waterproofing, silicone caulking may be required at the vertical edge of the cove, which will seal it properly to the wall.

Duct tape placed along the wall at the desired height enables the coving to be feathered directly against the wall for a watertight seal. Pulling the tape and producing a neat edge is a technique, which is acquired over time.

Chamfer covering is quite simple to install and in many applications is satisfactory to prevent a build up of dirt along the wall edge.

## 9.0 BASECOATS

### 9.0 Self-Leveling

Self-leveling is the easiest and most labor-efficient method of installing PlexiDeck MMA-base coatings whether using PlexiDeck MMA Flexible Bodycoat. Production rates of up to 1700 ft.<sup>2</sup> / hr are possible in open areas free of obstructions.

Basecoat mixes are commonly based on 1 gal, 1.5 gal or 2 gal of PlexiDeck MMA resin at a time, to which the appropriate fillers are added, as described below. Ideal mixing containers are 5 gal. buckets.

#### 9.0.1 Pigment

Pigment is generally added first for proper dispersion. A dosage of 2-4 volume oz/gal of PlexiDeck MMA resin is normally sufficient; this amount can be reduced in subsequent batches once material builds up in the mixing buckets. A measuring cup or container with a known volume is necessary for uniformity of pigment among batches.

#### 9.0.2 Fillers

Fillers are the next ingredients to be added; in general, silica flour should be added first followed by the appropriate sand, which helps to keep dust down. The materials do not require a long mixing time; approximately one min. is sufficient. Please consult our **Mixing Charts** for details on recipes for Flexible Bodycoat and Bodycoat self-leveling mixes. If preblended PlexiDeck MMA SL Filler is used, gradually add mix to ease blending.

#### 9.0.3 Hardener

For self-leveling mixes, which are basically, resin rich, hardener should be added first and mixed then add fillers. A measuring cup is ideal for batching the hardener powder, which may require adjustments during the course of the job due to temperature variations encountered. Once again, approximately one min. of mixing is all that is required, although this is dependent on the overall batch size.

### 9.1 Application

#### 9.1.1 Gage Rake

Gage rakes allow for the high production rates mentioned previously. Although set to a required thickness, i.e. 1/8" or 3/16", the pins of the rake tend to wear, especially when used over rough substrates. It is recommended to keep several preset rakes on hand for substitution throughout the course of the basecoat application. This also allows for cleanup of the rakes at regular intervals.

When applying the basecoat, the rake should be held squarely with respect to the floor in order to ensure the correct thickness of the coating. By varying this angle, large differences in coverage rates may be encountered. In combination with the rake, a margin trowel or other small hand trowel is recommended for touch up of inaccessible areas.

#### 9.1.2 Trowel

Trowel application of self-leveling basecoats can also be accomplished with little effort.

With this technique, the material is merely moved about the floor in an even manner. The coating will often flow to the thickness of 3/16" for PlexiDeck MMA Flexible Bodycoat and 1/8" for PlexiDeck MMA Bodycoat mixes. Excessive finishing should be avoided to allow even formation of the paraffin layer on the surface of the coating and proper cure.

#### 9.1.3 Ramped Areas

Ramps in parking garages, sloped floors toward drains in food processing plants and other areas can be coated with self-leveling coatings via the addition of Sil-co-sil to the mixture to reduce or stop flow of the material. A general rule of thumbs is 2 quarts of Sil-co-sil to 1 gallon of PlexiDeck MMA. For these mixes, a roller or gage rake is normally required in order to regulate the thickness of the basecoat. Sil-co-sil should be added to the mix prior to the addition of hardener. Two thin applications may be easier in some circumstance than a single, heavier one.

#### 9.1.4 Degassing

Degassing with a porcupine roller or spiked roller is required for PlexiDeck MMA basecoats only. After raking into place, the basecoat should be treated with the porcupine roller or spiked roller in order to release any air, which has been trapped within the material, allowing for the formation of an even surface. Excessive or late rolling will result in improper formation of the paraffin layer and air inhibition as described previously.

#### 9.1.5 Broadcasting

Broadcasting of non-skid aggregates into the fresh basecoat is required for PlexiDeck MMA Flexible Bodycoat coatings and optional for PlexiDeck MMA Bodycoat coatings. A variety of materials may be used depending on the profile and degree of abrasion resistance required. In general, aluminium oxide, basalt, bauxite, emery, garnet, silica sand and silicon carbide are used for this purpose. No. 30 or larger particle size is recommended for effective broadcasting. A blend of color quartz aggregate may also be used for tweed effects. Broadcast to excess is recommended with final adjustment of the surface profile by the sealer application. Color paint chips may be used also.

#### 9.1.6 Hand Broadcasting

Broadcasting of wearing course aggregates by hand is a conventional technique. Distribution should be in a manner similar to "feeding the chickens" where the aggregate rains upon the basecoat rather than being thrown down. This will provide for a uniform appearance free of wrinkles.

#### 9.1.7 Automatic Methods

Broadcasting can be accomplished with mechanized equipment such as modified sandblasting pots, etc. manufacturer has no standard recommendations for the use of this equipment other than it should be free of contaminants and tested prior to use.

#### 9.1.8 Sweep Off

Once the basecoat has cured, often in one hour or less the excess broadcast aggregate should be removed by sweeping or for larger areas; by power brooms or sweeping equipment. The collected material can be used as broadcast for subsequent applications if free of contaminants gathered during the brooming operation.

#### 9.1.9 Trowel-On

Trowel-on coatings require slightly different installation techniques as described below. Once again, batches based on 1 gal of resin are recommended.

##### 9.1.9.1 Blending sands

A minimum of two sizes of sands is required for trowel-on basecoats using PlexiDeck MMA Flexible Bodycoat. No.16-25 and No.50-70, as with the cove base mixes, these can either be natural quartz aggregate or color quartz aggregate. For special decorative coatings, it is recommended to blend the combination of sands prior to use at the job site. Please consult a manufacturer representative for more information.

##### 9.1.9.2 Adding Hardener

For trowel-on mixes, which are higher filler content, it is necessary to add and disperse the hardener into the resin before adding any of the fillers. This will ensure proper cure of the coating.

##### 9.1.9.3 Fillers

The fillers, in this case silica sands, are added next and dispersed for approximately one minute.

##### 9.1.9.4 Applications

Many experienced epoxy contractors who are comfortable with this technique and are skilful at it prefer trowelling. An easier method involves the use of a gage rake to distribute the basecoat at a controlled thickness of 1/8" followed by finishing with a spiked roller to remove the rake marks.

## 10.0 SEALERS

## 10.0 Selection

The selection of proper PlexiDeck MMA sealer is dependent upon the following three parameters described below.

### 10.0.1 Resilient

PlexiDeck MMA Flexible Bodycoat basecoats are extremely resilient and require a flexible sealer. PlexiDeck MMA Sealcoat is recommended for these applications. For all other types of basecoats, PlexiDeck MMA Topcoat can be used. These sealers allow for easier cleaning of the installed coating.

### 10.0.2 Chemical Resistance

PlexiDeck MMA Topcoat provides the highest degree of chemical resistance of all the resin in the PlexiDeck MMA product line. This resin should not be used on PlexiDeck MMA Flexible Bodycoat basecoats due to its hard and brittle nature. In some PlexiDeck MMA Flexible Bodycoat applications, however, where increased chemical resistance is desired. PlexiDeck MMA Topcoat can be used.

### 10.0.3 Appearance

Where aesthetics are of utmost importance, i.e. in direct lighting or when light color coatings are installed, PlexiDeck MMA Sealcoat helps to reduce roller marks and provides a more uniform appearance over coatings based on PlexiDeck MMA Flexible Bodycoat. However, PlexiDeck MMA Topcoat used alone provides the highest clarity of the sealer systems.

## 10.1 Mixing

PlexiDeck MMA sealers are applied to PlexiDeck MMA basecoats, which have fully cured. They are generally mixed in 1 - 2 gallon batches at a time in 5 gal buckets.

### 10.1.1 Additives

#### 10.1.1.1 Pigment

Liquid pigments or micronized powder pigments based on synthetic metal oxides are once again the material of choice for PlexiDeck MMA sealers, which can be applied clear if desired. Liquid pigments can also be used following the recommendations given in Section 2.1.2. In general, 2- 6 volume oz. of pigment/gal of PlexiDeck MMA resin are recommended.

#### 10.1.1.2 Hardener

Hardener is added only after the pigment is satisfactorily dispersed. Dipping a mixing paddle into the sealer and checking its consistency can check this. If desired, the sealer may be

poured through fine mesh screening, thereby ensuring the removal of lumps, etc., and then catalyzed. If the sealer is to be broadcast with aggregate and backrolled, slightly less hardener should be added to allow for a longer working time.

## 10.2 Application

Brush or roller can apply PlexiDeck MMA sealers. Squeegees may be used for the more flexible sealers such as PlexiDeck MMA Flexible Bodycoat and PlexiDeck MMA Sealcoat. Professional rollers (18") are recommended, although any size can be used. In open areas, application rates of 1000 sq ft/hr/man are easily attainable. For smooth basecoats or those with a minor profile, the sealer should be poured out of the buckets and spread. For heavy non-skid surfaces use 1 gal or 2 gal batches of sealer should be prepared and applied in a dip-and-roll fashion to control the thickness. A coverage rate of 100 ft<sup>2</sup>/gal at 10-15 mils is recommended for sealer applications.

## 11.0 CLEAN UP

### 11.0 General

Tools and other items with cured resin and coating materials can be cleaned with organic solvents as described. If necessary, skin can easily be cleaned with hand cleaners containing pumice. Debris accumulated from the mixing station should be disposed of as the job progresses.

### 11.1 Drum Disposal

We recognize the problems associated with the proper disposal of empty PlexiDeck MMA resin pails and drums. Under normal circumstance, waste resin and/or coating mixtures may be polymerized with hardener into inert solids for disposal. In the case of empty containers lined with unpolymerized residue, however, empty drums should be handled with the same safety precautions as full drums; lit cigarettes, propane torches and other sources of ignition must be avoided.

We would ask that you comply with state and local disposal laws; if you require additional information on these regulations, please contact us for assistance.

## 12.0 MAINTAINANCE

### 12.0 Cleaning

PlexiDeck MMA based coatings can be easily cleaned depending on the surface profile and the type of cleaning product selected. In most cases, warm soapy water is excellent. Waxing is not required.

We have tested many industrial cleaners for compatibility with PlexiDeck MMA and have found problems with those products containing butyl cellosolve and monoethylamine, which will soften the coatings after prolonged use. Please consult our **Cleaning and Maintenance Guide** for further recommendations on specific cleaning products.

#### 12.1 Tire Marks

Tire marks may be the result of rubber build up or actual burning of the sealer on PlexiDeck MMA based floor coatings. PlexiDeck MMA is a thermoplastic material and will soften upon exposure to excessive heat, which may result from wheel spinning of overloaded and abused forklifts.

The extent of damage to a PlexiDeck MMA floor can first be evaluated by a proper cleaning with a product from our recommended list. Residual build up can then be removed with small amounts of solvent. In some cases, a new sealer application may be required.

#### 12.2 Repairs

##### 12.2.1 Restoring Non-Skid

Restoring non-skid characteristics to an older PlexiDeck MMA floor can easily be accomplished. The existing coating should be cleaned of contaminants and allowed to dry. Scarification or chemical stripping is not required under normal circumstances. A new PlexiDeck MMA sealer can then be applied seeded with aggregate and backrolled to produce a new skid resistant finish. The fresh sealer will dissolve the surface of the existing PlexiDeck MMA coating upon contact resulting in a welded bond and a monolithic floor.

##### 12.2.2 Cracks

Cracks in control joints or unforeseen reflective cracking can also be simply treated. The crack should be routed and filled with a Flexible Bodycoat as described in Section 7.2.3.